Perfectionism and Attitudes Towards Doping in Athletes: The Mediating Role of Achievement Goal Orientations

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The candidate confirms that the work submitted is his own and that appropriate credit has been given where reference has been made to the work of others.

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Onwards and upwards!

Abstract

Doping is of increasing concern for those involved in sport. With this in mind, researchers have sought to determine factors that increase the risk of doping. Perfectionism is one such factor. Perfectionism is a multidimensional personality characteristic comprised of excessively high personal standards (perfectionistic strivings) and overly critical evaluations (perfectionistic concerns). While numerous studies have shown that perfectionistic strivings and perfectionistic concerns predict attitudes towards doping in athletes, it is currently unclear why this is the case. In this regard, achievement goal orientations may be important. Goal orientations reflect tendencies to judge success based on the development and demonstration of self-referenced (task) or normative (ego) competence. Perfectionistic strivings and concerns are related to both task- and ego-orientations (albeit to different degrees). Consequently, the present study provided a first examination of whether achievement goal orientations mediated the relationship between perfectionism and attitudes towards doping. Following institutional ethical approval, 135 athletes (mean age 24.4 years) completed measures of perfectionistic strivings, perfectionistic concerns, ego-orientation, task-orientation, and attitudes towards doping. Using bias-corrected bootstrapping of indirect effects, ego-orientation mediated the relationships between perfectionistic strivings and attitudes towards doping (indirect effect = .07, 95% CI = .01,.18) and perfectionistic concerns and attitudes towards doping (indirect effect = .08, 95% CI = .01,.20). Overall, the findings imply that both perfectionistic strivings and perfectionistic concerns may instil the belief that success is defined by beating others. This belief may impart the tendency to consider doping as socially acceptable and necessary.

Keywords: Perfectionism, achievement goals, doping, athletes

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List of abbreviations

Abbreviation	Meaning	Page
AAS	Anabolic Androgenic Steroids	4
AGT	Achievement Goal Theory	20
APS-R	Revised Almost Perfect Scale	12
CFI	Comparative Fit Index	30
CI	Confidence Interval	30
EPO	Erythropoietin	4
FMPS	Frost Multidimensional Perfectionism Scale	12
HF-MPS	Hewitt-Flett Multidimensional Perfectionism Scale	12
HGH	Human Growth Hormone	4
IOC	International Olympic Committee	1
LCMPE	Life Cycle Model of Performance Enhancement	7
MIPS	Multidimensional Inventory of Perfectionism in Sport	14
NNFI	Non-Normed Fit Index	30
OOP	Other Oriented Perfectionism	12
PANPS	Positive and Negative Perfectionism Scale	12
PEAS	Performance Enhancement Attitude Scale	6
PI	Perfectionism Inventory	13
PSS	Perfectionism in Sport Scale	13
RMSEA	Root Mean Square Error of Approximation	30
SDCM	Sport Drug Control Model	7
SMPS	Sport Multidimensional Perfectionism Scale	13
SOP	Self-Oriented Perfectionism	12
SPP	Socially Prescribed Perfectionism	12
SRMR	Standardised Root Mean Square Residual	30
TEOSQ	Task and Ego Orientation in Sport Questionnaire	28
TLI	Tucker-Lewis Index	30
WADA	World Anti-Doping Agency	1

1. Introduction

Athletes are under increasing pressure to perform (Mandarić & Delibašić, 2014). In order to cope with these pressures, some athletes may engage in illegal behaviours, such as doping. To support this idea, recent evidence suggests that more athletes than ever may be doping (Ulrich et al., 2018). As such, governing bodies, researchers, and coaches are looking for ways to explain and understand this trend. In this regard, research suggests that an athlete's personality may be particularly important. One relevant personality factor that has been implicated in an athlete's decision of whether to dope or not is perfectionism. Consequently, the present study aimed to further examine the role of perfectionism in predicting athletes' attitudes towards doping. In doing so, the study will extend previous work by examining whether achievement goal orientations are a factor that may explain (i.e., mediate) this relationship.

1.1 Doping

Doping is a specific type of performance enhancement that involves the use of or manipulation of synthetic or autologous substances that the World Anti-Doping Agency (WADA) has banned (Momaya, Fawal & Este, 2015). In modern times, there have been several notable instances of doping use reported by the media. For example, during the Tour de France in 1998, a drug raid found a large quantity of banned performance enhancement substances in one of the team's hotels rooms. As a consequence of the increased interest in doping, the International Olympic Committee (IOC) organised a world conference in February 1999, whereby the Lausanne Declaration on Doping in Sport was produced. Under this declaration, the World Anti-Doping Agency (WADA) was formed. The main objective of WADA is to protect sport and fight against doping (WADA, 2015). To this aim, WADA produced a list of banned

substances, which is updated on a yearly basis, and for which athletes are regularly tested. Currently, WADA categorise substances under three categories, two of which must be met for it to be classified as a banned substance, these include; (1) it can potentially enhance sport performance, (2) it possesses a risk, or potential risk to the user's health, or (3) breaches the integrity of sport (WADA, 2015).

The IOC and WADA deem doping a rule violation and doping is therefore considered cheating (WADA, 2015; Corlett, Brown & Kirkland, 2013). Cheating is a deceptive behaviour where individuals intend to break rules in order to make prohibited gains (Reddiford, 1998). In early work, Striegel, Vollkommer, and Dickhuth (2002) examined the reasons athletes would choose to break the rules by using banned performance-enhancing substances. Athletes reported using banned substances for the following reasons: for athletic success (86%), financial gain (74%), increasing self-confidence (30%) and social acknowledgement (24%) (see also Backhouse et al., 2007). However, more recent research has indicated that these enticements are often weighed up against the possible risks of doping. If these benefits outweigh the risks athletes will more likely engage in doping and the use of banned performance-enhancing substances (Ring et al., 2018).

Doping is becoming an increasing concern due to the development of new procedures and new drugs, which means there are no testing procedures able to detect if athletes have used such banned substances (Trout & Kazlauskas, 2004; Haugen, 2004). With the emergence of new 'designer' drugs, testing for doping in sport has become increasingly difficult. Additionally, there are opportunities, surroundings, and conditions which can increase the prevalence of anti-doping rule violations (Backhouse, Griffiths & McKenna, 2017). Ultimately, this means that athletes today may be more likely to participate in doping behaviours as there is potentially less risk of them being caught.

Therefore, adopting a preventative approach in order to dissuade athletes from doping has been widely encouraged (Backhouse, McKenna & Patterson, 2009).

