



Project Title:

A test of the effectiveness of the SafeYou program in four countries. A randomised control trial

FINAL REPORT

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EXECUTIVE SUMMARY

Objectives: Existing evidence highlights that previous interventions only moderately changed doping behavior and cognition. Several new interventions have been developed, e.g., CoachMADE, VIRTUE, ADVICE, and IPlayClean, and are promising novel interventions that may change psychosocial factors of doping and behavior. The fight against youth doping still requires updated empirical evidence and sophisticated intervention design and implementation. We sought to improve anti-doping action with the evaluation of the effectiveness of an evidence-based intervention, SafeYou program, with competitive athletes.

Method: A total of 285 athletes from Cyprus, Greece, Romania and UK took part in the study. Athletes were randomly assigned to intervention and control groups. Intervention group athletes attended the SafeYou program whereas those in the control groups viewed videos related to doping. Athletes completed measures of knowledge about doping and inadvertent doping, doping attitudes, willingness and moral disengagement, self-efficacy to resist temptations, intentions to support clean sport, doping related benefits and actual doping use in three time points, before and after the intervention and two months follow-up. The SafeYou program was shortened to six sessions (four sessions were delivered in Cyprus) and delivered online due to COVID-19 restrictions during the implementation period.

Results: The results of the analyses indicated no significant effects of the intervention on athletes' beliefs about doping in all countries. In Romania only, significant effects were found for health benefits, self-efficacy in resisting temptation, and intentions to support clean sport.

Discussion-Conclusion: Shortening and delivering the intervention online for pragmatic reasons (COVID-19 constraints) may have reduced its depth and effectiveness. Additionally, floor and ceiling effects in certain psychosocial variables may have affected the ability to detect substantial changes. The impact of preceding anti-doping education emphasizes the necessity for customized intervention designs. To maximize doping prevention awareness, attitudes, and behaviors, participants' pre-existing knowledge must be acknowledged. Recognizing and addressing these challenges is essential for improving intervention designs and choosing the right information to target athlete psychological characteristics for doping prevention.



COVID-19 restrictions limited the SAFEYOU intervention, but researchers, anti-doping authorities, and stakeholders might enhance future intervention design and implementation by addressing these limitations.



INTRODUCTION

Despite efforts to control and prevent such behavior, the continued use of doping in sports poses a continuing challenge to the concepts of sportsmanship and equal standards. This is the case despite the fact that these efforts are ongoing. Doping is knowingly engaged in by a sizeable fraction of elite athletes, with estimates ranging from 14% to 39% of those athletes participating (De Hon et al., 2015), as stated in a recent analysis of the relevant research. In addition, research conducted using techniques of indirect questioning have found percentages of doping prevalence among elite athletes can reach above 50% (Gleaves et al., 2021; Ulrich et al., 2018). Official reports based on doping controls reveal that prevalence rates are lower than 2%. Therefore, it seems that prevalence of doping in sports varies significantly across different countries, sports disciplines, athlete populations and estimation methods (see Petroczi et al., 2022). These variations make it challenging to establish a definitive prevalence rate.

Determinants of doping use

In the past two decades, WADA has provided significant backing for social science research on doping use, resulting in the publication of over 200 peer-reviewed research articles that examine various psychosocial processes and risk factors associated with doping use (Arandjelovic, 2015; Barnes et al., 2022; Blank et al., 2016; Nicholls et al., 2017; Ntoumanis et al., 2014).

Personality traits

Nicholls et al. (2017) aimed to investigate the correlation between personality traits and more specifically the "Dark Triad", and doping attitudes among amateur and professional athletes. They demonstrated that there exists a positive correlation between Machiavellianism and psychopathy with favorable attitudes towards the use of doping substances. The authors posited that the utilization of performance-enhancing substances is indicative of "reckless" conduct, which is a salient characteristic of psychopathy, but not narcissism.

An alternative avenue of inquiry has directed attention towards the function of perfectionism in the manifestation of doping conduct. Perfectionism has been linked to various aspects of sports behavior, such as confidence, achievement goals, responses to stress and competitive anxiety, and sport performance, within the sports

context (Stoeber, 2011; Stoll et al., 2008). The study conducted by Zuchetti et al. (2015) revealed a positive correlation between elevated scores in the Perfectionism in Sport Scale and favorable attitudes towards doping use. Madigan et al. (2015) conducted a study utilizing a multidimensional approach to perfectionism and revealed a positive correlation between parental pressure to attain perfection and favorable attitudes towards using doping substances. The collective results of Madigan et al.'s (2015) study indicate that perfectionism may serve as both a potential hazard and safeguard against the use of prohibited drugs.

Furthermore, the study conducted by Madigan et al. (2020) employed a meta-analytic approach to examine the relationship between various dimensions of perfectionism and attitudes towards doping. The findings of this study revealed that different aspects of perfectionism exhibit distinct associations with doping attitudes. Specifically, the results demonstrated a robust positive correlation between evaluative concerns perfectionism and attitudes towards doping. Furthermore, athletes who possess high levels of evaluative concerns perfectionism and low levels of personal standards perfectionism are particularly susceptible to engaging in doping behaviors.

Chan et al. (2015) investigated the correlation between individual variations in self-control, attitudes, and intentions towards the use of doping. The study's findings indicate that there exists a negative correlation between trait self-control and both attitudes and intentions towards doping use. Conversely, a positive correlation was observed between trait self-control and both doping avoidance intentions and behavior. The trait of self-control was found to be a significant predictor of both refraining from taking the lollipop and taking it but not consuming it among the participants. The study conducted by Sagoe et al. (2016) involved the assessment of personality traits using the Big Five model of personality, as reported by the participants. The study revealed that athletes who consumed banned performance and image enhancing drugs (PAEDs), were perceived to exhibit higher levels of neuroticism, lower levels of openness to experience, and lower levels of agreeableness compared to those who consumed nutritional supplements or refrained from using ergogenic substances. In this line Nicholls et al. (2020) found that there was a positive relationship between psychopathy and narcissism with attitudes towards doping. The Dark Triad exhibited significant association with attitudes towards doping and cheating behavior within the realm of athletics.

Motivational variables

In the doping context, two primary theories pertaining to sport motivation have been employed, namely self-determination theory (Deci & Ryan, 1985, 2010) and achievement goal theory (Nicholls, 1989). Barkoukis et al. (2011) indicated that athletes who scored higher in intrinsic motivation exhibited a significant decrease in their future intentions to use prohibited performance and image enhancing drugs (PAEDs) and had a lower history of using doping substances, in comparison to athletes who were extrinsically motivated or amotivated. However, in subsequent research, after controlling for other variables in the analysis, it was found that self-determination profiles were not linked to doping intentions and self-reported doping use in both adolescent and adult elite athletes (Barkoukis et al., 2013; Lazuras et al., 2015). Hodge et al. (2013) presented various results indicating that individuals with low self-determination exhibited a positive correlation with favorable attitudes and increased susceptibility towards doping use. Zucchetti et al. (2015) demonstrated that athletes who were motivated by external factors exhibited more positive attitudes towards doping use.

Another avenue of inquiry in the realm of self-determination theory has explored the impact of social-contextual factors, specifically motivational climate, on individuals' attitudes and intentions towards the use of banned performance-enhancing drugs (PAEDs). Ntoumanis et al. (2017) conducted a study which revealed that the provision of autonomy supportive climate had a positive effect, while controlling climate had a negative effect on the intentions of Greek and Australian athletes to use doping substances. The study found that there was a negative correlation between the fulfillment of needs and the intention to use doping substances. Conversely, there was a positive correlation between needs frustration and the intention to use such substances. Similarly, ego-oriented climate was positively associated with doping intentions, while the effect the association of task climate was negative (Guo et al., 2021).

Studies conducted through the lens of the achievement goal theory (AGT) have yielded noteworthy outcomes. Allen et al. (2015) indicated that task orientation had a negative association, while ego orientation had a positive association, with favorable attitudes towards doping use. Barkoukis et al. (2011) demonstrated that Greek athletes who were oriented towards mastery exhibited notably reduced scores

in terms of self-reported prior usage of doping substances and future intentions for doping. Furthermore, Barkoukis et al. (2013) indicated that performance-avoidance goals had a positive association with the intention to use PAEDs, while mastery-approach goals had a negative association. On the contrary, athletes who self-reported previous doping usage and endorsed mastery-avoidance goals demonstrated a greater inclination for doping. Lazuras et al. (2015) reported that mastery-approach goals had a negative correlation with intentions to use doping. Hardwick et al. (2020) found that task orientation mediated the negative effects of perfectionism on doping attitudes whereas ego orientation the positive ones. With respect to motivational climate, ego-oriented climate was positively associated with doping intentions, while the effect the association of task climate was negative (Guo et al., 2021). In the same vein, Mwangi et al. (2019) indicated that ego climate was the most significant predictor of attitudes towards doping

Morality

Doping practices are in contradiction with several sport values, including ethics, fair play and honesty, health, respect for rules and laws, and respect for self and other participants (WADA, 2015). The examination of morality and moral reasoning in relation to the use of performance and appearance enhancing drugs (PAEDs) has primarily focused on the domains of sportsmanship and moral disengagement. Barkoukis et al. (2011) indicated that there was no significant correlation between the sportspersonship profiles of athletes and their self-reported history of doping, nor their intentions to dope in the future. However, previous research has indicated that Greek elite athletes with lower levels of sportsmanship are more likely to have stronger intentions to dope. This was particularly evident among athletes who had no prior experience with PAEDs (Barkoukis et al., 2013; Lazuras et al., 2015).

With respect to moral disengagement, Lucidi et al. (2004, 2008) revealed a significant correlation between moral disengagement and doping intention. Hodge et al. (2013) and Garcia-Grimau et al. (2022) highlighted the significant correlation between moral disengagement and positive attitudes towards doping use among athletes. Furthermore, Mallia et al. (2016) noted that moral disengagement was significantly associated with increased doping intentions among an international sample of young athletes from Germany, Italy, and Greece. Similarly, moral

disengagement was significant predictor of doping likelihood Boardley et al. (2017) and Girelli et al. (2020) suggested that moral disengagement was linked to doping attitudes and use among both competitive and amateur athletes and exercisers, regardless of gender, countries and sport type.

Affective determinants of doping

Scholars in the field of decision-making have engaged in a longstanding debate regarding the significance and impact of emotions on the decision-making process (Lerner et al., 2015). Additionally, research has indicated that the anticipation of emotions, particularly regret, can affect the processes of intention-formation and action-initiation as outlined in the reasoned action approach (Brewer et al., 2016; Sandberg et al., 2016). The existing body of literature pertaining to the psychological determinants of doping use has predominantly centered on the correlation between the expectation of regret and guilt and doping intentions.

Bloodworth and McNamee (2010) revealed that the emotion of shame was identified as a noteworthy barrier to doping use. Kavussanu and Ring (2017) indicated a modest to moderate correlation between guilt and doping likelihood. The significance of anticipated regret in forecasting doping intentions was underscored by Lazuras and his associates in 2015 and 2017. The study conducted by Lazuras et al. (2015) revealed that the anticipated regret resulting from doping use was a significant predictor of the intention to use such substances. Specifically, individuals who exhibited higher levels of anticipated regret were less likely to intend to use prohibited PAEDs. Lazuras et al. (2017) conducted a follow-up investigation and discovered that the anticipation of regret was a significant predictor of intentions to engage in doping, even after accounting for the influence of other predictors. Overall, anticipated regret has been consistently found to be associated with proxies of doping (Kavussanu et al., 2020; Petrou et al., 2022; Ring & Hurst, 2019).

Social cognitive determinants of doping

It is widely agreed upon that doping use is a deliberate, intentional, and purpose-driven behavior (Petróczi & Aidman, 2008). Individuals who engage in physical activity and sports and utilize performance and appearance enhancing drugs (PAEDs) typically do not do so impulsively or in response to external social pressures, but rather with premeditation and strategic planning. Obtaining, acquiring,



and utilizing prohibited substances is a complex process. The Theory of Planned Behavior (TPB) has been extensively utilized to forecast athletes' behavior towards doping.

The meta-analysis undertaken by Ntoumanis et al. (2014) encompassed a total of 63 studies that examined the relationship between doping intentions and behavior. The findings revealed that the Theory of Planned Behavior (TPB) served as the predominant theoretical framework employed in the conducted investigations. Furthermore, it was found that perceived social norms and attitudes play a significant role in shaping individuals' intents and behaviors related to doping. According to the findings of Ntoumanis et al. (2014), there were strong negative connections observed between self-efficacy to resist doping, moral values, and the intention and behavior associated with the use of performance and appearance enhancing drugs (PAEDs). In their studies, Lucidi et al. (2004, 2008) utilized an enhanced version of the Theory of Planned Behavior (TPB) that integrated moral disengagement and prior usage of nutritional supplements alongside attitudes, subjective norms, and perceived behavioral control. According to the findings of Lucidi et al. (2004), it was indicated that all of the characteristics included in the study were found to be statistically significant predictors of individuals' intentions to engage in doping behavior. The results of the longitudinal analysis indicated a substantial correlation between the propensity for doping and favorable attitudes and social norms, decreased efficacy in resisting social pressures to use performance and appearance enhancing drugs (PAEDs), and increased moral justification for the use of PAEDs. Furthermore, Lazuras et al. (2010) revealed that all social cognitive variables under consideration exhibited a significant association with doping likelihood. Additionally, the influence of subjective and descriptive norms on the intention to use doping substances was found to be mediated by situational temptation. Overall, norms and self-regulatory efficacy have been considered as important determinants of doping cognition and actual behavior (Garcia-Grimau, et al., 2022; Girelli et al., 2020; Petrou et al., 2022).

Recent research has differentiated between proximal and distal predictors of doping intentions, drawing on Fishbein's (2006, 2009) Integrative Model of behavioral prediction. The proximal predictors of behavior encompass the social cognitive precursors of intentions, such as attitudes, social norms, and perceived behavioral control. On the other hand, the distal predictors of behavior comprise demographic characteristics, moods and affectivity, personality, and individual



differences that are pertinent to the behavior under consideration. Barkoukis and colleagues (2013) examined an integrative model in a cohort of elite competitive athletes and found that the impact of achievement goals and sportspersonship on athletes in both groups was mediated by attitudes, social norms, and perceived behavioral control/situational temptation. Lazuras et al. (2015) conducted a study on adolescent competitive athletes to further apply this model. The study revealed that situational temptation played a mediating role in the relationship between achievement goals and doping intentions. Overall, the existing body of literature indicates that doping intentions and actual usage are consistently predicted by attitudes, social norms, and self-efficacy pertaining to doping use, regardless of age groups and sporting levels.