1.2 Doping Prevalence

In order to deter athletes from doping, WADA is involved in the testing of thousands of athletes' blood and urine samples. These tests result in a positive finding approximately 1-2% of the time (Ulrich et al., 2018). It is a common assumption among researchers that many athletes are slipping under the radar when it comes to testing, especially given the emergence of more modern doping methods (Butch et al., 2011; Thomas et al., 2011; Beiter et al., 2011; Ashenden et al., 2011; Sottas et al., 2011). This assumption stems from the recent major doping scandals within popular sports (Callaway, 2011; Sparling, 2013; Pielke, 2015). Estimations based on self-report measures suggest that doping rates in sport may range anywhere from 5-31% (Simon et al., 2006; Striegel et al., 2006; Buckman et al., 2009; Dietz et al., 2013).

A recent systematic review of doping in elite sport (de Hon et al., 2015) suggest that doping prevalence may be even higher (14-39% of athletes). However, in this review, de Hon et al. (2015) stated that doping prevalence was still under-researched, especially in elite sport. In a more recent study, Ulrich et al. (2018) identified that across two major sports events the prevalence of doping was significantly higher (43.6% of 440 athletes and 57.1% of 670 athletes) than the 1-2% estimated from biological testing. These findings suggest that there is still a large percentage of athletes who may be violating the spirit of sport by doping.

1.3 Health Implications of Doping

Regardless of the prevalence of doping in sport, some athletes are still using banned performance-enhancing substances. Doping not only diminishes the potential for an equal playing field but it places significant risk on an athlete's mental and physical

health (Kayser, Mauron & Miah, 2007). Worryingly, many athletes still do not fully understand the health risks associated with doping (Nicholls et al., 2015). A recent systematic review examined banned performance-enhancing substances in sport (Momaya, Fawal & Estes, 2015). The study highlighted a number of commonly used banned performance-enhancing substances in sport, including; anabolic androgenic steroids (AAS), Human Growth Hormone (HGH), amphetamines, stimulants, Erythropoietin (EPO), and blood doping (see also Reardon & Creado, 2014). There are substantial health implications associated with all of these substances.

Typically, AAS use has a considerable amount of side effects. These can include; acne, testicular atrophy, gynecomastia, cutaneous striae, and injection site pain and infection (Momaya, Fawal & Estes, 2015). In addition to these, the use of AAS can present further side effects that can be life-threatening, including cardiovascular disease, cancer, arrhythmias, stroke, blood clots, and liver dysfunction (Liddle & Connor, 2013). These side effects occur because of an increase in triglyceride levels, changes to the myocardium and dilated cardiomyopathy and the concentration of several clotting factors (Momaya, Fawal & Estes, 2015).

Another popular banned performance-enhancing substance, HGH can also have numerous side effects. HGH can cause fluid accumulation, which leads to carpal tunnel syndrome, pseudotum or cerebri, and arthralgias. This is because HGH activates the renin-angiotensin system (Momaya, Fawal & Estes, 2015). Additionally, HGH can cause insulin resistance, hyperlipidaemia, cancer, and cardiovascular disease (Rennie, 2003).

Stimulants, such as Amphetamines, D-methamphetamine, methylphenidate, ephedrine, pseudoephedrine, caffeine and cocaine can have significant side effects for athletes. These include; rebound fatigue, headaches, nausea, gastrointestinal distress,

insomnia and anxiety/panic attacks. Additionally, more severe side effects include; hallucinations, seizures, stroke, exhaustion from heat, arrhythmias, and psychosis (McDuff & Baron, 2005; Liddle & Connor, 2013).

EPO and blood doping can also develop into health-related problems for athletes. For example, five Dutch cyclists died from unexplained causes in the first year EPO was released (Momaya, Fawal & Estes, 2015). Additionally, between 1997 and 2000, 18 cyclists have also died from myocardial infarction, pulmonary embolism, or stroke (Tokish, Kocher & Hawkins, 2004). However, it is important to consider that not all banned performance-enhancing substances in sport are illegal drugs or medications, such as anabolic steroids (Wanjek et al., 2007). Some banned substances can be found in dietary supplements and other compounds found at food stores (Botre & Pavan, 2009).

Finally, researchers have highlighted the possible effects of banned performance-enhancing substances on an athlete's mental health (Lindqvist et al., 2013). This includes research suggesting a link between steroid use and an increase in the risk of suicide (Morse, 2013). In conjunction with the fact that athletes may be less likely to seek help for mental health concerns, these issues show that educating athletes about the possible consequences of doping is essential. To this aim, researchers have sought to quantify an athlete's likelihood to dope.

1.4 Attitudes Towards Doping

Because doping is an illicit behaviour it is particularly difficult to measure. This said several researchers, have devised methods to quantify doping behaviours (Mallia et al., 2016; Gucciardi, Jalleh & Donovan, 2010; Petróczi & Aidman, 2009; Petroczi, 2007). Research has adopted several models and has focused on a range of variables including athlete's attitudes towards doping (Petróczi & Aidman, 2009), susceptibility

to doping (Gucciardi, Jalleh & Donovan, 2010), and doping use (Mallia et al., 2016). Of these, a large body of research has sought to examine the role of attitudes towards doping (Petróczi, 2007; Petroóczi & Aidman, 2008; Bahrami et al., 2014; Zucchetti, Candela & Villosio, 2015; Madigan, Stoeber & Passfield, 2016; Nicholls, Madigan & Levy, 2017).

Attitudes stem from evaluating and associated behavioural choice from everyday life, which results in liking or disliking a certain behaviour (Petty, Wegener & Fabrigar, 1997). This sense of good or bad, pleasant or unpleasant, negative or positive is fundamental in most behaviours (Cunningham & Johnson, 2007). Schwarz and Bohner (2001) highlighted the importance of subjective experiences that are associated with attitudes, which then manifest into approach or avoidance behaviours. This suggests that attitudes form a distinct type of motivation for individuals. Typically, athletes have attitudes towards doping in order to perform better, for an inner desire to win and external pressures to win (Anshel, 1991; Kersey, 1993). Therefore, attitudes are beliefs that doping is necessary and socially acceptable (Petrozci & Aidman, 2009). Consequently, attitudes are likely to predict doping behaviours (Lucidi et al., 2008).