Need for anti-doping interventions

The sustained viability of sport and the public's trust in it are directly proportional to how honestly and fairly it is played. Nevertheless, the ongoing problem of doping poses a danger to these fundamental principles. Anti-doping interventions, as part of broader anti-doping policies, can maintain the integrity of sport, protect the rights and health of athletes, and provide a level playing field if they are designed to meet this need (Barkoukis, 2015). More specifically, anti-doping interventions can assist in:

- a) *Preserving the Integrity of Sport:* The practice of doping undermines the principle of fair competition since it gives individuals who engage in doping activities an unfair advantage. Athletes who make the decision to compete in a clean manner are at a competitive disadvantage when compared to their peers who choose to artificially boost their performance. It is essential to implement anti-doping measures in order to keep all competitors on an equal playing field and guarantee that the winners of events are selected by a combination of talent, skill, and determination rather than by the use of illegal drugs or techniques (Barkoukis et al., 2016).
- b) *Protecting the Confidence of Spectators:* Doping scandals damage the public's trust in sporting events. The authenticity and credibility of sporting events suffers as a result of the public's growing suspicion that athletes are receiving an unfair advantage through the use of performance-enhancing drugs. It is vital to implement anti-doping measures in order to maintain the trust and enthusiasm of spectators, as well as to

encourage their continuous participation in and support of sports that are clean and fair (Sipavičiūtė et al., 2020).

c) *Safeguarding the Rights and Health of Athletes:* Athletes who dope put themselves at substantial danger of developing a variety of serious health conditions, including cardiovascular problems, organ damage, hormonal imbalances, and psychological difficulties. Interventions aimed at combating doping play an essential part in preserving the physical and mental health of athletes by discouraging the use of potentially dangerous substances and promoting the adoption of drug-free training practices. Anti-doping procedures, which place an emphasis on athletes' health as a top priority, contribute to the longevity and sustainability of athletes' careers (Woolf, 2020; Zhumabayeva et al., 2022).

d) *Upholding the Rights of Athletes:* Athletes have the right to compete in a setting that is free from the pressure to engage in doping activities and that is also a setting that is clean and safe. Interventions aimed at preventing doping in sport serve to defend athletes' rights by offering a structure that safeguards athletes' integrity, makes certain that they are treated fairly, and ensures that all athletes have equal access to opportunities. Anti-doping measures safeguard the rights and dignity of athletes at all levels of competition by cultivating a culture of clean sport. This is true regardless of the type of competition (Zhumabayeva et al., 2022).

e) *Educating Athletes and Shaping Their Behavior:* The implementation of anti-doping programs, particularly education initiatives, is critical to the development of moral principles, the encouragement of good sportsmanship, and the promotion of responsible decision-making on the part of athletes. Athletes are given the ability to make educated decisions that are in line with the ideals of fair play, respect, and integrity as a result of these interventions, which raise awareness about the repercussions of doping as well as the ethical implications of doing so (Barkoukis et al., 2016). Athletes, in general, and aspiring athletes in particular can look up to them as role models because of the positive examples they set in their sports. By putting an emphasis on clean sports, ethical behavior, and the pursuit of excellence by natural means, anti-doping initiatives play a crucial role in the process of building positive role models for athletes. Anti-doping campaigns motivate future generations of athletes to prioritize integrity and ethical principles in their athletic endeavours by promoting clean and fair sport.

There is an undeniable and compelling necessity for anti-doping actions. These interventions are necessary in order to protect athlete health and rights, maintain the sport's integrity, and advance ethical principles. This ensures that athletes may compete on an even playing field and that the spirit of sport is preserved for future generations.

Existing anti-doping interventions

DiClemente et al. (2009) asserted that interventions aimed at transforming unhealthy lifestyles and maladaptive behaviors into healthier and more adaptive ones must be informed and guided by current behavioral and social science research. Backhouse et al. (2009) have contended that the primary objective of anti-doping education is to establish a body of evidence that facilitates the identification, implementation, and assessment of the essential components required for effective doping prevention education. In order to achieve this objective, an abridged synopsis of pertinent discoveries derived from social scientific investigations on the utilization of performance-enhancing substances is initially provided.

The ATLAS and ATHENA programs

ATLAS and ATHENA are two anti-doping interventions that have undergone extensive research, as noted by Elliot et al. (2008) and Goldberg & Elliot (2005). The study conducted by Ntoumanis and colleagues (2014) revealed that the ATLAS/ATHENA program has demonstrated a moderate level of efficacy in altering pro-doping beliefs and attitudes. This outcome can be attributed to various factors, including the delivery mode of the program, which involves a time-consuming approach and multiple classroom-based lectures that require the participation of coaches and peers. Additionally, the program's exclusive focus on anabolic steroids may have contributed to its effectiveness. It is imperative to acknowledge the limitations of ATLAS/ATHENA despite their significance and influence. Initially, it is noteworthy that at the time of the development and execution of the interventions in question (Goldberg et al., 1996), the existing body of research on doping usage was relatively restricted and failed to account for the diverse array of risk factors that have since been examined in more current investigations. The intervention's content was predominantly influenced by research that primarily focused on the utilization of anabolic steroids. Currently, there has been a proliferation of doping techniques,

rendering a limited emphasis on steroid utilization as outdated. The ATLAS/ATHENA programs created educational materials and evaluated their effectiveness by measuring the knowledge and attitudes of individuals regarding the use of steroids. The extant literature on the doping decision-making process, as evidenced by studies conducted by Barkoukis et al. (2013), Lazuras et al. (2010, 2015), Mallia et al. (2016), and Ntoumanis et al. (2017), posits that the doping decision-making process is influenced by factors beyond mere knowledge and attitudes. Specifically, moral disengagement and self-efficacy, which refers to one's ability to resist doping under specific circumstances, are deemed to be more salient variables in shaping the doping decision-making process. As of present, the incorporation of this empirical evidence has not been observed, neither within the ATLAS/ATHENA framework nor in other recognized anti-doping interventions. Furthermore, as previously stated, at the time of the development of ATLAS/ATHENA, the prevalence of web applications and online interventions was negligible. According to Valkenburg and Peter (2007), a significant proportion of young individuals in Europe and other developed nations utilize online applications and emerging information and communication technologies (ICTs) to exchange experiences, establish connections with others, and establish or sustain new social relationships. The integration of emerging information and communication technologies (ICTs) into educational curricula has become increasingly prevalent. This is done with the aim of supplementing conventional teaching methods in schools and improving the quality of teaching and learning experiences. This has been noted by scholars such as Greenhow et al. (2009) and Leu et al. (2004). It is evident that there exists a necessity to integrate contemporary Information and Communication Technologies (ICTs) trends into anti-doping interventions to ensure that the dissemination of information is prompt and pertinent to the requirements and encounters of the designated audience.

The ADEL program

The World Anti-Doping Agency (WADA) is responsible for the provision of the global Anti-Doping Education and Learning platform, known as ADEL. Various stakeholders, including athletes, coaches, and anti-doping organizations, can access a wide array of online materials upon registering with the website. These resources pertain to clean sport education and anti-doping initiatives. The ADEL platform

encompasses several components, such as eLearning modules, materials tailored for athletes, resources designed for athlete support workers, quizzes, films, and webinars. Specialized educational programs have been implemented to cater to the needs of athletes, athlete support workers, anti-doping practitioners, and educators. These programs have been specifically designed to address the unique requirements of each group, providing them with the necessary knowledge and skills to excel in their respective fields.

The ADVICE program

The primary objective of the ADVICE project, which is co-funded by the Erasmus+ Program of the European Union, is to offer coach education programs specifically designed for grassroots coaches. The interactive smartphone application, ADVICE, was developed with the aim of assisting coaches in analyzing their perspectives on various conditions they may encounter, as well as mitigating the occurrence of doping among young athletes engaged in grassroots sports. The application is comprised of various important modules that cover a variety of subject areas, including "fair play," "substances," "supplements," "rules," and "support." Nicholls et al., (2020a) indicated that the intervention improved the coaches' understanding of doping and also reduced the number of coaches in the experimental arm who had favorable views about doping. The ADVICE mobile application is considered to provide a practical means of disseminating information to grassroots coaches about prohibited substances and the possible adverse effects of doping, as well as strengthening the coaches' existing knowledge of these topics (Nicholls et al., 2020a).

The ANTI-DIF program

The ANTI-DIF educational program aims to educate football players about doping through 10 animated videos that address key issues of anti-doping such as health and ethical consideration related to doping use, the Spirit of Sport, checking medication, address body image and body stereotypes and dealing with pressure to dope (Skoufa et al., 2022).



Coaches' Sport Integrity (CSI) course

This program titled 'Coaches and Sport Integrity' addresses the ethical challenges and risks that modern sport coaches encounter, which pose threats to the integrity of sport at both grassroots and competitive levels. The primary objective of the program is to foster and facilitate the implementation of effective governance practices in the realm of sports, while also promoting inclusivity and providing fair chances for all individuals involved. Additionally, the program aims to enhance the knowledge and awareness of coaches and educators on the many risks and implications associated with activities such as doping, match-fixing, and anti-social behavior. The primary objective of CSI is to equip educators and coaches with the necessary information, competencies, and proficiencies to effectively confront the diverse forms of intolerance and prejudice prevalent within the realm of sports. The program involves a new academic curriculum that gives pre-service and in-service coaches the option of finishing one of two courses (long or short courses) that have both been produced utilizing up-to-date and cutting-edge theory.

The DELTS program

The Doping E-learning Tools (DELTS) program assesses the efficacy and reception of several e-learning modules focused on performance and image enhancing drugs (PIEDs) among healthcare professionals and fitness personnel. The primary focus of these modules is the phenomenon of doping in the context of athletic competition. This program possesses the capacity to boost clinical results as it focuses on the enhancement of best practices in healthcare through the utilization of e-learning tools. These tools offer targeted interventions aimed at providing improved health education and counseling. The DELTS curriculum comprises two distinct online learning modules. The first one is aimed towards people working in the medical field, and the second one is for people in the fitness industry (Barkoukis et al., 2022).

The GAME serious game

The need to enhance and alter anti-doping education is one that GAME aims to address by providing a new form of anti-doping education resource. To combat the use of performance-enhancing drugs in leisure and competitive sports, GAME focuses specifically on reaching out to young amateur and elite athletes. The project offers a

novel and influential gamified strategy for educational intervention, which has a broader reach compared to traditional anti-doping programs. This is accomplished through the utilization of cutting-edge pedagogies, research from the most recent years in the social and behavioral sciences, as well as gaming design and technology at the cutting edge. The game, which is fun to play and simple to understand, places players in realistic scenarios designed to get them thinking about their anti-doping knowledge and how they would respond in scenarios involving the possible use of drugs. After the players have determined whether they are "amateurs" or "elites," the game presents them with one of five scenarios, each of which tells a different tale. The game's five levels correspond to various learning markers (knowledge, self-efficacy, moral displacement, awareness, and attitudes), and each scenario reflects a different level of difficulty. The participants are required to make significant choices throughout the course of the game in order to achieve high score.

iPlayClean

iPlayClean is an innovative anti-doping education program that engages users by providing them with information, films, and questions that cause them to think deeply about the topic. The primary objective of the program is to disseminate information to high-level athletes between the ages of 14 and 18, as well as to their coaches and parents. iPlayClean is a website that focuses on the issue of performance enhancing drugs, and it provides a number of different tactics that are geared toward assisting athletes in making appropriate choices regarding their participation in sporting events. The informational resource is broken up into two parts: the first addresses the ways in which parents and coaches may make the most of the sports environment and foster partnerships, and the second discusses the ways in which athletes can make informed decisions, gain an awareness of nutritional supplements, and investigate the myths that surround doping. The component of the resource geared toward parents and coaches is comprised of three sections, in addition to supplementary links to other resources. There are ten different modules that make up the athletes area, and nine of them have short videos that center on important fictional characters (Nicholls et al., 2020b).

I Run Clean

I Run Clean is the most recent anti-doping education campaign and knowledge base to be developed by European Athletics. The program provides participants with access to a cutting-edge online learning platform in order to assist them in their efforts to combat the use of illegal drugs. This assistance is offered to sports enthusiasts as well as professional athletes. As a result of the resource being built in collaboration with athletes and specialists in the field of sport, it is both interesting and simple to make use of. I Run Clean is organized into eight different sections, which are titled ‘decisions,’ ‘prohibited substances,’ ‘health consequences,’ ‘control procedures,’ ‘rule violations,’ ‘whereabouts procedures,’ ‘therapeutic use exemptions,’ and ‘dietary supplements.’ These sections provide users with the necessary information and knowledge to make informed decisions, safeguard their well-being, and prevent any breaches of anti-doping legislation.

The Values and Individual Responsibility Training to Uphold Ethics in Sport (VIRTUE) program

Doping prevention is the primary focus of the VIRTUE program, which is an anti-doping initiative designed specifically for young athletes between the ages of 16 and 22. The intervention is centered on the hypothesis that existing anti-doping education resources place an excessive amount of emphasis on the hazardous effects of drug usage on a person's health. In response to this worry, the purpose of this program is to take action by concentrating on the psychological and ethical aspects that are known to be connected with the use of performance-enhancing drugs by athletes. The program focuses on two psychological variables that have been discovered as essential determinants of doping intervention. These variables are self-regulatory efficacy and moral disengagement. Both of these factors have been studied extensively. An in-person version and a web-based application are included in the finished product of the educational resource (Kavussanu et al., 2022).

The 100% Me program

The United Kingdom Anti-Doping Agency (UKAD) created the ‘100% me’ values-based clean sport education initiative with the intention of assisting athletes at every stage of their athletic careers. Athletes are given tools to make educated

decisions about playing clean sports through an education program that is founded on the principles of passion, respect, integrity, determination and enjoyment.

The Hercules program

The program includes theoretical instruction and supervised strength training exercises. The theoretical education include four sessions of ninety minutes providing an overview of the essential concepts underlying exercise and strength training, the fundamentals of strength training, the acceptable and adequate nutrition behaviors and food supplementation, and ethics of sports, anti-doping, anabolic steroids and their consequences, and how to resist peer pressure. The strength training includes twelve sessions of guided and monitored strength training activities. According to Sagoe et al. (2016), the program has demonstrated its efficacy in imparting knowledge to teenagers regarding anabolic steroids and their detrimental effects, as well as equipping them with beneficial strength training abilities.

CoachMADE

CoachMADE is an educational program aiming to educate coaches on the appropriate ways to communicate with their athletes when it comes to doping. Its primary objective is to create educational materials that enable coaches to cultivate and employ a suitable motivating and interactional environment while addressing drug-related matters with their athletes. The intervention program comprises two seminars that specifically address the growing necessity for coaches to develop supportive communication strategies for their athletes, both in general interactions and specifically in relation to doping-related matters such as the testing of prohibited substances in medications (Ntoumanis et al., 2021).

VIRAL

The VIRAL intervention, similar to TARGET, is designed to employ novel technology, i.e., virtual reality, in order to educate athletes and facilitate their ability to make well-informed decisions on doping (Barkoukis et al., 2021).