Given the potential importance of attitudes, Petróczi and Aidman (2009) sought to develop a measure in relation to doping. They developed the Performance Enhancement Attitude Scale (PEAS; Petróczi & Aidman, 2009). The PEAS is a 17-item unidimensional scale that measures athletes' beliefs that doping is socially acceptable and necessary to be successful in the sport. The PEAS is based around current literature that defines doping within a sports context (e.g., Petróczi & Aidman, 2009). Although initial studies support the scales validity and reliability, Nicholls, Madigan, and Levy (2017) recently suggested that an 8-item version of the PEAS provides a better factor-analytic representation of athletes' data. Both versions have been used in numerous

studies in sport including those examining antecedents of doping in sport (e.g., Petróczi, 2007; Petroóczi & Aidman, 2008; Bahrami et al., 2014; Zucchetti, Candela & Villosio, 2015; Madigan, Stoeber & Passfield, 2016; Nicholls, Madigan & Levy, 2017). Attitudes are integral to models that aim to explain doping behaviour (Dodge & Jaccard, 2008; Donovan et al., 2002; Lucidi et al., 2008; Strelan & Boeckmann, 2003).

1.5 Models of Attitudes Towards Doping

Many models have been proposed to explain athletes' doping behaviours (Strelan & Boeckmann, 2003; Petróczi, 2013; Stewart & Smith, 2008; Smith et al., 2010; Mazanov & Huybers, 2010; Johnson, 2011; Johnson, 2012; Lazarus et al., 2015; Gibbons et al., 1998). Each model proposes numerous antecedents of doping behaviour, which include personal factors, social pressures, and environmental factors. There are two models that are particularly important because they have the most empirical support and include a central role for attitudes towards doping. These are the Life Cycle Model of Performance Enhancement (LCMPE; Petróczi & Aidman, 2008) and the Sport Drug Control Model (SDCM; Donovan et al., 2002).

Both the LCMPE and the SDCM indicate that doping behaviours are goal-directed, self-regulated and intentional (Wolff, Schindler & Brand, 2015). The LCMPE (Figure 1) features personality traits, situational traits and systematic factors that are all different risk factor groups. In accordance with the LCMPE, banned performance-enhancing substance use stems across six distinct phases, which include the choice, goal commitment, execution, goal attainment feedback, goal evaluation, and adjustment phase. In the last phase, the individual then decides if they wish to repeat the cycle or to abandon it (Petróczi & Aidman, 2008). Athletes progressing from one phase to the next stem from the relationship between their personality, systemic and situational factors including attitudes towards doping. This process will continue until the athlete abandons

their goal of performance enhancement (Petróczi & Aidman, 2008).

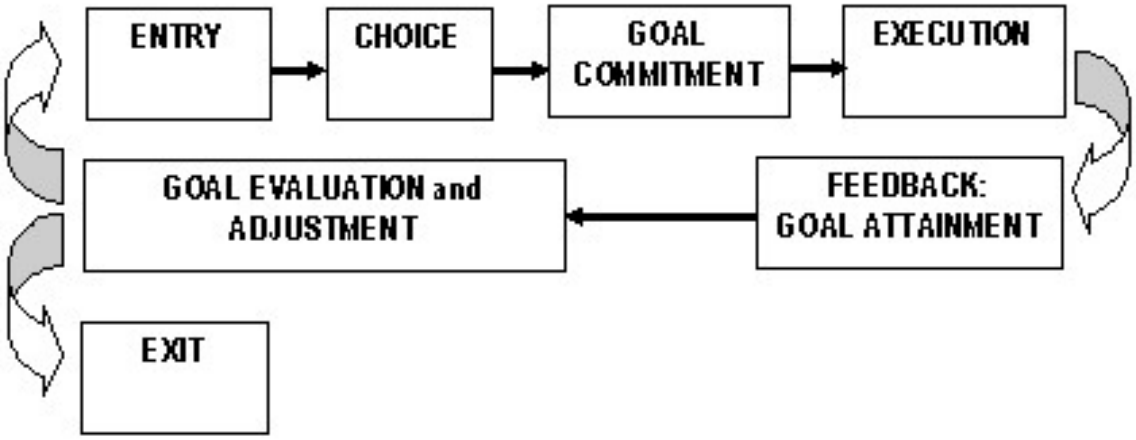

Figure 1. The life-cycle model of performance enhancement (Petróczi & Aidman, 2008).

The SDCM (Figure 2) indicates that forming intentions and attitudes towards doping results from a number of factors, which include; threat appraisals, incentives, social norms, moral stance, the perceived legitimacy of anti-doping policies, and personality factors. Jalleh and colleagues (Gucciardi, Jalleh & Donovan, 2011; Jalleh, Donovan & Jobling, 2014) have tested the SDCM twice. Gucciardi and colleagues (2011) reported that the variance between the SDCM and doping attitudes was 30% and 11% for doping susceptibility. Threat appraisal (β^3 = 0.14), benefit appraisal (β = 0.25), and cheating (β = 0.40) significantly predicted doping attitudes, which predicted doping susceptibility (β = 0.33). They found that the significant predictors of attitudes towards doping use were morality (β = 0.64), legitimacy (β = 0.25), and reference group opinion (β = 0.19). Importantly, attitudes were significantly associated with actual doping behaviour (β = 0.36). Elbe and Barkoukis (2017) highlighted that the SDCM may be useful to help understand the determinants of doping use.