Other educational programs and anti-doping interventions

Barkoukis et al. (2016) devised and assessed a school-centered program that targeted the utilization of performance enhancing drugs in sport. The intervention comprised of ten active learning and co-creation sessions that were led by peers. These sessions involved participants in various investigative, decision-making, and problem-solving activities that pertained to nutritional supplements and doping. Barkoukis et al. (2016) found that the intervention implemented was successful in altering the attitudes of students towards the utilization of nutritional supplements. Additionally, it was observed that the intervention led to an increase in the prominence of norms concerning the use of nutritional supplements and prohibited performance and image-enhancing drugs (PAEDs) in sports, a greater inclination towards the values encompassed in the spirit of sport, and regarded health promotion as the most crucial value associated with sports.

James et al. (2010) devised and assessed an intervention aimed at increasing awareness regarding the use of performance and image enhancing drugs (PAEDs) in non-professional sports. The intervention included educational materials and communication regarding the benefits of healthy nutrition as a safe alternative for doping. The study revealed that a solitary exposure to the information led to a rise in the participants' comprehension of healthy nutrition and a favorable shift in their attitudes towards healthy nutrition, in contrast to the control group participants.

Melzer et al. (2010) devised an intervention that prioritized ethical decision-making as a means of mitigating the likelihood of athletes engaging in the use of performance and appearance enhancing drugs (PAEDs). The study's intervention comprised of six online sessions, each consisting of three dilemmas, aimed at enhancing moral reasoning and ethical decision-making abilities. In their study, Elbe and Brand (2015) did not provide substantiating evidence to suggest that ethical decision-making was more effective than raising awareness regarding the health implications associated with the use of performance and image enhancing drugs (PAEDs).

The Strengthening the Anti-Doping Fight in Fitness & Exercise in Youth (SafeYou) program

The SAFE YOU Anti-Doping Education Program is an educational resource that has been created through the collaborative efforts of academic experts, anti-



doping practitioners, and policy-makers across five European countries. It is based on research and theory and was developed within the framework of Erasmus+ Sport funding from the European Commission between 2015-2019. The SAFE YOU Anti-Doping Education Program has been collaboratively developed with athletes from the countries involved, providing a practical and authentic perspective on doping in sports. This approach is comparable to that of WADA's ADeL and its precursor, ALPHA. The SAFE YOU Anti-Doping Education Program employs a comprehensive strategy to advance the cause of fair play in sports. At the initial stage, the program aims to achieve three fundamental objectives related to anti-doping education: firstly, to acquire knowledge about doping; secondly, to make informed decisions regarding doping; and thirdly, to serve as a role model for others by exemplifying the principles of "clean sport champion". The program's second level encompasses various themes that enable the attainment of specific learning outcomes. These include the cultivation of vigilance and awareness regarding doping and anti-doping regulations, as well as the potential repercussions of doping use and anti-doping rule violations (ADRVs). Additionally, the program aims to equip individuals with the necessary skills to manage pressures to engage in doping, while also promoting the development of resilience skills to facilitate informed and safe decision-making regarding doping use. Lastly, the program emphasizes the importance of fostering a sense of social responsibility and leadership among participants. The aforementioned themes are encompassed by a wide-ranging array of learning resources and activities, both online and offline, that can be administered either as a collective or as independent sessions. These resources comprise of problem-based learning scenarios, athlete case studies, a mobile information application, and an interactive video that heightens awareness regarding the three outcomes, namely Knowing, Deciding, and Leading.

The resources presented have been formulated based on empirical research conducted on the psychological mechanisms that underlie the use of performance-enhancing drugs. This research has been conducted by scholars such as Elbe and Barkoukis (2017), Lazuras et al. (2015), Ntoumanis et al. (2014), and Petroczi (2013a, 2013b). Additionally, the resources have been developed with the direct involvement of athletes from five different countries (namely, Greece, UK, Italy, Germany, and Cyprus) through co-creation workshops that were conducted as part of the SAFE YOU project. The present study has resulted in the development of a distinctive and adaptable anti-doping educational initiative that acknowledges the various factors that



impact doping conduct, including social, political, economic, and psychological influences. The program's guiding principle, "know your body, know your substances, know your rules," underscores the significance of acquiring knowledge about enhancing performance through legitimate methods and consistently adhering to anti-doping statutes and guidelines. The Anti-Doping Education Program known as SAFE YOU acknowledges that the decision to use doping is not a binary choice, but rather exists on a spectrum where individuals make their own decisions.

The SAFE YOU Programme comprises a meticulously designed assemblage of instructional materials and informational resources. The primary objective of the project is to enhance individual empowerment by offering coaches and teachers access to valuable and applicable sources of information, hence facilitating a profound learning experience. The available resources are diverse and designed to accommodate various learning requirements. Educators and coaches have access to a range of materials, including video stimuli, comprehensive case studies, structured workshop activities, web-based information sources, a mobile application (Play Safe) for accessing information, pertinent research papers, customized assessments, and an extensive guide on SAFEYOU. The Play Safe application is accessible in various languages and effectively involves users in a profoundly immersive interactive encounter.

Aim of the project

To date, there has been a restricted amount of research conducted on the efficacy of interventions aimed at anti-doping education. The majority of the research that has been published has concentrated on the ATLAS and ATHENA interventions. These interventions, which were developed to discourage the use of performance-enhancing substances, including legal ergogenic aids and anabolic steroids, have been extensively studied. Relevant sources include Goldberg and Elliot (2005), Goldberg et al. (1996), Goldberg et al. (2000), and Elliot et al. (2008). The interventions are led by peers and facilitated by coaches, and are administered through a sequence of lectures that are tailored to the specific needs of female and male athletes (e.g., male participants receive greater emphasis on muscularity, while the pursuit of thinness is addressed among female participants). The dissemination of information pertaining to the adverse effects of doping, hazards associated with the imprudent and excessive consumption of nutritional supplements, and the availability of alternative and lawful

methods for enhancing performance such as adherence to specific dietary and training regimens, are communicated to the intended audience (Bahrke, 2012; Goldberg & Elliot, 2005). Despite the efficacy of ATLAS/ATHENA in altering attitudes and predispositions towards doping, a meta-analysis conducted by Ntoumanis et al. (2014) revealed that the magnitudes of the effects reported in the extant literature were relatively small. In addition, the delivery method employed by ATLAS/ATHENA may be deemed obsolete due to its exclusive reliance on in-person, traditional classroom-based communication, which fails to incorporate the benefits and advancements of modern pedagogical techniques, including technology-enhanced learning and active learning. In recent times, scholarly research has documented the efficacy of interventions implemented in schools (Barkoukis et al., 2016; Lucidi et al., 2017) aimed at enhancing the attitudes of adolescents towards the use of doping in Greece and Italy. However, these interventions were conducted on a sample of the general population and did not consider the intricacies of doping behavior, such as the dynamic versus categorical nature of doping, in the context of competitive sports. Furthermore, Bates et al. (2019) indicated that existing interventions were only modestly effective in changing doping behavior. Recently, several more interventions have been developed and tested. These new interventions, such as CoachMADE, VIRTUE, ADVICE and IPlayClean have been developed and showed promise in altering the psychosocial determinants of the decision to dope and potentially actual behavior.

Nevertheless, there is still the need for the integration of updated empirical evidence and modern trends in intervention design and delivery into the fight against doping among young athletes. Building on previous evidence we aimed to further improve the anti-doping intervention paradigm. As Sipaviciute et al. (2020) noted interventions increasing athletes' critical thinking and altering their beliefs system are expected to be more effective. This is achieved by testing the effectiveness of an evidence-based, innovative and co-created preventive intervention that addresses explicit and implicit psychosocial processes, and utilizes contemporary ICTs and evidence-based approaches for the delivery of intervention messages.

The project was designed to investigate the following Research Questions (RQ):



RQ1: Knowing - Will athletes who attend the SAFE YOU Anti-doping Education Program report greater awareness of and knowledge of the consequences of doping and ADRVs?

RQ2: Deciding - Will athletes who attend the SAFE YOU Anti-doping Education Program report greater scores in self-efficacy and coping skills to resist doping use in given situations?

RQ3: Leading - Will athletes who attend the SAFE YOU Anti-doping Education Program report greater self-efficacy to be clean sport champions and set the example for others?

Based on the aforementioned literature and consistent with our research questions we formulated the following hypotheses:

Hypothesis 1: Young athletes in the intervention group will report greater awareness and knowledge about doping, as compared to control group participants.

Hypothesis 2: Young athletes in the intervention group will report higher scores in psychological and coping skills relevant to resisting doping pressures, as compared to control group participants.

Hypothesis 3: Young athletes in the intervention group will report lower scores in future doping likelihood and intentions, as compared to control group participants.

Hypothesis 4: Young athletes in the intervention group will report greater readiness to support clean sport initiatives, report doping and become clean sport champions, as compared to control group participants.



METHOD

Sample size and eligibility criteria: A priori calculation of the required sample size (analysis of variance with repeated measures, anticipated 3 time measurements, 2 groups, power = .95, α =.05, ϵ =1.00, effect size $f = .30$) indicated a total sample size of $n = 32$. To achieve the required sample size and account for possible drop out during the intervention each group (intervention vs control) consisted of 40 participants. To facilitate the application of the intervention and avoid high attrition rates, the team (in team sports) and the coach (in individual sports) would be the selection unit; all the athletes of a team or a specific coach would be included in either the intervention or control groups. Eligible participants should participate systematically in trainings (4-5 times per/week) and in national competitions. The age span of participants ranged from 16 to 25 years.

Research design

In accordance with the guidelines of the Open Science Framework (<http://osf.io>), the hypotheses, methods, and design of the project have been registered to Open Science Framework (<https://osf.io/p6fq4/>) prior to the beginning of data collection. The implementation of the project coincided with the COVID-19 pandemic and the associated restrictions in sport and exercise. This resulted in the adaptation of the research protocol to meet the requirements in each partner country. An effort was made for consistent application of the research protocol but there were small deviations in each country. Therefore the Methods and Results sections are presented separately for each partner country to explicitly describe the way the research protocol was implemented in each case.

GREECE

Participants: A total of 82 athletes took part in the study (38 males, 3 did not disclosure gender). The intervention group included 44 athletes and the control group 38 athletes. The age span of participants ranged from 15 to 30 years ($M = 18.70$, $SD = 4.22$). To facilitate the application of the intervention and avoid high attrition rates, the team (in team sports) and the coach (in individual sports) was the selection unit; all the athletes of a team or a specific coach was included in either the experimental or



control groups. Eligible participants participated systematically in trainings (4-5 times per/week) and in national competitions.

Measures: The measures reflect the three core components of the SafeYou anti-doping education program, namely Know, Decide, and Lead. More specifically, with respect to "Know" the following measures were used:

Knowledge about anti-doping was measured with six quiz-based items derived from current NADO knowledge assessment approaches (Ntoumanis et al., 2018). Participants may respond with three possible answers (*True, False, I Don't Know*; example item: "If a nutritional supplement is bought from the pharmacy (over-the-counter), it will not contain a banned substance").

Knowledge about behaviours related to unintentional/inadvertent doping was assessed through a list of six behaviors asking participants to indicate with a *Yes* or *No* answer whether they have engaged in this behavior in the last 4 weeks (example item: "Checked if my supplements, food and/or drinks contain banned substances") (Ntoumanis et al., 2018).

With respect to "Decide", the following measures were used:

Doping-related moral disengagement was assessed with six items representing the respective operant mechanisms in doping (Lucidi et al., 2008) (e.g. "A player should not be blamed for doping if everyone on the team is doing it"). Participants responded on a 7-point scale ranging from 1 (Don't agree at all") to 7 ("Completely agree").

Attitudes were assessed in response to the question: "The use of prohibited substances to enhance my performance during this season is..." Responses were measured on an eight 7-point semantic differential scales.

Self- efficacy to resist temptations was measured with the six items derived from the self-regulatory efficacy scale by Mallia et al. (2016). Using the scale 1-7 (1- No confidence, 7 - Complete confidence), participants indicated to what extent they would be confident that they would not use a banned substances (e.g. "How confident would you be that you could resist the temptation to use a banned substances even if... Your team captain was the one asking you to do so? ")

The level of willingness to dope was measured with eight items including questions such as "Would you be willing to use a banned substance if you... were told that you needed to bulk up because all the other players were much bigger and stronger than

you?” Answers were given on a 7-point scale ranging from 1 (“Not at all willing”) to 7 (“Extremely willing”).

Doping use/behavior/doping consideration was measured by choosing which statements best describe participants thoughts (e.g. “I never thought of using a banned performance enhancing substance.”).

Doping Benefits were measured with 3 subcategories of questions. Sport benefits (4 items – e.g. “Legalizing performance enhancing substances will benefit my team”), Health benefits (4 items – e.g. “If I used substances i would have consequences for my health in the future”) and Personal benefits (5 items – e.g. “Substance use could help me maintain my place in the team”). All items were answered on a 7-point scale ranging from 1 (“Don’t agree at all”) to 7 (“Completely agree”).

With respect to "Lead", participants reported their intentions to support clean sport in the next three months in three items (e.g., "*I intend to support clean sport policies in the next 3 months*") anchored on a 7-point continuous scale, with higher scores denoting stronger intentions.

Feedback from the intervention was measured in Time 2 and Time 3 with the stem question ‘How much the intervention helped you...’. Responses were given to three items, such as ‘...in understanding the health risks from doping use’ on a 5-point Likert scale ranging from 1 (not at all) to 5 (very much).

All measures have been already used in our past research, and showed adequate psychometric properties in both Greek and English language (Barkoukis et al., 2013; Lazuras et al., 2017; Mallia et al., 2016). Most of the measures have been also used in Romania as part of our joint research.

Study Design: Selected teams and coaches were randomly assigned - using an Internet-based randomization program (e.g., www.randomizer.org) - either to the intervention (Safe You Anti-Doping Education Program) or to the control group. Measures were completed in three time points, namely, before the baseline (baseline or Time 1 measurement), immediately after the intervention (post-intervention or Time 2 measurement), and two months post-intervention (Time 3 measurement).

Intervention: Participants in the intervention group underwent the SAFE YOU Anti-Doping Education Program which incorporates powerpoint presentations, supplementary material, Problem Based Learning, Case studies, Mobile Information

Application and Interactive video. The education material includes nine 45-min sessions that were delivered by trained associates. Due to COVID restrictions, the sections were delivered online. Also they were shortened to produce 6 sessions of 45 minutes to facilitate athletes attend the program. The modules and all the intervention materials were hosted on an online platform (www.safeyou.eu). This facilitated access and participation to the intervention.