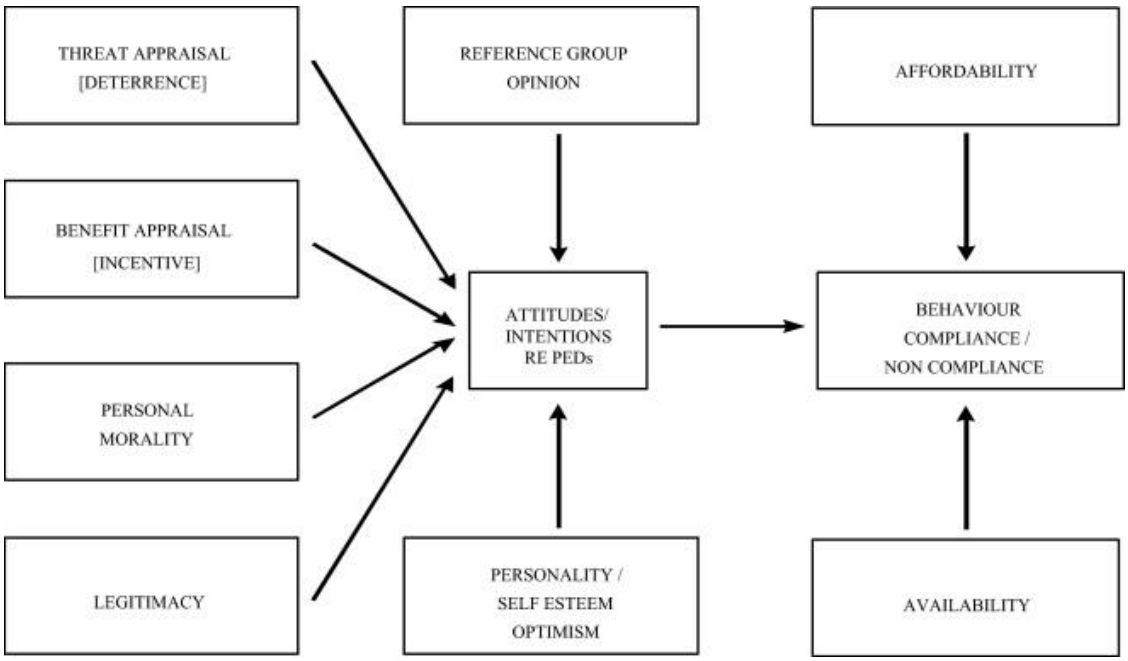

Figure 2. The Sport Drug Control Model (SDCM; Donovan et al., 2002).

Athletes' attitudes towards doping have been widely researched in sport psychology to further understand athletes' doping behaviours. In the first meta-analysis of the doping literature, based on 14 studies, and a total of 6,878 athletes, Ntoumanis et al. (2014) found that attitudes were a significant predictor of doping behaviours (q = 0.17, 95 % CI 0.04–0.29). Thus, there appears to be sufficient theoretical and empirical rationale to examine attitudes towards doping as a proxy measure of actual doping use.

1.6 Predictors of Attitudes Towards Doping

Discussing doping matters with athletes is a difficult task, hence the lack of research in this area (Morente-Sanchez & Zabala, 2013). This also explains why attitudes towards doping are more widely researched (Bahrami et al., 2014; Zucchetti, Candela & Villosio, 2015; Madigan, Stoeber & Passfield, 2016; Bae et al., 2017). Attitudes towards doping are often used to determine behaviours, which are the biggest predictor of doping intentions (Lucidi et al., 2004; Petroczi & Aidman, 2009). Typically, attitudes towards doping are mixed. In a study by Peretti-Watel et al. (2004)

90% of athletes deemed doping as dishonest, risky and unhealthy. These findings have been reported in a similar study, with 91% (N = 433) of athletes reporting that they would have feelings of guilt if they used banned performance-enhancing substances (de Hon, Eijs & Havenga, 2011). Whilst another study highlighted that 74% of athletes stating that using PES's are very dangerous to health (Alaranta et al., 2006).

However, some studies have found different views on doping. A study on eight Swiss cyclists found that they deemed doping as acceptable if it was used in a professional setting, but was not acceptable in an amateur setting (Lentillon-Kaestner & Carstairs, 2010). Furthermore, in a survey of 403 athletes, 72% disclosed that they would dope if it had no harmful side effects, while more than 40% said they would dope even if their lifespan was shortened (Bloodworth et al., 2012). Bloodworth & McNamee (2010) reported similar results, with some athletes considering a hypothetical performance-enhancing substance if it guaranteed success and it could not be detected. Additionally, Waddington et al. (2005) found that 5% of 706 English footballers stated that they would use performance-enhancing substances if it would guarantee world cup selection for their national team.

1.7 Personality and Attitudes Towards Doping

Another factor that may influence an athlete's attitudes towards doping is personality. Personality represents individual differences in thoughts, feelings, and behaviours that are consistent across situations and contexts (Pervin & Cervone, 2010). Therefore, personality may predict doping-relevant cognitions, emotions, and behaviours. This may be particularly the case for attitudes towards doping (Lucidi et al., 2004; Petroczi & Aidman, 2009). Previous research has highlighted the link between personality and attitudes towards doping. For example, Nicholls et al. (2017) examined the relationship between the Dark Triad and attitudes towards doping.

The Dark Triad are three distinct, but related personality traits; Machiavellianism, psychopathy, and narcissism. Nicholls and colleagues (2017) found that all three factors had a positive correlation with attitudes towards doping. Moreover, the combination of the three traits explained 29% of the variance in athletes' attitudes towards doping. These findings suggest that athletes who score highly across the dark triad of Machiavellianism, psychopathy, and narcissism may be more likely to dope. Another personality factor that may be particularly important in relation to doping is perfectionism.

1.8 Perfectionism

Perfectionism is a complex personality characteristic. It can be broadly defined as a characteristic that comprises extremely high standards, which are accompanied by overly critical evaluations of behaviour (Frost et al., 1990). Perfectionism was first discussed in detail in the counselling and clinical field by several renowned psychotherapists (Horney, 1946; Ansbacher & Ansbacher, 1956). In recent years, research on perfectionism has grown exponentially (Stoeber, 2018). Much of this work owes much to the development of multidimensional models of perfectionism.

1.9 Models of Perfectionism

Perfectionism was originally conceptualised as a unidimensional construct (Burns, 1980). Such models focused on the negative attitudes and irrational beliefs that are associated with perfectionism (see Hill, 2016). However, several decades of research have suggested that perfectionism may be a much more complicated construct. Importantly, our current understanding of perfectionism is that it is best considered multidimensional (i.e., constructed of multiple dimensions). Several groups of researchers have developed multidimensional models of perfectionism.

Frost and colleagues (1990) were the first to publish a multidimensional measure of perfectionism: The Frost Multidimensional Perfectionism Scale (FMPS). The FMPS consists of 35 items, with six subscales, which include; personal standards, concern over mistakes, doubts about actions, parental expectations, parental criticism, and organisation. However, a noted critique of this model is that its factorial validity is unclear, with a factorial analysis identifying between three and five factors, rather than six (Stoeber & Madigan, 2016).

Around the same time, Hewitt and Flett (1991) produced the Hewitt-Flett Multidimensional Perfectionism Scale (HF-MPS). This model identified three dimensions of perfectionism; self-oriented perfectionism (SOP), socially prescribed perfectionism (SPP), and other-oriented perfectionism (OOP). The SOP is the search of exceedingly high standards, along with strict and debilitating self-criticism. SPP is the awareness that significant others impose unrealistic standards on one's self. And finally, OOP refers to the tendency to inflict unrealistic expectations on others. All three types of perfectionism are theorised to predispose individuals to a debilitating pattern of emotions, cognitions, and behaviours (Flett & Hewitt, 2002; Flett & Hewitt, 2005).

There have also been several other measures created, including the Positive and Negative Perfectionism Scale (PANPS; Terry-Short et al., 1995). The PANPS is used to measure the positive and negative consequences of perfectionism, with 40 items and two subscales: positive perfectionism (20 items) and negative perfectionism (20 items). Also, the Revised Almost Perfect Scale (APS-R). This scale is comprised of 23 items, featuring three subscales. The APS-R is used mainly on general perfectionism and is the third most used scale behind FMPS and HF-MPS (Stoeber & Madigan, 2016). However, the use of this scale in sport has not been disclosed and has only been used to relate perfectionism, eating disorders and exercise (Paulson & Rutledge, 2014). Finally, the

Perfectionism Inventory (PI) is another scale used to measure perfectionism. This scale features 59 items, with eight subscales. The PI incorporates aspects of the FMPS and HF-MPS while featuring new aspects, such as rumination. The PI is the longest perfectionism scale, which is why it is less frequently used to measure perfectionism. However, the scale has been used in several sport related studies (Elison & Partridge, 2012; Cremades, Donlon & Poczwardowski, 2013) and dance (Nordin-Bates, Walker & Redding, 2011; Nordin-Bates et al., 2014).

Further important developments in the measurement of perfectionism are the focus on domain-specific measures. Sport-related perfectionism scales are needed, as perfectionism is not just one main construct where individuals are perfectionistic in all aspects of their life. Individuals tend to have one aspect of perfectionism and are often domain specific (McArdle, 2010; Dunn, Gotwals &Dunn, 2005). Therefore, it is important to have a specific scale for what is being measured, which in this context is a sport related study.

The Sport Multidimensional Perfectionism Scale (SMPS) is the first sport-specific measurement of perfectionism and is based on the FMPS. The SMPS has 34 items, with four subscales, which comprise of personal standards (seven items), concerns over mistakes (eight items), perceived parental pressure (nine items) and perceived coach pressure (six items). The SMPS is a widely used scale for measuring multidimensional perfectionism in sport and has demonstrated its validity in several studies (Dunn, Dunn & Syrotuik, 2002; Dunn et al., 2006). As such, this scale has been recommended by Stoeber and Madigan (2016) as a scale to be used if researchers are measuring perfectionism in sport.

The Perfectionism in Sport Scale (PSS; Anshel & Eom, 2003) is a measure of perfectionism in sport that incorporates 32 items in four subscales, which include;

coach's criticism (eight items), parental criticism (eight items), concern over mistakes (eight items) and personal standards (eight items). The PSS is based on Frost et al. (1990) model of multidimensional perfectionism. Based on their own reliability test the PSS has displayed good reliability (> .80 Cronbach's alpha) across all subscales. However, the PSS is not commonly used to measure perfectionism in sport, with most researchers opting for either the SMPS, MIPS, or the HF-MPS. To the knowledge of the researcher, only two studies have used the PSS when measuring perfectionism and attitudes towards doping (Zucchetti, Candela & Villosio, 2015; Bae et al., 2017). Additionally, based on the recommendations of Stoeber & Madigan (2016) other models should be used instead of the PSS. This is because it is unclear whether the PSS can be fully related to perfectionism in sport or not. This stems from the personal standards section because it uses more general terms, such as "one of my goals is to be perfect at everything I do" (Stoeber & Madigan, 2016).

The Multidimensional Inventory of Perfectionism in Sports (MIPS) is a measure of perfectionism in sport, which includes multiple combinations of multidimensional models, such as the HF-MPS and the FMPS. The MIPS was first developed by Stoeber, Otto & Stoll (2004) in German and then translated in English by Stoeber, Otto & Stoll (2006). The MIPS is comprised of 72 items, with nine subscales, all with eight items. These include; perfectionistic aspirations during training, perfectionistic aspirations during the competition, negative reactions to non-perfect performance during training, negative reactions to non-perfect performance during competition, perceived pressure from parents, perceived pressure from coaches, perceived pressure from teammates, perfectionistic pressure on teammates, and finally negative reactions non-perfect performance of teammates. The striving for perfection and negative reactions to

perfection scales are the most commonly used subscales in sport and have shown acceptable levels of reliability and factor validity (Madigan, 2016).

Finally, based on Hewitt and Flett's (1991) HF-MPS, a multidimensional performance perfectionism scale was recently developed (Hill, Appleton & Mallinson, 2016). This study interpreted the three forms of perfectionism into performance-based. Self-orientated performance perfectionism is the demand an athlete has on themselves to have the perfect athletic performance. Other orientated performance perfectionism is the perception others demanded perfect athletic performance and finally, socially prescribed performance perfectionism is the demand from others of perfect athletic performance (Hill, Appleton & Mallinson, 2016). However, based on this recently developed model the scale has not been used in empirical studies. Therefore, the MIPS and the S-MPS would appear to be the most valid and reliable measures of perfectionism in sport (see also Stoeber & Madigan, 2016).

1.10 Higher-Order Model

Based on the preceding discussion, it should be apparent that there is a multitude of models and measures of perfectionism. This can make for a particularly confusing landscape. Importantly, however, these models and measures show considerable overlap. This overlap has been captured in a factor analytical study (e.g., Enns & Cox, 2002). The results of the factor analysis suggest that two higher-order dimensions are sufficient to capture the overlap between these various measures and models. The two factors are commonly known as perfectionistic strivings and perfectionistic concerns (Frost et al., 1993; Stoeber & Otto, 2006). Perfectionistic strivings (also known as personal standards perfectionism) is defined as "aspects of perfectionism associated with self-oriented striving for perfection and the setting of very high personal performance standards" (Gotwals et al, 2012, p. 264). Perfectionistic concerns (also

known as evaluative concerns perfectionism) is defined as “aspects associated with concerns over making mistakes, fear of negative social evaluation, feelings of a discrepancy between one's expectations and performance, and negative reactions to imperfection” (Gotwals et al., 2012, p. 264).

There are numerous reasons why adopting the higher order model is an acceptable approach for measuring perfectionism. The higher order model allows researchers to understand the multiple models of perfectionism into one integrated, unified and simplified model (Hill, 2016). This is particularly important when researchers are comprehending the magnitude of the different models for perfectionism. The higher order model also exploits the statistical overlap of different measures. Therefore, because of the statistical advantage of this model and how that it integrates numerous perfectionistic models, numerous studies in sport have adopted the higher order model (Gaudreau & Antl, 2008; Stoeber, Uphill & Hotham, 2009; Hill, 2013). Finally, because perfectionistic strivings and concerns are broad higher order dimensions, researchers have suggested that it is appropriate to use multiple measures to capture this complexity.