Procedure: A stratified sampling procedure was employed based on location and sport type. A number of sports clubs was approached and provided a detailed explanation of the project's objectives to both the administrative board and the coaches. After obtaining permission, the athletes were provided with a briefing regarding the intervention, and thereafter, informed consent was sought from those individuals who expressed a desire to participate, as well as their parents or carers. The athletes answered a baseline questionnaire in an anonymized and isolated manner. The participants were provided with written instructions pertaining to the completion of the questionnaire. Furthermore, the athletes were provided with a reminder on their voluntary involvement, and were assured of the anonymity and confidentiality of their responses. The intervention group received the SafeYou program. The same procedure was followed in the post intervention and follow-up measurements. An 'active control group' was used. Control group participants were asked to watch sport-related videos, doping-related material such as WADA Code about the definition of doping and doping control procedures. These tasks are relevant to doping, but completely unrelated to the envisaged intervention. The duration and delivery mode of the control group was similar to those of the intervention group. The use of active control groups is favored in research because it produces more robust results when comparing between treatment/intervention and no-treatment/intervention groups. Athletes were informed that they were selected to participate in a WADA-funded project on young athletes' perceptions about doping, and that they would be asked to complete a series of activities (e.g., survey completion, feedback etc.) throughout the year. The participants were asked to develop a unique personal code at baseline measures so that their future assessments can be matched in the in the Time 2 and Time 3 assessments. As an incentive for participation and successful completion of the modules, there were in-kind prizes (e.g., t-shirts). Accordingly, all the participants who successfully completed the modules received an 'Anti-Doping



Education Certification' issued by the PI's University and the respective national anti-doping organization (for Greece, Cyprus and Romania). Participants in the control group were provided with anti-doping information (e.g., leaflets, videos and other educational and awareness-raising resources). The training sessions of the intervention group and the control group material were translated and adapted to each partner language. This ensured that participants in each country are provided with materials that are developed in their language and adapted in their culture.

Data analysis: Univariate and multivariate repeated measures ANOVAs were used to evaluate the effectiveness of the intervention in changing the dependent variables of the study.

ROMANIA

Participants: A total of 86 athletes took part in the study (46 males). The intervention group included 44 athletes and the control group 42. The age span of participants ranged from 15 to 20 years ($M = 16.31$, $SD = .55$). The eligibility criteria and recruitment process were similar to that employed in Greece.

The measures, study design, intervention and procedure were identical to the one employed in Greece.

UNITED KINGDOM

Participants: Overall, 128 competitive athletes in the UK agreed to participate in the study and completed the baseline measures (pre-intervention) and took part in the training. Of these, 58 cases were removed because they did not complete the post-intervention measures. Follow-up interviews with a sample of athletes who did not complete the post-intervention surveys indicated fatigue with the intervention content and loss of interest because they had already completed the 100% Me clean sport training provided by UK Anti-Doping. A remaining sample of 70 completed the measures across the different time points of the study (33 males, 11 did not disclose their gender). The intervention group included 52 athletes and the control group 18 athletes. The age span of participants ranged from 18 to 30 years ($M = 20.90$, $SD = 4.98$). The eligibility criteria and recruitment process were similar to that employed in Greece.

The measures, study design, intervention and procedure were identical to the one employed in Greece.

CYPRUS

Participants: A total of 47 athletes took part in the study (37 males). The intervention group included 26 athletes and the control group 21 athletes. The age span of participants ranged from 20 to 25 years ($M = 23.11$, $SD = 6.21$). A convenience sample was selected due to COVID-19 restrictions. The eligibility criteria were similar to that employed in Greece.

In Cyprus the intervention was delivered in one 3 hour session due to obligations of the participants. The measures of personal benefits, feedback, doping use and knowledge about doping were not administered following the intervention as no change was expected in this timeframe.



RESULTS

GREECE

Participants in the study indicated participating in a variety of sports including athletics, martial arts, weightlifting, volleyball, basketball, swimming, football and handball. A large part of the participants had taken part in Olympic Games/World Championships and international events (18.5%), 28.4% in national competitions and 53.1% in regional and local competitions. A large number of the participants (29.6%) had been awarded a national or international award. The percentage of participants that had received anti-doping education in the past was 33.3%. This education had been provided by the coach (28.2%), the national federation (15.4%) and the NADO (12.8%) whereas a large proportion of athletes reported receiving anti-doping education from other sources, such as university or school (33.3%). A small proportion of the participants had been included in the doping control testing pool (12.3%), and similarly a small proportion had been tested for doping (6.3%).

The descriptive statistics of the study variables are presented in Tables 1 and 2. The analysis of correlations among the study variables in the three time points are presented in Tables 3, 4 and 5.

Table 1.

Descriptive statistics of the study variables in the total sample in Greece

Variables	Pre intervention		Post intervention		Follow-up	
	M	SD	M	SD	M	SD
Knowledge about doping	1.86	.44	1.68	.37	1.62	.32
Knowledge about inadvertent doping	1.78	.25	1.67	.26	1.69	.29
Sport benefits	1.64	.91	1.55	.82	1.70	1.04
Health benefits	5.78	1.28	6.10	1.26	6.05	1.28
Personal benefits	2.75	1.72	2.72	1.67	2.58	1.56
Willingness	1.55	1.05	1.58	.99	1.50	1.03
Self-efficacy	5.54	1.97	6.14	1.33	6.27	1.21
Moral disengagement	1.64	.76	1.55	.61	1.70	.81
Attitudes	1.64	1.07	1.35	.62	1.44	1.07
Intentions	6.25	1.29	6.53	.71	6.42	.87

Feedback	4.37	.60	4.50	.50	1.62	.32
Doping use	1.18	.57	1.16	.45	1.14	.54

Table 2.

Descriptive statistics of the study variables in the intervention and control groups in Greece

Variables	Intervention group					
	Time 1		Time 2		Time 3	
	Mean	SD	Mean	SD	Mean	SD
Knowledge about doping	1.84	.49	1.76	.43	1.71	.35
Knowledge about inadvertent doping	1.84	.16	1.72	.23	1.74	.27
Sport benefits	1.50	.67	1.51	.79	1.50	.96
Health benefits	5.56	1.48	5.82	1.56	5.76	1.55
Personal benefits	2.36	1.48	2.32	1.64	2.32	1.57
Willingness	1.56	1.14	1.60	1.03	1.52	1.04
Self-efficacy	5.65	1.85	6.04	1.40	6.19	1.25
Moral disengagement	1.61	.73	1.48	.61	1.61	.85
Attitudes	1.56	1.00	1.44	.10	1.49	1.32
Intentions	6.22	1.28	1.41	.71	6.33	1.00
Feedback	-	-	4.22	.67	4.45	.51
Doping use	1.13	.34	1.13	.34	1.02	.15
	Control group					
	Mean	SD	Mean	SD	Mean	SD
Knowledge about doping	1.88	.38	1.58	.26	1.51	.24
Knowledge about inadvertent doping	1.71	.31	1.60	.29	1.62	.32
Sport benefits	1.81	1.13	1.60	.87	1.97	1.10
Health benefits	6.04	.96	6.42	.65	6.42	.68
Personal benefits	3.21	1.89	3.18	1.61	2.92	1.51
Willingness	1.54	.94	1.56	.94	1.48	1.03
Self-efficacy	5.41	2.12	6.27	1.27	6.37	1.18
Moral disengagement	1.67	.80	1.63	.61	1.81	.75
Attitudes	1.73	1.15	1.28	.49	1.36	.65
Intentions	6.28	1.33	6.70	.54	6.53	.66
Feedback	-	-	4.55	.44	4.57	.49
Doping use	1.24	.76	1.18	.56	1.29	.78

Table 3.

Correlation analysis of the variables in the pre-intervention measurement in Greece

	1	2	3	4	5	6	7	8	9	10	11	12
1. Knowledge about doping	1	.01	-.04	.12	.02	-.07	-.03	-.04	.01	.29**	.19	-.27*
2. Knowledge about inadvertent doping		1	-.27*	-.06	-.02	-.18	.17	-	-.15	-.04	-.07	-.09
3. Sport benefits			1	-.19	.45**	.40**	-.21	.61**	.23*	-.02	-.15	.12
4. Health benefits				1	-.06	-	.07	-.14	-.09	.12	.24*	-.05
5. Personal benefits					1	.25*	-.14	.27*	.06	-.05	-.06	.37**
6. Willingness						1	-.27*	.31**	.16	.09	-.04	.25*
7. Self-efficacy							1	-.22*	.04	.10	.05	-.14
8. Moral disengagement								1	.21	-.02	-.18	.13
9. Attitudes									1	-.00	-.00	.06
10. Intentions										1	.12	-
11. Feedback											1	.08
12. Doping use												1

Table 4.
Correlation analysis of the variables in the post-intervention measurement in Greece

	1	2	3	4	5	6	7	8	9	10	11	12
1. Knowledge about doping	1	.18	.02	-.16	-.01	-.03	-.10	-.04	.03	-.03	-.08	.05
2. Knowledge about inadvertent doping		1	-.24*	-.21	-.02	-.00	.07	-.03	-.19	-.20	-.14	-.03
3. Sport benefits			1	-.19	.38**	.35**	-.26*	.49**	.46**	-.02	-.28*	.16
4. Health benefits				1	-.00	-.024	.21	-.10	-.10	-.00	.09	.03
5. Personal benefits					1	.28*	-.16	.28*	.14	-.10	-.30*	.16
6. Willingness						1	-.47**	.29**	.18	.03	-.10	.54**
7. Self-efficacy							1	-.23*	-.39**	.04	.10	-.21
8. Moral disengagement								1	.56**	-.19	-.31**	.21
9. Attitudes									1	-.32**	-.23	-.00
10. Intentions										1	.22	.07
11. Feedback											1	-.10
12. Doping use												1

Table 5.
Correlation analysis of the variables in the follow-up measurement in Greece

	1	2	3	4	5	6	7	8	9	10	11
1. Knowledge about doping	1	-.06	.15	-.06	.12	.17	-.08	.06	.04	.00	.16
2. Knowledge about inadvertent doping		1	-.09	-.18	-.04	-.03	-.05	-.14	-.26*	.00	-.19
3. Sport benefits			1	.02	.53**	.68**	-.43**	.62**	.12	-.18	.48**
4. Health benefits				1	.11	-.07	.13	-.09	-.09	.28*	-.03
5. Personal benefits					1	.37**	-.24*	.28*	-.05	-.12	.25*
6. Willingness						1	-.71**	.49**	.12	-.11	.54**
7. Self-efficacy							1	-.52**	-.34**	.34**	-.46**
8. Moral disengagement								1	.46**	-.30**	.35**
9. Attitudes									1	-.48**	.23
10. Intentions										1	-.06
11. Feedback											1

With respect to the effectiveness of the intervention on the variables of the study, the results of the repeated measures analyses of variances revealed no significant time by group interactions in the tested variables ($F < 1.96, p > .05$). A notable exception was knowledge about doping where significant interaction emerged, $F = 6.63, p < .01, \eta^2 = .08$. The results of the analysis indicated that in the intervention group, perceptions of knowledge about anti-doping decreased following the intervention (Figure 1).

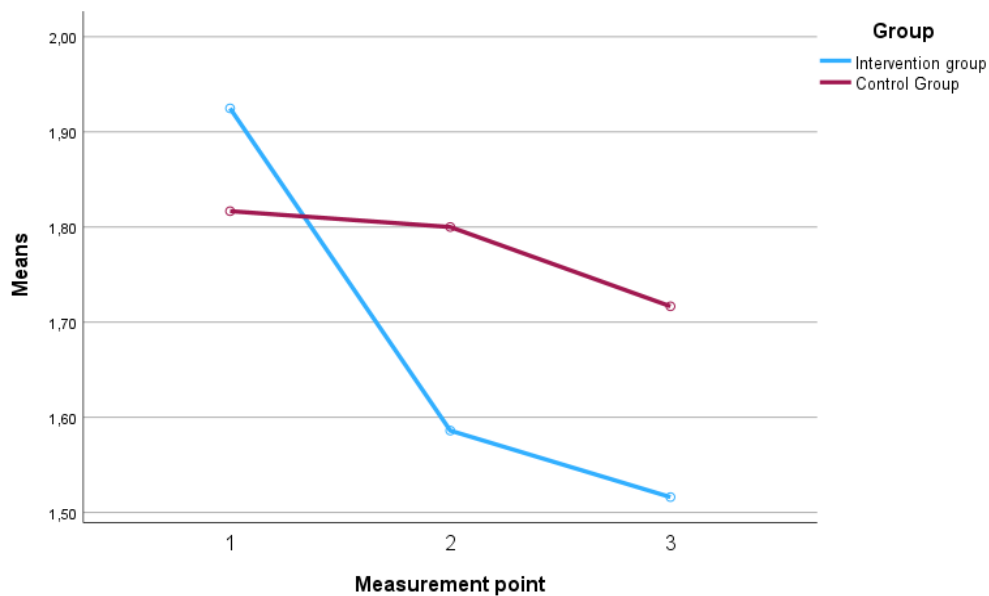


Figure 1.
Effect of the intervention on perceptions of knowledge about anti-doping



ROMANIA

Participants in the study indicated participating in a variety of sports including athletics, swimming, water polo, tennis and badminton, volleyball, basketball, and handball. A large part of the participants had taken part in Olympic Games/World Championships and international events (33.7%), 62.8% in national competitions and 3.5% in regional and local competitions. A large number of the participants (55.8%) had been awarded a national or international award. The percentage of participants that had received anti-doping education in the past was 2.4%. This education had been provided by the coach (5.8%), and the NADO (14%) whereas a large proportion of athletes reported receiving anti-doping education from other sources (75.6%). A small proportion of the participants had been included in the doping control testing pool (22.1%), whereas 32.6% of the participants had been tested for doping.

The descriptive statistics of the study variables are presented in Tables 6 and 7. The analysis of correlations among the study variables in the three time points are presented in Tables 8, 9 and 10.

Table 6.

Descriptive statistics of the study variables in the total sample in Romania

Variables	Pre		Post		Follow-up	
	M	SD	M	SD	M	SD
Knowledge about doping	1.73	.35	1.56	.25	1.52	.23
Knowledge about inadvertent doping	1.61	.30	1.57	.28	1.57	.32
Sport benefits	2.49	1.26	1.83	.88	2.20	1.32
Health benefits	4.73	1.67	4.73	1.67	5.65	1.57
Personal benefits	2.73	1.74	2.73	1.74	2.38	1.37
Willingness	2.02	1.12	1.77	.94	1.99	1.29
Self-efficacy	4.17	2.37	4.14	2.58	3.41	2.51
Moral disengagement	2.48	1.09	2.48	1.09	1.90	.81

Attitudes	1.34	.13	1.31	.11	1.31	.15
Intentions	2.26	1.41	1.84	.93	1.80	.70
Feedback	5.93	1.37	6.32	1.23	6.40	1.13
Doping use	-	-	4.63	.55	4.81	.35

Table 7

Descriptive statistics of the study variables in the intervention and control groups in Romania

Variables	Intervention group					
	Time 1		Time 2		Time 3	
	Mean	SD	Mean	SD	Mean	SD
Knowledge about doping	1.70	.29	1.59	.30	1.51	.22
Knowledge about inadvertent doping	1.56	.29	1.54	.32	1.52	.32
Sport benefits	2.55	1.15	1.93	1.04	1.99	1.05
Health benefits	4.47	1.51	4.47	1.51	6.15	1.32
Personal benefits	2.60	1.54	2.60	1.54	2.32	1.29
Willingness	2.12	1.12	1.96	1.13	1.98	1.58
Self-efficacy	3.86	2.30	3.22	2.38	3.42	2.53
Moral disengagement	2.42	.94	2.42	.94	1.83	.84
Attitudes	2.24	1.53	1.82	.83	1.78	.66
Intentions	6.03	1.17	5.89	1.46	6.04	1.36
Feedback	-	-	4.53	.63	4.85	.34
Doping use	1.20	.40	1.18	.44	1.18	.39
	Control group					
	Mean	SD	Mean	SD	Mean	SD
Knowledge about doping	1.76	.40	1.52	.17	1.53	.24
Knowledge about inadvertent doping	1.66	.30	1.60	.22	1.62	.31
Sport benefits	2.43	1.37	1.72	.68	2.45	1.54
Health benefits	5.00	1.79	5.00	1.79	5.12	1.65
Personal benefits	2.87	1.95	2.87	1.95	2.45	1.45



Willingness	1.92	1.13	1.58	.63	2.00	.91
Self-efficacy	4.50	2.43	5.10	2.45	3.40	2.52
Moral disengagement	2.54	1.23	2.54	1.23	1.98	.78
Attitudes	2.27	1.29	1.87	1.04	1.82	.74
Intentions	5.82	1.57	6.77	.70	6.77	.63
Feedback	-	-	4.73	.44	4.77	.35
Doping use	1.59	1.12	1.30	.64	1.52	.80



Table 8.