Importantly, perfectionistic strivings and perfectionistic concerns often show opposite and different relations with indicators of psychological adjustment and maladjustment (Frost et al., 1993; Stoeber & Otto, 2006). Perfectionistic concerns show positive relations with maladjustment indicators and negative relations with psychological adjustment indicators. However, perfectionistic strivings can sometimes show negative relations with maladjustment and positive relations with psychological adjustment (Stoeber & Gaudreau, 2017). These relations are stronger when the perfectionistic strivings and perfectionistic concerns overlap is controlled for, partialled out, or controlled for in a statistical manner (Gotwals et al., 2012; Hill, Huelsman & Araujo, 2010; Stoeber & Otto, 2006).

Recent studies have found that perfectionistic strivings are associated positively with self-confidence (Koivula, Hassme & Fallby, 2002; Stoeber et al., 2007), internal attribution to success (Stoeber & Becker, 2008), approach goal orientations (Stoeber et al., 2008) and positive sport success reactions (Sagar & Stoeber, 2009). Alternatively, perfectionistic concerns have shown positive relationships with eating psychopathology (McNulty et al., 2001), self-esteem (Koivula et al., 2002), competition anxiety, external attributions to success (Stoeber & Becker, 2008). Also, avoidance goal orientations (Stoeber et al., 2008), burnout (Chen et al., 2008) and fear associated with shame, embarrassment, and the negativity after failure (Sagar & Stoeber, 2009). Therefore, differentiating these two superordinate dimensions is also important from an empirical perspective.

1.11 Perfectionism and Doping

Perfectionism could ultimately lead to doping behaviours. Here, the theoretical propositions offered by Flett and Hewitt (2016) are highly relevant. Specifically, these authors suggest that both dimensions of perfectionism could result in "dark striving" (Flett & Hewitt, 2014). This is because perfectionism instils a win-at-all-costs attitude, meaning perfectionistic athletes are likely to be hypercompetitive, and do what they can to win. This may include engaging in illegal and unacceptable behaviours, such as doping (Flett & Hewitt, 2014). Thus, when a perfectionistic athlete is placed under extreme pressures, either from themselves or others, they may use banned performance-enhancing substances as a means to alleviate and deal with these pressures. As such, we may expect perfectionistic athletes to have more favourable attitudes towards doping.

Several studies have examined the relationships between perfectionism and doping (Bahrami et al., 2014; Zucchetti, Candela & Villosio, 2015; Madigan, Stoeber & Passfield, 2016; Bae et al., 2017). The first study was conducted by Bahrami et al.

(2014), which assessed the relationship between perfectionism and attitudes towards doping with 389 bodybuilders. The study included measures of attitudes towards doping, perfectionism, sensation seeking and a physical self-concept profile. To measure perfectionism, the SMPS was used (Dunn et al., 2006) which was further divided into perfectionistic strivings, perfectionistic concerns, coach pressure to be perfect and parental pressure to be perfect. The PEAS were used to measure attitudes towards doping in this study. Results indicated that perfectionistic concerns and perfectionistic strivings were positively correlated with attitudes towards doping. However, there was a non-significant relationship with attitudes towards doping and both coach and parental pressure to be perfect.

There are two main issues with the study by Bahrami et al. (2014). Firstly, the study examined a sample of bodybuilders. Doping is considered a widely practised behaviour and an integral part of the culture of bodybuilding (Pedersen, 2010; Santos, Da Rocha & Da Silva, 2011). Therefore, it is unclear whether the findings would generalise to more mainstream sports where this culture is not apparent. Secondly, the study did not include enough information on the sample group, for example, they did not report whether the sample was competitive or recreational bodybuilders. This information would provide further context and can then be related to the relationships that were found.

The second study (Zucchetti, Candela & Villosio, 2015) examined athletes who attended a centre of sports medicine (N = 109) who were aged between 15 and 45 years. Zucchetti, Candela & Villosio. (2015) also used the PEAS to measure attitudes towards doping and the PSS was used to measure perfectionism (Anshel & Eom, 2003). Similarly, to the SMPS, the PSS segregates perfectionistic concerns, perfectionistic strivings, coach pressure to be perfect and parental pressure to be perfect. However,

Zucchetti, Candela & Villosio. (2015) inspected these factors overall and conducted a multiple regression analysis by also including self-confidence, life satisfaction and motivation in order to predict positive attitudes towards doping. From the multiple regression, analysis perfectionism was found to be a positive predictor of doping attitudes. However, by analysing this study several limitations have been highlighted. First, as the four aspects of perfectionism were combined it is unclear which of the factors were responsible for the prediction of attitudes towards doping. Second, no bivariate correlations were reported. Therefore, there is no indication as to whether any other variables that were included in the multiple regression analysis had an impact on perfectionism (Cohen et al., 2003).

The third study conducted by Madigan, Stoeber & Passfield (2016) was based on male junior athletes (N = 130), aged 16 to 19 years. These athletes were part of two sports academies. Similar to the previous studies, Madigan, Stoeber & Passfield (2016) used the SMPS to measure perfectionism. However, based on recommendations (Stoeber & Madigan, 2016) the study also employed the MIPS and used both measures to form composites of perfectionistic strivings and concerns. Madigan, Stoeber & Passfield (2016) also utilised the PEAS as a measurement for positive attitudes towards doping. However, recent evidence suggests that the PEAS may not be appropriate for use with athletes under 17 years of age (Nicholls, Madigan & Levy, 2016).

Finally, the study by Bae et al. (2017) was conducted on Korean Olympic athletes. This study was conducted on 198 Korean athletes all aged over 18 years (mean = 26.02). The study was cross-sectional and measures were completed on Korean Olympic athletes 10 days prior to the Rio 2016 Olympic games where the athletes covered 24 of the 28 Olympic sports. The study by Bae et al. (2017) also looked into the possibility of motivational climates having an influence on attitudes towards doping.

Bae et al. (2017) used the PEAS to measure attitudes towards doping, the Perceived Motivational Climate in Sport Questionnaire-2 and the PSS to measure perfectionism. Whilst this study has featured a useful measure in the PEAS, which has displayed high levels of reliability and validity and has been used in numerous studies (Bahrami et al., 2014; Zucchetti, Candela & Villosio, 2015; Madigan, Stoeber & Passfield, 2016; Nicholls, Madigan & Levy, 2016), a notable critique of this study was there use of the PSS.