Correlation analysis of the variables in the pre-intervention measurement in Romania

	1	2	3	4	5	6	7	8	9	10	11	12
1. Knowledge about doping	1	.23*	-.17	-.19	.05	-.12	.04	.21*	-.01	-.36**	-.19	.07
2. Knowledge about inadvertent doping		1	.17	.13	.27*	.34**	-.02	.46**	.25*	-.25*	-.03	.18
3. Sport benefits			1	-.04	.66**	.26*	-.19	.42**	.39**	-.30**	.08	.20
4. Health benefits				1	-.07	-.07	.21	-.08	.07	.43**	.18	.11
5. Personal benefits					1	.24*	-.17	.45**	.28**	-.40**	-.13	.39**
6. Willingness						1	-.22*	.48**	.28**	-.32**	-.08	.05
7. Self-efficacy							1	-.14	-.32**	.14	.18	-.01
8. Moral disengagement								1	.38**	-.52**	-.13	.38**
9. Attitudes									1	-.18	-.14	.22*
10. Intentions										1	.12	-.24*
11. Feedback											1	-.03
12. Doping use												1

Table 9.

Correlation analysis of the variables in the post-intervention measurement in Romania

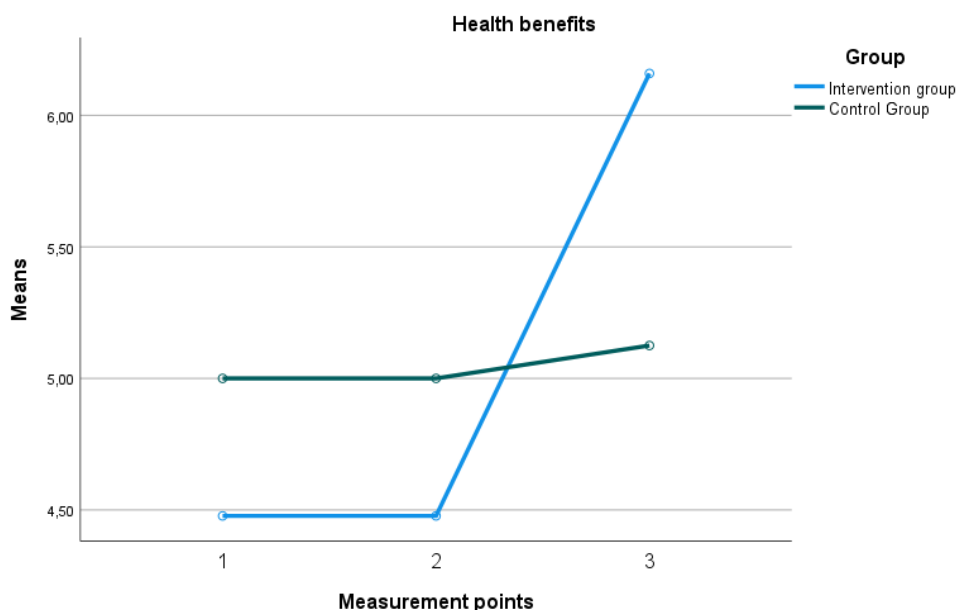
	1	2	3	4	5	6	7	8	9	10	11	12
1. Knowledge about doping	1	.23 [*]	-.01	-.07	.08	-.09	-.16	.14	.14	-.09	.03	-.02
2. Knowledge about inadvertent doping		1	.08	.03	.10	.27 [*]	.01	.20	.28 ^{**}	-.04	-.06	.24 [*]
3. Sport benefits			1	-.04	.45 ^{**}	.53 ^{**}	-.00	.11	.44 ^{**}	-.01	.08	-.07
4. Health benefits				1	-.07	-.09	.04	-.08	-.15	.21	-.06	.22 [*]
5. Personal benefits					1	.30 ^{**}	.05	.45 ^{**}	.55 ^{**}	-.02	.13	-.18
6. Willingness						1	-.25 [*]	.21 [*]	.57 ^{**}	-.29 ^{**}	.07	.15
7. Self-efficacy							1	-.21	.02	.02	.19	.08
8. Moral disengagement								1	.22 [*]	-.06	-.12	.01
9. Attitudes									1	-.19	.15	.08
10. Intentions										1	-.00	-.10
11. Feedback											1	.02
12. Doping use												1

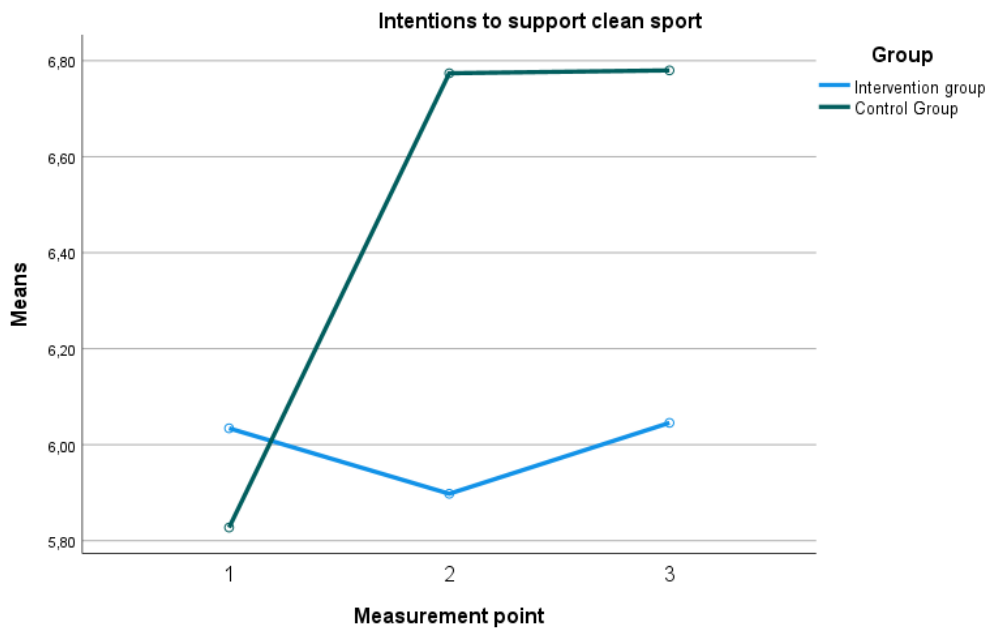
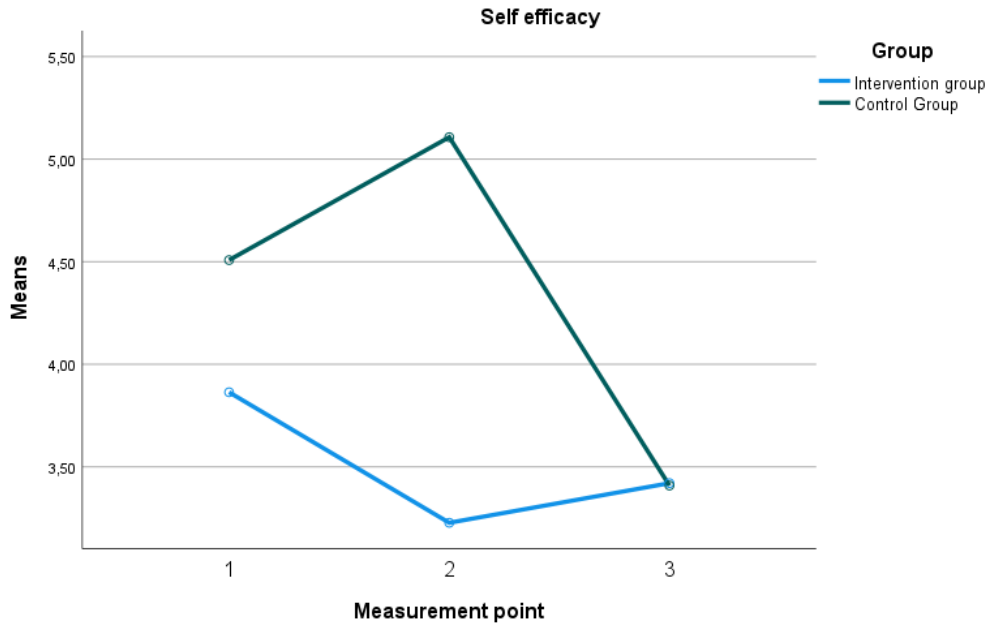
Table 10.

Correlation analysis of the variables in the follow-up measurement in Romania

	1	2	3	4	5	6	7	8	9	10	11
1. Knowledge about doping	1	.10	-.16	-.42**	.12	-.07	-.15	-.03	.22*	-.04	-.04
2. Knowledge about inadvertent doping		1	.18	-.17	.34**	.29**	.16	.29**	.32**	.06	-.03
3. Sport benefits			1	-.21*	.11	.51**	.07	.40**	.20	.01	.21
4. Health benefits				1	-.09	-.23*	-.02	-.25*	-.26*	.07	-.27*
5. Personal benefits					1	.22*	-.26*	.14	.62**	.06	-.14
6. Willingness						1	-.02	.59**	.40**	-.31**	.00
7. Self-efficacy							1	.19	-.14	-.01	.01
8. Moral disengagement								1	.34**	-.17	.28**
9. Attitudes									1	-.25*	-.02
10. Intentions										1	.09
11. Doping use											1

With respect the effectiveness of the intervention on the variables of the study the results of the repeated measures analyses of variances revealed no significant time by group interactions in participants' knowledge about anti-doping, inadvertent, sport benefits, personal benefits, willingness, moral disengagement, attitudes and actual doping behavior. However, significant time by group interaction was revealed for health benefits, $F = 16.51$, $p < .001$, $\eta^2 = .16$. The results of the post hoc analysis revealed that the scores of the intervention group increased significantly in the follow up measurement as compared to those of the control group. Also, a significant time by group interaction was found for self-efficacy in resisting temptation, $F = 4.50$, $p < .05$, $\eta^2 = .05$. The results of the post hoc analysis revealed that scores in the control group decreased significantly as compared to those in the intervention group. In addition, a significant time by group interaction was found for intentions to support clean sport, $F = 9.13$, $p < .01$, $\eta^2 = .09$. The results of the post hoc analysis revealed that scores in the control group increased significantly as compared to those in the intervention group. Lastly, a significant time by group interaction was revealed for feedback, $F = 4.29$, $p < .05$, $\eta^2 = .05$. The results of the post hoc analysis revealed that scores in the intervention group increased significantly as compared to those in the intervention group (Figure 2).





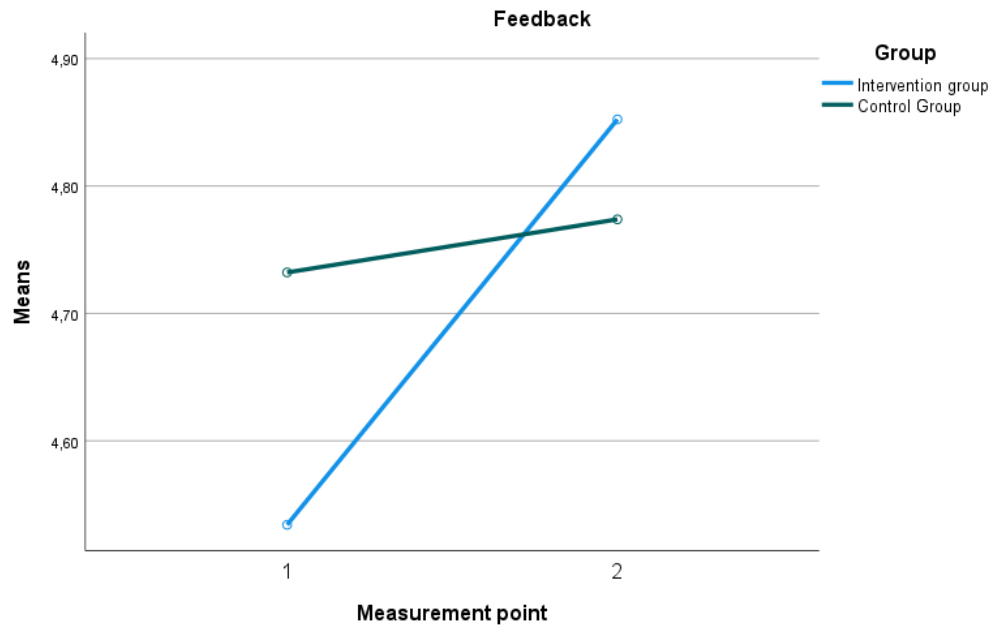


Figure 2.
Effects of intervention on health benefits, self-efficacy in resisting temptation, intentions to support clean sport, and feedback



UNITED KINGDOM

Participants in the study indicated participating mainly in weightlifting. A small part of the participants had taken part in Olympic Games/World Championships and international events (8.6%), 28.6% in national competitions and 62.9% in regional and local competitions. A small number of the participants (8.3%) had been awarded a national or international award. The percentage of participants that had received anti-doping education in the past was 58.3%. This education had been provided by the coach (16.7%), and people in the team (12.5%) or the NADO (4.2%) whereas a large proportion of athletes reported receiving anti-doping education from other sources (66.7%). A small proportion of the participants had been included in the doping control testing pool (6.7%), whereas 1.7% of the participants had been tested for doping. The descriptive statistics of the study variables are presented in Tables 11 and 12. The analysis of correlations among the study variables in the three time points are presented in Tables 13, 14 and 15.

Table 11.