The PSS is a model that measures parental criticism, coach criticism, personal standards and concerns over mistakes, which would make it ideal for this study. However, the PSS is not widely used in measuring perfectionism in sport, as most researchers tend to use the MIPS (Stoeber, Otto & Stoll, 2004), or the Sport-MPS (Dunn et al., 2006). In fact, only one other study has incorporated the PSS when measuring attitudes towards doping in athletes (Zucchetti, Candela & Villosio, 2015). This can be due to the fact that some of the questions can be confused with more general perceptions of perfectionism rather than in a sporting context (e.g., "I expect higher performance in my daily tasks than most people"). Despite creating the PSS, Anshel and colleagues have not used the scale in any studies since, but creating combinations of the PSS with other scales (see, Anshel, Kim & Henry, 2009; Anshel, Sutarso & Jubenville, 2009). Finally, all four studies did not examine factors that could mediate the relationships between perfectionism and attitudes towards doping. That is mechanisms that may explain "why" perfectionism predicts attitudes towards doping.

1.12 Achievement Goal Theory

Achievement goal theory (AGT; Nicholls, 1989) posits that in achievement-related domains, such as sport, an individuals' main goal is to demonstrate competence. From this perspective, individuals are viewed as rational agents. Importantly, how

individuals construe their competence has implications for their motives, beliefs, emotions, and performance in sport. Individuals can be predisposed to view their competence in two ways. Individuals can view their competence in a task-oriented manner, whereby they aim to display their competence through self-assessment and a desire to improve their own performance (Nicholls, 1989). They may also view it in an ego-oriented manner, that is, they aim to display competence by outperforming others (i.e., normative competence), winning, and by displaying their superior performance to others in their social surroundings (Nicholls, 1989). Task-oriented individuals practice a sport for internal purposes (self-esteem, being physically active and developing mastery), which can result in them experiencing more positive feelings when engaging in sport. Ego-oriented individuals believe that they should be better than others and in most circumstances, can do so with less effort. These ego-orientated individuals focus on beating others, while willing to do anything they can to win. The two-goal orientations are orthogonal but are often examined as mutually exclusive. This is because individuals can only be task-involved or ego-involved at any given time (Roberts & Kristiansen, 2012).

In terms of attitudes towards doping, task orientation has been associated with high levels of functioning and prosocial behaviour (Kavussanu & Ntoumanis, 2003; Kavussanu, 2006). Therefore, it is unlikely to be implicated in cheating behaviours like doping. Whereas, ego-orientation has been positively associated with low levels of moral functioning and anti-social behaviour (Kavussanu & Ntoumanis, 2003; Kavussanu, Seal & Phillips, 2006; Sage, Kavussanu & Duda, 2006). Therefore, this may be a factor that predisposes an athlete to do whatever it takes to achieve, including illicit behaviours, to allow them to demonstrate competence by beating others. In a recent meta-analysis by Ntoumanis et al. (2014), this relationship pattern was found to be the

case. Specifically, Ntoumanis and colleagues' (2014) showed that task orientation displayed a negative relationship with doping behaviours and doping intentions, whereas an ego-orientation displayed a positive relationship with doping behaviours and intentions (see also Lochbaum et al., 2016). Moreover, in a study by Sas-Nowosielski & Swiatkowsa (2008) athletes who displayed higher levels of ego orientations were more likely to endorse doping than athletes who were more task orientated. Similar reports were found in a more recent study by Allen and colleagues (2015). In the context of doping, ego-oriented individuals may be more likely to use banned performance-enhancing substances because the "preoccupation with winning may well be accompanied by a lack of concern about justice and fairness" (p. 133, Nicholls, 1989). Conceptually there are links between perfectionism, the AGT, and attitudes towards doping. From this perspective athletes who are concerned about making mistakes and want to beat others may be willing to engage in more illicit behaviours (in this case doping). These athletes could be engaging in what is known as 'dark striving'

1.13 Perfectionism and Achievement Goal Orientations

Several studies have examined the relationship between achievement goal orientations and perfectionism (Hall et al., 2007; Ommundsen et al., 2005; Dunn, Dunn & Syrotuik, 2002; Hall, Kerr & Matthews, 1998). Overall, these studies suggest a distinct pattern of relationships, which is relatively complex. While perfectionistic concerns have repeatedly shown positive relations with only ego-orientation, perfectionistic strivings have shown positive relations with both task- and ego-orientations. In addition, and more recently, Stoeber, Damian & Madigan (2018) conducted a review of twenty-two studies that focused on achievement goals and perfectionism in a range of domains (e.g., sport, education, work). They found that the majority of the studies (k = 16) also supported this complex pattern of relationships. It

appears then that high personal standards and a self-oriented striving for perfection may manifest in the belief that one should always demonstrate one's ability relative to past personal performance, as well as in comparison to others. Conversely, concern over mistakes and negative reaction to imperfection may manifest solely in the belief that one should always demonstrate one's ability in comparison to others (see also Madigan et al., 2018). This suggests that perfectionistic athletes (athletes high in either perfectionistic strivings or concerns or high in both) may still be more concerned about beating others than trying to master a task.

1.13 Dark Striving

The desire to beat others at all costs and the overwhelming internal pressure athletes put on themselves may further explain why perfectionistic athletes engage in doping behaviours. When other competitors are provided with a substantially high amount of attention, they are perceived as an obstacle to be overcome (Flett, Hewitt & Sherry, 2016). For perfectionistic athletes, these obstacles have to be overcome (Flett, Hewitt & Sherry, 2016). As such, ultimately, this may lead to elite perfectionistic athletes to engage in performance-enhancing substances to do anything to win (Flett & Hewitt, 2014). Consequently, this orientation may account for the win-at-all-costs and hypercompetitive nature of perfectionists proposed by "dark striving" (Flett & Hewitt, 2014). Conceptually this highlights the link between perfectionism, achievement goal orientations, and attitudes towards doping. These factors combined could indicate why athletes may engage in negative behaviours such as doping.

1.13 The Present Study

The aim of the present study was to examine the relationship between perfectionism and attitudes towards doping in athletes. To extend previous research, the present study aimed to determine if achievement goal orientations played a mediating

role in these relationships. In this regard, there were several expectations (see Figure 3). It was expected that perfectionistic strivings would have a positive relationship with task orientation, but then task orientation would have a negative relation with attitudes towards doping. Furthermore, it was expected that perfectionistic concerns would have a positive relationship with ego orientation and then ego orientation would have a positive relationship with attitudes towards doping. Additionally, it was hypothesised that perfectionistic strivings will have a significant positive correlation with ego orientation and perfectionistic concerns will not be related to task orientation. Overall, it was expected that ego orientation would mediate the relationship between perfectionistic strivings and attitudes towards doping. Due to perfectionistic strivings links to both task and ego-orientation, it may be expected that both would mediate the relationships between perfectionistic strivings and attitudes towards doping.