Descriptive statistics of the study variables in the total sample in UK

Variables	Pre intervention		Post intervention		Follow-up	
	M	SD	M	SD	M	SD
Knowledge about doping	1.68	.48	1.70	.44	1.65	.54
Knowledge about inadvertent doping	1.93	.14	1.92	.20	1.92	.11
Sport benefits	2.10	1.14	2.10	1.14	2.15	1.02
Health benefits	5.16	1.21	5.15	1.28	5.18	.88
Personal benefits	3.35	1.59	3.06	1.71	3.80	1.81
Willingness	2.21	1.12	2.00	1.19	2.13	1.47
Self-efficacy	4.71	2.05	3.90	2.43	4.49	2.43
Moral disengagement	2.21	1.13	2.03	1.06	2.30	1.46
Attitudes	2.28	1.23	1.86	.70	2.44	1.58
Intentions	5.19	1.77	4.42	1.55	4.66	1.59
Feedback	3.42	.49	3.58	.53	-	-

Table 12.

Descriptive statistics of the study variables in the intervention and control groups in UK

Variables	Intervention group					
	Time 1		Time 2		Time 3	
	Mean	SD	Mean	SD	Mean	SD
Knowledge about doping	1.71	.50	1.80	.48	1.75	.59
Knowledge about inadvertent doping	1.91	.16	1.93	.10	1.88	.12
Sport benefits	2.25	1.20	2.25	1.20	2.16	1.15
Health benefits	4.97	1.19	5.08	1.56	4.95	.68
Personal benefits	3.80	1.46	3.88	1.77	4.58	1.69
Willingness	2.28	1.14	2.19	1.33	2.43	1.78
Self-efficacy	5.07	1.84	4.71	2.31	4.20	2.46
Moral disengagement	2.38	1.23	2.27	1.21	2.67	1.64
Attitudes	2.45	1.30	1.91	.758	2.	1.74
Intentions	4.95	1.66	4.98	1.20	4.40	1.33
Feedback	-	-	3.49	.47	-	-
	Control group					
	Mean	SD	Mean	SD	Mean	SD
Knowledge about doping	1.62	.45	1.59	.39	1.48	.42
Knowledge about inadvertent doping	1.98	.05	1.91	.28	1.97	.05
Sport benefits	1.76	.96	1.76	.96	2.12	.86
Health benefits	5.59	1.16	5.25	.88	5.53	1.07
Personal benefits	2.30	1.39	2.03	.94	2.62	1.34
Willingness	2.06	1.08	1.77	1.00	1.67	.69
Self-efficacy	3.99	2.32	2.90	2.28	4.95	2.47
Moral disengagement	1.86	.82	1.73	.78	1.68	.89
Attitudes	1.90	.96	1.80	.65	1.89	1.18
Intentions	5.68	1.92	3.72	1.71	5.09	1.96
Feedback	-	-	3.34	.52	3.58	.53



Table 12.

Correlation analysis of the variables in the pre-intervention measurement in UK

	1	2	3	4	5	6	7	8	9	10	11
1. Knowledge about doping	1	-.06	-.01	-.01	.06	.10	.19	-.02	-.12	-.12	.26
2. Knowledge about inadvertent doping		1	-.02	-.15	-.04	.22	-.29*	.12	-.28*	-.21	-.15
3. Sport benefits			1	-.11	.38**	.36**	-.31*	.45**	.32*	-.11	.34
4. Health benefits				1	-.29*	-.19	.15	-.24	-.30*	.17	.15
5. Personal benefits					1	.34*	.02	.49**	.29*	-.01	.15
6. Willingness						1	-.31*	.60**	.13	.13	.25
7. Self-efficacy							1	-.04	-.10	-.15	.00
8. Moral disengagement								1	.37**	.05	.05
9. Attitudes									1	.07	.01
10. Intentions										1	.08
11. Feedback											1

Table 14.

Correlation analysis of the variables in the post-intervention measurement in UK

	1	2	3	4	5	6	7	8	9	10	11
1. Knowledge about doping	1	.16	.13	.14	-.03	-.01	.17	-.02	-.23	.11	.30
2. Knowledge about inadvertent doping		1	-.02	.01	-.28	.15	.07	.16	.21	.23	-
3. Sport benefits			1	.18	.34	.52**	-.01	.37	.44*	.45*	.35
4. Health benefits				1	-.16	-.08	.13	-.28	-.09	.34	.13
5. Personal benefits					1	.27	.22	.35	.39*	.03	-
6. Willingness						1	-.19	.72**	.59**	.13	-.40
7. Self-efficacy							1	.09	-.16	.26	-
8. Moral disengagement								1	.51**	.06	-.38
9. Attitudes									1	.08	-.31
10. Intentions										1	.91*
11. Feedback											1

Table 15.

Correlation analysis of the variables in the follow-up measurement in UK

	1	2	3	4	5	6	7	8	9	10
1. Knowledge about doping	1	.07	-.07	-.08	.38	-.15	-.11	-.03	.02	-.37
2. Knowledge about inadvertent doping		1	-.22	.07	-.39	-.19	.18	-.09	.05	-.07
3. Sport benefits			1	-.14	.37	.69**	.14	.68**	.38	.05
4. Health benefits				1	-.44	-.07	-.02	-.19	-.55*	.02
5. Personal benefits					1	.42	-.20	.46*	.46*	-.00
6. Willingness						1	.10	.84**	.67**	.22
7. Self-efficacy							1	.30	.07	.38
8. Moral disengagement								1	.69**	.13
9. Attitudes									1	-.04
10. Intentions										1

With respect the effectiveness of the intervention on the variables of the study the results of the repeated measures analyses of variances revealed no significant time by group interactions in the studied variables.



CYPRUS

Participants in the study indicated participating in a variety of sports including athletics, football, basketball, gymnastics, swimming, table tennis and badminton. A large part of the participants had taken part in Olympic Games/World Championships and other international events (21.3%), 25.5% in national competitions and 53.2% in regional and local competitions. A large number of the participants (29.8%) had been awarded a national or international award. The percentage of participants that had received anti-doping education in the past was 40.4%. This education had been provided by the coach (11.8%), people in the team (17.6%) and the NADO (47.1%) whereas a smaller proportion of athletes reported receiving anti-doping education from other sources (17.6%) such as university lectures. None of the participants had been included in the doping control testing pool, whereas 6.4% of the participants had been tested for doping.

The descriptive statistics of the study variables are presented in Tables 16 and 17. The analysis of correlations among the study variables in the three time points are presented in Tables 18, 19 and 20.

Table 16.

Descriptive statistics of the study variables in the total sample in Cyprus

Variables	Pre intervention		Post intervention		Follow-up	
	M	SD	M	SD	M	SD
Knowledge about doping	1.64	.38	1.62	.42	1.64	.46
Knowledge about inadvertent doping	1.82	.25	1.75	1.14	1.72	.28
Sport benefits	1.97	1.41	5.68	1.79	2.01	1.11
Health benefits	5.57	1.72	2.48	1.72	5.00	2.17
Personal benefits	3.12	1.89	-	-	2.48	1.72
Willingness	2.13	1.47	1.89	1.25	2.05	1.48
Self-efficacy	5.33	2.05	4.76	2.35	5.50	1.74
Moral disengagement	2.09	1.23	1.84	1.08	2.10	1.21
Attitudes	1.41	.11	-	-	1.40	.19
Intentions	2.58	1.98	1.98	1.81	1.69	1.21



Feedback	5.68	1.61	-	-	6.04	1.21
Doping use	4.40	.68	-	-	-	-

Table 17.

Descriptive statistics of the study variables in the intervention and control groups in Cyprus

Variables	Intervention group					
	Time 1		Time 2		Time 3	
	Mean	SD	Mean	SD	Mean	SD
Knowledge about doping	1.61	.37	1.68	.47	1.66	.53
Knowledge about inadvertent doping	1.78	.29	-	-	1.75	.28
Sport benefits	2.25	1.58	1.87	1.15	1.98	1.17
Health benefits	5.57	1.79	6.33	1.08	4.60	2.37
Personal benefits	3.37	1.74	2.91	1.21	2.91	1.21
Willingness	2.25	1.51	2.08	1.35	2.22	1.60
Self-efficacy	5.80	1.48	5.11	2.20	5.17	1.85
Moral disengagement	2.14	1.36	2.04	1.40	1.96	1.19
Attitudes	2.44	1.90	1.61	1.07	1.75	1.36
Intentions	5.65	1.67	-	-	5.88	1.21
Feedback	-	-	4.35	.56	-	-
Doping use	1.31	.64	-	-	1.35	.84
	Control group					
	Mean	SD	Mean	SD	Mean	SD
Knowledge about doping	1.68	.39	1.59	.40	1.56	.25
Knowledge about inadvertent doping	1.87	.18	-	-	1.66	.31
Sport benefits	1.66	1.15	1.67	1.15	2.10	1.06
Health benefits	5.57	1.68	5.30	2.03	6.10	.89
Personal benefits	2.82	2.05	2.22	1.94	2.22	1.94
Willingness	1.99	1.44	1.78	1.21	1.57	1.08



Self-efficacy	4.84	2.46	4.55	2.47	6.43	1.01
Moral disengagement	2.04	1.12	1.72	.85	2.50	1.32
Attitudes	2.75	2.11	2.20	2.13	1.52	.66
Intentions	5.72	1.60	-	-	6.45	1.22
Feedback	-	-	4.43	.75	-	-
Doping use	1.30	.65	-	-	1.40	.89



Table 18.

Correlation analysis of the variables in the pre-intervention measurement in Cyprus

	1	2	3	4	5	6	7	8	9	10	11	12
1. Knowledge about doping	1	-.06	.24	.09	-.19	-.09	-.32*	-.00	.09	-.36*	-.04	.02
2. Knowledge about inadvertent doping		1	-.19	.18	.13	-.07	-.04	-.06	.10	.07	.00	-.31*
3. Sport benefits			1	-.07	.37*	.31*	-.06	.52**	.16	-.38*	-.27	.30*
4. Health benefits				1	.07	-.07	.20	-.05	-.30*	.18	.09	-.03
5. Personal benefits					1	.56**	-.17	.33*	.04	-.17	-.21	.28
6. Willingness						1	-.55**	.51**	.29	-.32*	-.46**	.57**
7. Self-efficacy							1	-.27	-.31*	.38*	.06	-.25
8. Moral disengagement								1	.55**	-.39*	-.44*	.37*
9. Attitudes									1	-.32*	-.15	.14
10. Intentions										1	.49**	-.49**
11. Feedback											1	-.52**
12. Doping use												1

Table 19.

Correlation analysis of the variables in the post-intervention measurement in Cyprus

	1	2	3	4	5	6	7	8
1. Knowledge about doping	1	.37*	-.26	.30	.45*	-.14	.45**	.12
2. Sport benefits		1	-.11	.51**	.59**	-.17	.38*	.26
3. Health benefits			1	.09	-.04	.43*	-.09	-.38*
4. Personal benefits				1	.79**	-.40*	.32	.12
5. Willingness					1	-.42*	.64**	.34*
6. Self-efficacy						1	-.32	-.24
7. Moral disengagement							1	.16
8. Attitudes								1



Table 20.

Correlation analysis of the variables in the follow-up measurement in Cyprus

	1	2	3	4	5	6	7	8	9	10	11
1. Knowledge about doping	1	.35	.04	-.38	.60*	.25	-.40	.45	.05	-.38	.74**
2. Knowledge about inadvertent doping		1	.33	-.04	.44	.43	-.34	.13	-.08	-.40	.41
3. Sport benefits			1	.25	.15	.55*	-.31	.49*	.16	-.19	.04
4. Health benefits				1	-.33	.03	.25	-.23	-.34	.48*	-.24
5. Personal benefits					1	.46	-.76**	.29	.09	-.33	.28
6. Willingness						1	-.50*	.49*	.25	-.59**	.38
7. Self-efficacy							1	-.59**	-.23	.57*	-.35
8. Moral disengagement								1	.30	-.53*	.54*
9. Attitudes									1	-.60**	.06
10. Intentions										1	-.67**
11. Doping use											1

With respect to the effectiveness of the intervention on the variables of the study the results of the repeated measures analyses of variances revealed no significant time by group interactions in any of the variables studied.



DISCUSSION

The present project aimed to investigate the effectiveness of SAFEYOU, an anti-doping intervention, on psychosocial variables among young athletes. Contrary to our initial hypotheses, the results did not provide support for any of the anticipated outcomes in three (Cyprus, Greece, and United Kingdom) out of four countries that the intervention was implemented. Instead, the implementation of the intervention in Romania revealed that was able to influence several of the anticipated variables. This section will discuss potential explanations for these unexpected findings, including issues related to intervention implementation, potential floor and ceiling effects, and prior exposure to anti-doping education.

Intervention Implementation

One plausible explanation for the lack of significant findings could be attributed to the implementation of the intervention itself. Several deviations from the original study protocol, due to COVID-19 restrictions, may have influenced the outcomes. First, the intervention duration was shortened, potentially limiting the exposure and depth of information provided to the participants. The decision to shorten the intervention duration that was made in order facilitate participants attend the intervention during the COVID-19 restrictions, is a critical factor that likely played a significant role in influencing the outcomes of this study. A condensed intervention schedule inherently implies a reduction in the time allocated for delivering crucial content, interactive discussions, and practical exercises. This compression may have inadvertently limited the depth and breadth of information provided to participants.

More specifically, in the shortened intervention, participants might not have had sufficient time to fully absorb and internalize the intricacies of anti-doping information. Concepts that require nuanced understanding, such as the mechanisms and consequences of doping, may have been presented in a more cursory manner. This might potentially hindered participants' ability to grasp the full scope and significance of the material. Furthermore, we observed a reduced time for interactive learning. Face-to-face interactions provide opportunities for dynamic engagement, live demonstrations, and immediate clarification of doubts or concerns. The less time allocated to the sessions may have restricted the level of interaction, potentially hindering participants' ability to actively engage with the material and their peers.

This lack of direct engagement might have diminished the impact of the program on participants' awareness and knowledge about doping.

Notably, the SAFEYOU intervention largely relies on practical activities through which the participants endorse the taught material and develop skills for implementing into practice. Such practical activities are pivotal components of any educational intervention, allowing participants to apply theoretical knowledge in a hands-on context. A shortened intervention may have curtailed the time available for executing these practical activities. As a result, participants may not have had sufficient opportunities to practice and internalize the skills necessary for resisting doping pressures effectively. Conversely, if the content was condensed too densely, participants may have experienced information overload. This could lead to reduced retention and comprehension of critical concepts, ultimately diluting the intervention's effectiveness.

A second reason for these results that is related to the implementation of the intervention involves its online delivery. SAFEYOU intervention was developed to be delivered face to face and thus a large part of the material includes interactive discussion and practical activities. Due to COVID-19 restrictions, the intervention was delivered online. While efforts were made to condense content for online delivery, it is possible that face-to-face interaction, which allows for more dynamic and interactive learning experiences, was a critical element that was inadvertently sacrificed. Furthermore, the transition to an online format might have introduced additional challenges. The absence of physical presence and personal interaction could have hindered the effectiveness of the intervention. The lack of direct engagement with facilitators and fellow participants might have diminished the impact of the program on participants' awareness and knowledge about doping. This shift to virtual delivery might have also affected the execution of practical activities, potentially compromising their efficacy.

Floor and Ceiling Effects

The presence of floor and ceiling effects in certain psychosocial variables warrants consideration (Andrade, 2021). Notably, variables such as willingness, moral disengagement, and attitudes have exhibited a floor effect, indicating that participants were already near the lower limits of these measures prior to the intervention. This may suggest that, at baseline, participants already possessed a relatively high level of

awareness and aversion towards doping. In the context of our study, these effects could have influenced the ability to detect changes in certain psychosocial variables. In particular, variables such as actual doping use, willingness, moral disengagement, and attitudes have exhibited floor effects. Consequently, any additional gains in these areas might have been difficult to detect statistically. For instance, if participants had already expressed a strong unwillingness to engage in doping behaviour or not being involved in the behaviour per se, further reductions in willingness may have been challenging to achieve, leading to a clustering of scores at the lower end of the scale. Similarly, for participants with a strong moral aversion to doping, the intervention might not have had a discernible impact on reducing moral disengagement, as they were already at a low baseline. In this vein, participants were already holding negative attitudes towards doping, leaving little room for improvement.

Conversely, ceiling effects occur when participants' scores are clustered at the upper end of the scale, indicating that they already possess high levels of a particular trait or behavior. Variables such as efficacy to resist temptations and intentions to support clean sport have experienced a ceiling effect, suggesting that participants' initial scores were already at a high level. This could indicate that the intervention could not have provided additional significant improvements beyond participants' already robust baseline levels. For instance, for participants starting with a high level of self-efficacy in resisting doping temptations prior the intervention, the intervention might not have provided significant room for improvement, leading to a clustering of scores at the upper end. Similarly, participants already expressed strong intentions to support clean sport initiatives, making it challenging for the intervention to induce further increases in this variable.

Prior Exposure to Anti-Doping Education

Another critical factor to consider is participants' prior exposure to anti-doping education. Many of the athletes in this study, such as in Greece, Cyprus and Romania, reported having received anti-doping education in the past. In addition, as doping is critical issue for athletes it is possible that many athletes had already made their search about the costs and benefits of doping. And certainly they have been engaged in informal discussions with parents, coaches and peers about the potential benefits of doping and anti-doping. This previous exposure may have already established a foundational level of knowledge and awareness, potentially limiting the incremental



effects of the current intervention. It is conceivable that repeated exposure to similar educational content over time may lead to diminishing returns in terms of knowledge acquisition and attitudinal change. The repeated exposure to anti-doping education is expected to have resulted in a saturation of knowledge. It is anticipated that participants who have previously received anti-doping education may have already attained a certain level of knowledge and awareness regarding doping. This pre-existing knowledge could have set a high baseline level, making it more challenging for the current intervention to demonstrate significant improvements. In such cases, the intervention may have been building on a strong foundation, leaving less room for substantial increases in knowledge and awareness.

In addition, prior exposure to anti-doping information, discussions and interventions is likely to have resulted in habituation to the content of such interventions (Schuetz et al., 2020). Repeated exposure to similar information or educational content (e.g., health hazards of doping use, moral concerns related to use, doping regulations etc) over time can lead to habituation. Participants who have encountered anti-doping informal information or structured education in the past may have become accustomed to the information presented. This familiarity may have diminished the novelty and impact of the current intervention, potentially contributing to the lack of significant changes in the targeted psychosocial variables.

Moreover, the continuous exposure to anti-doping information or educational interventions may result in diminishing the benefits of the intervention. With each subsequent exposure to anti-doping information or education, the incremental benefits of additional interventions may diminish. Participants who have already received comprehensive anti-doping education may experience diminishing returns in terms of knowledge acquisition and attitudinal change. This could also explain why the current intervention did not lead to significant improvements in the specified outcomes.

Considerations for future intervention implementations

The implementation of the SAFEYOU intervention did not produce the expected results due to the circumstances of its implementation and the characteristics of the participants. Nevertheless, the experience of implementing SAFEYOU is useful in defining the aspects and conditions under which anti-doping interventions can be effective. The SAFEYOU implementation revealed several issues that should be taken into account when developing and implementing anti-doping interventions. Firstly,



the duration of the intervention is of critical importance effectiveness. The current trend in anti-doping education is to develop short intervention that will be easily attended by athletes with heavy training and personal schedule. However, given the potential influence of intervention duration on efficacy, future studies may benefit from carefully considering the optimal length of interventions. Balancing the need for comprehensive content delivery with the practical constraints of participants' schedules is crucial.

With respect to the content delivery, longer interventions afford the opportunity for a more comprehensive and in-depth exploration of anti-doping concepts. They allow for a thorough examination of the mechanisms and consequences of doping, enabling participants to gain a nuanced understanding. Moreover, extended interventions provide additional time for reinforcing key messages and addressing complex questions, potentially leading to a more profound impact on participants' awareness and attitudes towards doping. Importantly, the duration of an intervention also impacts the level of interaction and engagement participants can achieve. Longer interventions may facilitate more interactive discussions, live demonstrations, and immediate clarification of doubts or concerns. This dynamic engagement fosters a deeper connection to the material, potentially leading to a more significant impact on participants' knowledge retention and application. On the other hand, the practical constraints of participants, particularly those engaged in rigorous training regimens, cannot be overlooked. Athletes often grapple with demanding schedules, leaving limited time for supplementary activities. Shorter interventions are designed to accommodate these constraints, aiming to deliver tailored made anti-doping education in a condensed format. This approach seeks to strike a balance between imparting critical information and respecting the time constraints of athletes' busy lives. Moving forward, researchers should consider tailoring intervention duration to the specific needs and circumstances of the target population. For athletes with limited availability, shorter, targeted interventions may be more effective in delivering key anti-doping messages. Conversely, for populations with more flexible schedules or a demonstrated need for in-depth education, longer interventions may be warranted.

Secondly, COVID-19's heritage of online education should be taken into account in future educational efforts. The adoption of online education has become increasingly prevalent in recent years, offering unique advantages and posing distinct



challenges. More specifically, online education a) transcends geographical boundaries, granting access to a global pool of learners, especially those who not have been accessible through traditional in-person methods, b) allows learners to flexibly schedule their studies, accommodating work, family, and other commitments, c) can be more cost-effective for both anti-doping authorities and students, d) leverages various multimedia tools, including video lectures, interactive simulations, and virtual labs that can cater to different learning styles, enhancing engagement and understanding among students, and e) and online platforms often offer a range of multimedia resources, enabling learners to tailor their educational experience to suit their learning preferences. On the other hand, online education typically reduces the in-person interaction with instructors and peers resulting in a hindered development of crucial communication, social skills as well as collaborative learning and immediate clarification of doubts. In addition, online education places a greater responsibility on individual learners to manage their time effectively and stay motivated. The advantages and disadvantages of online education are intertwined, highlighting the need for a balanced and learner-centric approach. By leveraging the strengths of online education while addressing its limitations, anti-doping authorities can create enriching educational experiences that meet the diverse needs of today's learners. In addition, researchers should explore innovative approaches, such as blended learning models that combine online modules with in-person sessions, to maximize the benefits of both formats.

Thirdly, the presence of floor and ceiling effects highlights the importance of correctly identifying the target groups and using tailor-made interventions and measures. In particular, the influence of prior exposure to anti-doping education, assumed in the present project, highlights the importance of considering participants' prior experiences when designing and implementing interventions. Researchers may need to tailor interventions to accommodate participants with varying levels of prior knowledge or beliefs about doping. For instance, more advanced or specialized interventions may be necessary for athletes who have already received extensive anti-doping education, whereas more basic information should be included in interventions targeting young and inexperienced athletes. In addition, future studies may need to consider using tailored interventions to address the specific needs of participants with varying baseline scores. For instance, interventions might be more effective when implemented with athletes considering doping use. As an example, the VIRTUE



intervention (Kavussanu et al., 2022) was found effective when implemented with athletes reporting above 2 (in a 7-point) in the intention to use doping. In this respect, future intervention implementation might benefit from stratifying participants whose prior exposure to anti-doping interventions and beliefs about doping are suitable for the content of the intervention. In the long term and through the application of different interventions, this would allow for a more nuanced analysis of the intervention's effectiveness within different subgroups, providing insights into which populations may benefit most from specific intervention approaches.

In addition, the implementation of future interventions might benefit from using more sensitive measures or statistical analyses that can capture changes in psychosocial variables, especially when participants already exhibit high or low baseline scores. In future studies, researchers may consider employing more nuanced measurement tools or statistical analyses to address the specific needs of participants with varying baseline scores. Additionally, exploring subgroups within the sample, such as participants with lower initial scores, might provide insights into whether the intervention was more effective for specific segments of the population.

Conclusion

In conclusion, the decision to shorten the intervention and deliver it online for pragmatic reasons (i.e., COVID-19 restrictions), while potentially necessary for logistical reasons, may have inadvertently impacted the depth and effectiveness of the program. Also, the presence of floor and ceiling effects in certain psychosocial variables may have influenced the ability to detect significant changes. Moreover, the influence of prior exposure to anti-doping education underscores the need for a targeted and tailored approach to intervention design. Acknowledging the varying levels of pre-existing knowledge among participants is crucial for optimizing the impact of interventions aimed at enhancing awareness, attitudes, and behaviors related to doping prevention. Recognizing and addressing these issues is crucial for refining intervention designs and selecting appropriate information to effectively target the psychosocial variables relevant to doping prevention among athletes. The discussion of the limitations observed in the implementation of the SAFEYOU intervention, due to COVID-19 restrictions, should help researchers, anti-doping authorities and stakeholders improve the future design and implementation of anti-doping interventions.

REFERENCES

- Andrade, C. (2021). The ceiling effect, the floor effect, and the importance of active and placebo control arms in randomized controlled trials of an investigational drug. *Indian Journal of Psychological Medicine*, 43(4), 360-361.
- Allen, J., Taylor, J., Dimeo, P., Dixon, S., & Robinson, L. (2015). Predicting elite Scottish athletes' attitudes towards doping: examining the contribution of achievement goals and motivational climate. *Journal of Sports Sciences*, 33(9), 899-906.
- Arandjelović, O. (2015). Doping use meta-analysis: science seasoned with moralistic prejudice. *Sports Medicine*, 45, 443-444.
- Backhouse, S.H., McKenna, J., & Patterson, L. (2009). Prevention through education: A review of current international social science literature: A focus on the prevention of bullying, tobacco, alcohol and social drug use in children, adolescents and young adults. Project Report. World Anti-Doping Agency. Retrieved from <https://eprints.leedsbeckett.ac.uk/id/eprint/1207/>
- Bahrke, M. S. (2012). Performance-enhancing substance misuse in sport: Risk factors and considerations for success and failure in intervention programs. *Substance Use & Misuse*, 47, 1505-1516.
- Barkoukis, V. (2015). Moving away from penalization: the role of education-based campaigns. In V. Barkokis, L. Lazuras, & H. Tsorbatzoudis (Eds). *The psychology of doping in sport* (pp. 215-229). Routledge.
- Barkoukis, V., Elbe, A. M., Lazuras, L., Moustakas, L., Ntoumanis, N., Palamas, G., & Stanescu, M. (2021). Virtual reality against doping: The case of project VIRAL. In *Interactive Mobile Communication, Technologies and Learning* (pp. 487-496). Cham: Springer International Publishing.
- Barkoukis, V., Kartali, K., Lazuras, L., & Tsorbatzoudis, H. (2016). Evaluation of an anti-doping intervention for adolescents: Findings from a school-based study. *Sport Management Review*, 19(1), 23-34.
- Barkoukis, V., Kaffe, S., Atkinson, A., Sumnall, H., Koskelo, J., Jussila, H. K., ... & Banyte, R. (2022). Fitness professionals' perceptions of acceptability and usability of anti-doping education tools for recreational sports. *Drugs: Education, Prevention and Policy*, 29(6), 726-736.

- Barkoukis, V., Lazuras, L., Tsorbatzoudis, H., & Rodafinos, A. (2011). Motivational and sportpersonship profiles of elite athletes in relation to doping behavior. *Psychology of Sport and Exercise*, *12*(3), 205-212.
- Barkoukis, V., Lazuras, L., Tsorbatzoudis, H., & Rodafinos, A. (2013). Motivational and social cognitive predictors of doping intentions in elite sports: An integrated approach. *Scandinavian journal of Medicine & Science in Sports*, *23*(5), e330-e340.
- Barnes, L. T., Patterson, L. B., & Backhouse, S. H. (2022). A systematic review of research into coach perspectives and behaviours regarding doping and anti-doping. *Psychology of Sport and Exercise*, *59*, 101780.
- Bates, G., Begley, E., Tod, D., Jones, L., Leavey, C., & McVeigh, J. (2019). A systematic review investigating the behaviour change strategies in interventions to prevent misuse of anabolic steroids. *Journal of Health Psychology*, *24*(11), 1595-1612.
- Blank, C., Kopp, M., Niedermeier, M., Schnitzer, M., & Schobersberger, W. (2016). Predictors of doping intentions, susceptibility, and behaviour of elite athletes: a meta-analytic review. *SpringerPlus*, *5*(1), 1-14.
- Bloodworth, A., & McNamee, M. (2010). Clean Olympians? Doping and anti-doping: The views of talented young British athletes. *International Journal of Drug Policy*, *21*(4), 276-282.
- Boardley, I. D., Smith, A. L., Mills, J. P., Grix, J., & Wynne, C. (2017). Empathic and self-regulatory processes governing doping behavior. *Frontiers in Psychology*, *8*, 1495.
- Brewer, N. T., DeFrank, J. T., & Gilkey, M. B. (2016). Anticipated regret and health behavior: A meta-analysis. *Health Psychology*, *35*(11), 1264.
- Chan, D. K., Lentillon-Kaestner, V., Dimmock, J. A., Donovan, R. J., Keatley, D. A., Hardcastle, S. J., & Hagger, M. S. (2015). Self-control self-regulation, and doping in sport: A test of the strength-energy model. *Journal of Sport and Exercise Psychology*, *37*(2), 199-206.
- De Hon, O., Kuipers, H., & Van Bottenburg, M. (2015). Prevalence of doping use in elite sports: a review of numbers and methods. *Sports Medicine*, *45*, 57-69.
- Deci, E. L., & Ryan, R. M. (2010). Self-determination. In I. B. Weiner & W. E. Craighead (Eds.), *The Corsini Encyclopedia of Psychology* (Vol. 4, pp. 1530 – 1531). Hoboken, NJ: Wiley.

- Deci, E. L. & Ryan, R. M. (1985). *Intrinsic Motivation and Self-determination in Human Behavior*. New York: Plenum
- DiClemente, R. J., Crosby, R., & Kegler, M. C. (Eds.). (2009). *Emerging theories in health promotion practice and research*. John Wiley & Sons.
- Elbe, A. M., & Barkoukis, V. (2017). The psychology of doping. *Current Opinion in Psychology*, *16*, 67-71.
- Elbe, A. M., & Brand, R. (2015). 12 Ethical dilemma training—a new approach to doping prevention?. *The psychology of Doping in Sport*, 165.
- Elliot, D. L., Goldberg, L., Moe, E. L., DeFrancesco, C. A., Durham, M. B., McGinnis, W., & Lockwood, C. (2008). Long-term outcomes of the ATHENA (Athletes Targeting Healthy Exercise & Nutrition Alternatives) program for female high school athletes. *Journal of Alcohol and Drug Education*, *52*(2), 73.
- Fishbein, M., & Cappella, J. N. (2006). The role of theory in developing effective health communications. *Journal of Communication*, *56*(suppl_1), S1-S17.
- Fishbein, M. (2009). An integrative model for behavioral prediction and its application to health promotion. In R. J. DiClemente, R. A. Crosby, & M. C. Kegler (Eds.), *Emerging Theories in Health Promotion Practice and Research* (pp. 215–234). Jossey-Bass/Wiley.
- García-Grimau, E., De la Vega, R., & Casado, A. (2022). Moral disengagement, social norms, and motivational profiles influence attitudes toward doping among Spanish athletics coaches. *Frontiers in Sports and Active Living*, *4*, 75.
- Girelli, L., Cavicchiolo, E., Alivernini, F., Manganelli, S., Chirico, A., Galli, F., ... & Lucidi, F. (2020). Doping use in high-school students: Measuring attitudes, self-efficacy, and moral disengagement across genders and countries. *Frontiers in Psychology*, *11*, 663.
- Gleaves, J., Petróczi, A., Folkerts, D., De Hon, O., Macedo, E., Saugy, M., & Cruyff, M. (2021). Doping prevalence in competitive sport: evidence synthesis with “best practice” recommendations and reporting guidelines from the WADA Working Group on Doping Prevalence. *Sports Medicine*, *51*(9), 1909-1934.
- Goldberg, L., & Elliot, D. L. (2005). Preventing substance use among high school athletes: The ATLAS and ATHENA programs. *Journal of Applied School Psychology*, *21*(2), 63-87.
- Goldberg, L., Elliot, D. L., Clarke, G. N., MacKinnon, D. P., Moe, E., Zoref, L., et al. (1996). Effects of a multidimensional anabolic steroid prevention intervention.

- The Adolescents Training and Learning to Avoid Steroids (ATLAS) program. *JAMA*, 276,1555–1562.
- Goldberg, L., MacKinnon, D. P., Elliot, D. L., Moe, E. L., Clarke, G., & Cheong, J. (2000). The adolescents training and learning to avoid steroids program: preventing drug use and promoting health behaviors. *Archives of Pediatrics & Adolescent Medicine*, 154(4), 332-338.
- Greenhow, C., Robelia, B., & Hughes, J. E. (2009). Learning, teaching, and scholarship in a digital age: Web 2.0 and classroom research: What path should we take now?. *Educational Researcher*, 38(4), 246-259.
- Guo, L., Liang, W., Baker, J. S., & Mao, Z. X. (2021). Perceived motivational climates and doping intention in adolescent athletes: The mediating role of moral disengagement and sportspersonship. *Frontiers in Psychology*, 12, 611636.
- Hardwick, B., Madigan, D. J., Hill, A. P., Kumar, S., & Chan, D. K. (2022). Perfectionism and attitudes towards doping in athletes: The mediating role of achievement goal orientations. *International Journal of Sport and Exercise Psychology*, 20(3), 743-756.
- Hodge, K., Hargreaves, E. A., Gerrard, D., & Lonsdale, C. (2013). Psychological mechanisms underlying doping attitudes in sport: Motivation and moral disengagement. *Journal of Sport and Exercise Psychology*, 35(4), 419-432.
- James, R., Naughton, D. P., & Petróczy, A. (2010). Promoting functional foods as acceptable alternatives to doping: potential for information-based social marketing approach. *Journal of the International Society of Sports Nutrition*, 7(1), 37.
- Kavussanu, M., & Ring, C. (2017). Moral identity predicts doping likelihood via moral disengagement and anticipated guilt. *Journal of Sport and Exercise Psychology*, 39(4), 293-301.
- Kavussanu, M., Barkoukis, V., Hurst, P., Yukhymenko-Lescroart, M., Skoufa, L., Chirico, A., Lucidi, F., & Ring, C. (2022). A psychological intervention reduces doping likelihood in British and Greek athletes: A cluster randomized controlled trial. *Psychology of Sport and Exercise*, 61, 102099.
- Kavussanu, M., Yukhymenko-Lescroart, M. A., Elbe, A. M., & Hatzigeorgiadis, A. (2020). Integrating moral and achievement variables to predict doping likelihood in football: A cross-cultural investigation. *Psychology of Sport and Exercise*, 47, 101518.

- Lazuras, L., Barkoukis, V., Rodafinos, A., & Tzorbatzoudis, H. (2010). Predictors of doping intentions in elite-level athletes: a social cognition approach. *Journal of Sport and Exercise Psychology, 32*(5), 694-710.
- Lazuras, L., Barkoukis, V., & Tzorbatzoudis, H. (2015). Toward an integrative model of doping use: an empirical study with adolescent athletes. *Journal of Sport and Exercise Psychology, 37*(1), 37-50.
- Lazuras, L., Barkoukis, V., Mallia, L., Lucidi, F., & Brand, R. (2017). More than a feeling: The role of anticipated regret in predicting doping intentions in adolescent athletes. *Psychology of Sport and Exercise, 30*, 196-204.
- Lerner, J. S., Li, Y., Valdesolo, P., & Kassam, K. (2015). Emotion and Decision Making. *Annual Review of Psychology, 1*.
- Leu, D. J., Kinzer, C. K., Coiro, J. L., & Cammack, D. W. (2004). Toward a theory of new literacies emerging from the Internet and other information and communication technologies. *Theoretical Models and Processes of Reading, 5*(1), 1570-1613.
- Lucidi, F., Grano, C., Leone, L., Lombardo, C., & Pesce, C. (2004). Determinants of the intention to use doping substances: an empirical contribution in a sample of Italian adolescents. *International Journal of Sport Psychology, 35*(2), 133-148.
- Lucidi, F., Zelli, A., Mallia, L., Grano, C., Russo, P. M., & Violani, C. (2008). The social-cognitive mechanisms regulating adolescents' use of doping substances. *Journal of Sports Sciences, 26*(5), 447-456.
- Lucidi, F., Mallia, L., Alivernini, F., Chirico, A., Manganelli, S., Galli, F., Biasi, V., & Zelli, A. (2017). The effectiveness of a new school-based media literacy intervention on adolescents' doping attitudes and supplements use. *Frontiers in Psychology, 8*, 749.
- Madigan, D. J., Mallinson-Howard, S. H., Grugan, M. C., & Hill, A. P. (2020). Perfectionism and attitudes towards doping in athletes: A continuously cumulating meta-analysis and test of the 2×2 model. *European Journal of Sport Science, 20*(9), 1245-1254.
- Madigan, D. J., Stoeber, J., & Passfield, L. (2015). Perfectionism and burnout in junior athletes: A three-month longitudinal study. *Journal of Sport and Exercise Psychology, 37*(3), 305-315.
- Mallia, L., Lazuras, L., Barkoukis, V., Brand, R., Baumgarten, F., Tzorbatzoudis, H., Zelli, A., & Lucidi, F. (2016). Doping use in sport teams: The development and

- validation of measures of team-based efficacy beliefs and moral disengagement from a cross-national perspective. *Psychology of Sport and Exercise*, 25, 78-88.
- Melzer, M., Elbe, A. M., & Brand, R. (2010). Moral and ethical decision-making: A chance for doping prevention in sports?. *Etikk i praksis-Nordic Journal of Applied Ethics*, (1), 69-85.
- Mwangi, F. M., Toriola, O., & Rintaugu, E. G. (2019). Influence of achievement goals and motivational climate on attitudes toward doping among East African university athletes. *African Journal for Physical Activity and Health Sciences (AJPHEs)*, 25(4), 547-562.
- Nicholls, A. R., Cope, E., Bailey, R., Koenen, K., Dumon, D., Theodorou, N., Chanal, B., Laurent, D. S., Muller, D., Andres, M., Kristensen, A., Thompson, M., Benoit, W. B. & Laurent, J. F. (2017). Children's first experience of taking anabolic-androgenic steroids can occur before their 10th birthday: a systematic review identifying 9 factors that predicted doping among young people. *Frontiers in Psychology*, 1015.
- Nicholls, A. R., Fairs, L. R., Plata-Andrés, M., Bailey, R., Cope, E., Madigan, D., Koenen, K., Glibo, I., Theodorou, N., Laurent, J., Garcia, G., & Chanal, B. (2020). Feasibility randomised controlled trial examining the effects of the Anti-Doping Values in Coach Education (ADVICE) mobile application on doping knowledge and attitudes towards doping among grassroots coaches. *BMJ Open Sport & Exercise Medicine*, 6(1), e000800.
- Nicholls, A. R., Madigan, D. J., Backhouse, S. H., & Levy, A. R. (2017). Personality traits and performance enhancing drugs: The Dark Triad and doping attitudes among competitive athletes. *Personality and Individual Differences*, 112, 113-116
- Nicholls, A. R., Morley, D., Thompson, M. A., Huang, C., Abt, G., Rothwell, M., Cope, E., & Ntoumanis, N. (2020). The effects of the iPlayClean education programme on doping attitudes and susceptibility to use banned substances among high-level adolescent athletes from the UK: A cluster-randomised controlled trial. *International Journal of Drug Policy*, 82, 102820.
- Nicholls, J. G., Cheung, P. C., Lauer, J., & Patashnick, M. (1989). Individual differences in academic motivation: Perceived ability, goals, beliefs, and values. *Learning and Individual Differences*, 1(1), 63-84.

- Ntoumanis, N., Barkoukis, V., Gucciardi, D. F., & Chan, D. K. C. (2017). Linking coach interpersonal style with athlete doping intentions and doping use: a prospective study. *Journal of Sport and Exercise Psychology*, 39(3), 188-198.
- Ntoumanis, N., Gucciardi, D. F., Backhouse, S. H., Barkoukis, V., Quested, E., Patterson, L., ... & Kaffe, S. (2018). An intervention to optimize coach motivational climates and reduce athlete willingness to DOPE (CoachMADE): protocol for a cross-cultural cluster randomized control trial. *Frontiers in Psychology*, 8, 2301.
- Ntoumanis, N., Ng, J. Y., Barkoukis, V., & Backhouse, S. (2014). Personal and psychosocial predictors of doping use in physical activity settings: a meta-analysis. *Sports Medicine*, 44, 1603-1624.
- Ntoumanis, N., Quested, E., Patterson, L., Kaffe, S., Backhouse, S. H., Pavlidis, G., Whitaker, L., Barkoukis, V., Smith, B., Staff, H., & Gucciardi, D. F. (2021). An intervention to optimise coach-created motivational climates and reduce athlete willingness to dope (CoachMADE): a three-country cluster randomised controlled trial. *British Journal of Sports Medicine*, 55(4), 213-219.
- Petróczi, A., & Aidman, E. (2008). Psychological drivers in doping: The life-cycle model of performance enhancement. *Substance Abuse Treatment, Prevention, and Policy*, 3, 1-12.
- Petroczi, A. (2013). The doping mindset—Part I: Implications of the functional use theory on mental representations of doping. *Performance Enhancement & Health*, 2(4), 153-163.
- Petróczi, A., Cruyff, M., de Hon, O., Sagoe, D., & Saugy, M. (2022). Hidden figures: Revisiting doping prevalence estimates previously reported for two major international sport events in the context of further empirical evidence and the extant literature. *Frontiers in Sports and Active Living*, 4, 1017329.
- Petrou, M., Lazuras, L., Hillier, M., & Mojtahedi, D. (2022). Doping behaviour in mixed martial arts athletes: The roles of social norms and self-regulatory efficacy. *International Journal of Sport and Exercise Psychology*, 20(4), 1086-1101.
- Ring, C., & Hurst, P. (2019). The effects of moral disengagement mechanisms on doping likelihood are mediated by guilt and moderated by moral traits. *Psychology of Sport and Exercise*, 40, 33-41.

- Sagoe, D., Huang, K., Molde, H., Andreassen, C. S., & Pallesen, S. (2016). Perceived anabolic-androgenic steroid use is associated with perceived neuroticism. *Journal of Substance Use, 21*(3), 263-267.
- Sagoe, D., Holden, G., Rise, E. N. K., Torgersen, T., Paulsen, G., Krosshaug, T., Lauritzen, F., & Pallesen, S. (2016). Doping prevention through anti-doping education and practical strength training: The Hercules program. *Performance Enhancement & Health, 5*(1), 24-30.
- Sandberg, T., Hutter, R., Richetin, J., & Conner, M. (2016). Testing the role of action and inaction anticipated regret on intentions and behaviour. *British Journal of Social Psychology, 55*(3), 407-425.
- Schuetz, S. W., Benjamin Lowry, P., Pienta, D. A., & Bennett Thatcher, J. (2020). The effectiveness of abstract versus concrete fear appeals in information security. *Journal of Management Information Systems, 37*(3), 723-757.
- Sipavičiūtė, B., Šukys, S., & Dumčienė, A. (2020). Doping prevention in sport: Overview of anti-doping education programmes. *Baltic Journal of Sport and Health Sciences, 2*(117).
- Skoufa, L., Daroglou, G., Loukovitis, A., Lunde, H., Guižauskaitė, G., & Barkoukis, V. (2022). Football players' preferences for anti-doping education: A cross-country study. *Performance Enhancement & Health, 10*(1), 100217.
- Stoeber, J. (2011). The dual nature of perfectionism in sports: Relationships with emotion, motivation, and performance. *International Review of Sport and Exercise Psychology, 4*(2), 128-145.
- Stoll, O., Lau, A., & Stoeber, J. (2008). Perfectionism and performance in a new basketball training task: Does striving for perfection enhance or undermine performance?. *Psychology of sport and Exercise, 9*(5), 620-629.
- Ulrich, R., Pope, H. G., Cléret, L., Petróczi, A., Nepusz, T., Schaffer, J., Kanayama, G., Comstock, D., & Simon, P. (2018). Doping in two elite athletics competitions assessed by randomized-response surveys. *Sports Medicine, 48*, 211-219
- Valkenburg, P. M., & Peter, J. (2007). Online communication and adolescent well-being: Testing the stimulation versus the displacement hypothesis. *Journal of Computer-Mediated Communication, 12*(4), 1169-1182.
- Woolf, J. J. R. (2020). An examination of anti-doping education initiatives from an educational perspective: Insights and recommendations for improved educational design. *Performance Enhancement & Health, 8*(2-3), 100178.

Zucchetti, G., Candela, F., & Villosio, C. (2015). Psychological and social correlates of doping attitudes among Italian athletes. *International Journal of Drug Policy*, 26(2), 162-168.

Zhumabayeva, G., Kapanova, G., Vinnikov, D., Bakasheva, M., Abdulla, V., & Grjibovski, A. (2022). Knowledge and experience of Kazakhstan athletes in anti-doping and the impact of past educational intervention. *Substance Abuse Treatment, Prevention, and Policy*, 17(1), 1-8.