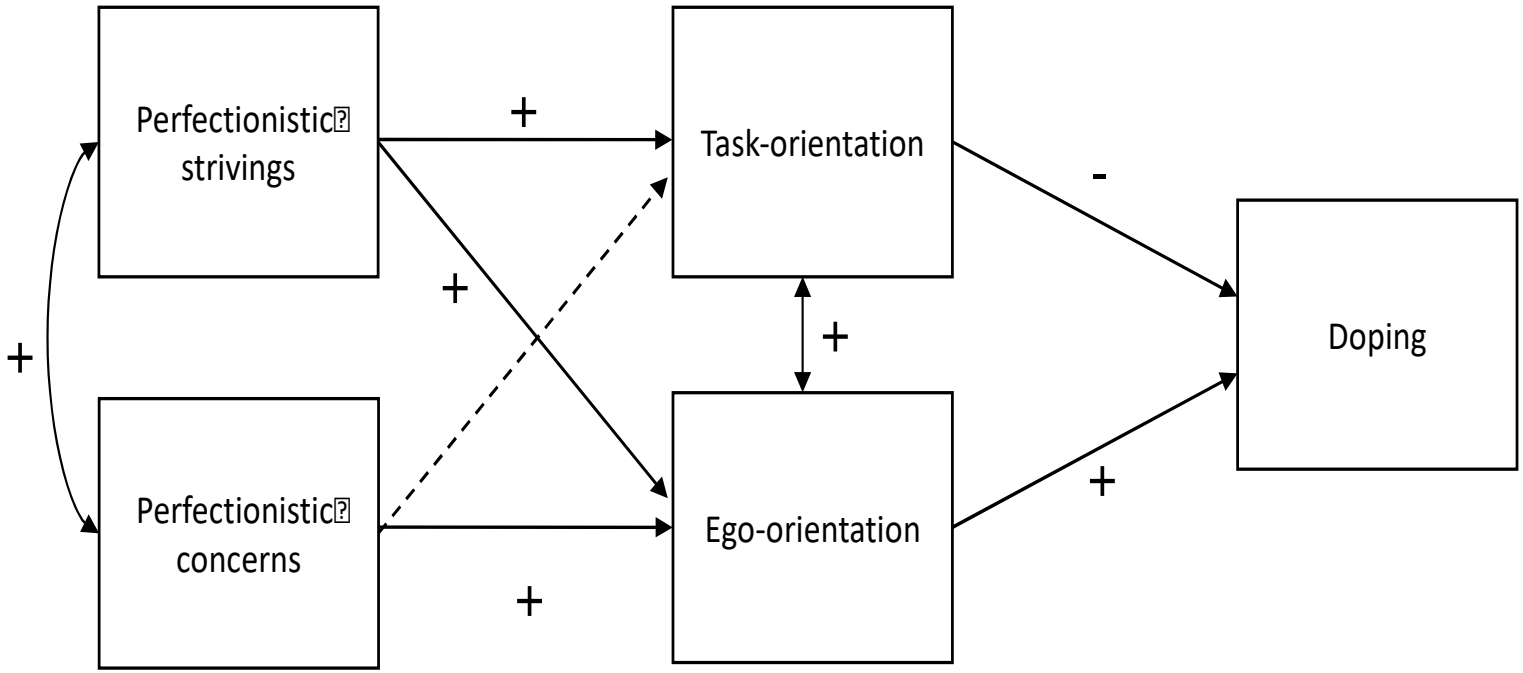

Figure 3. Hypothesised model of the relationships between perfectionistic strivings, perfectionistic concerns, task-orientation, ego-orientation, and attitudes towards doping. Dashed line = nonsignificant path.

2. Method

2.1 Participants

A sample of 135 athletes (105 men, 30 women; mean age = 24.39 years; *SD* = 7.34; range = 18 to 56 years) participated in the present study. Athletes were involved in a range of sports, which included; football (*N* = 67), rugby league (*N* = 26), American football (*N* = 17), and several other sports (e.g., netball, tennis; *N* = 25). These athletes competed across different levels of their sport, including; recreational (*N* = 50), regional (*N* = 51), national (*N* = 33) and international levels (*N* = 1). Athletes trained on average 8.47 hours (*SD* = 5.65) per week.

2.2 Procedure

Following ethical approval from the York St John University ethics committee (Appendix A), athletes were recruited to be part of the study on a voluntary basis. All participants completed an informed consent form followed by the questionnaire. Where necessary, a gatekeeper letter was distributed to teams to gain access to participants (Appendix B). The gatekeeper letter informed the coach or manager at the club about the content of the study, what will happen with the findings, and who to contact with regards to any further questions. Where necessary, this gatekeeper letter was distributed to and signed by the relevant gatekeeper before the questionnaires were distributed to their athletes. Prior to completing the questionnaire, each athlete was provided with an athlete information sheet (Appendix C). This provided each athlete with information regarding the purpose of the study, why they had been chosen, whether they have to take part, and what they have to do if they do take part. Also, the advantages and disadvantages of taking part were, where the information will be used, who is conducting the research, and the relevant contact information was provided. Once the athletes had read and understood the requirements of the study, they then completed the

informed consent form (Appendix D) and commenced with the questionnaire (Appendix E).

Following the completion of the questionnaire, each participant was provided with a debriefing form. This included relevant information regarding anti-doping and provided relevant websites for athletes to follow to be able to do further reading into the key issues around anti-doping, what the purpose of anti-doping is, and who to ask about anti-doping rules Also, information on how to comply with anti-doping rules, who to contact for psychological guidance, such as MIND or support line, regarding the topics raised in the questionnaire (see Appendix F) was provided. The debrief form also included the researcher's contact information for further inquiries.

2.3 Measures

Perfectionism. The present study adopted a multi-measure approach to measure perfectionism (see, Stoeber & Madigan, 2016). The two higher-order dimensions of perfectionism are considered broad dimensions. Following recent recommendations in this area (Stoeber & Madigan, 2016) Multiple indicators of perfectionistic strivings and concerns were used in this study. This is a common approach to examining perfectionism in sport (e.g., Madigan et al., 2015). In this regard, specific subscales from the Sport Multidimensional Perfectionism Scale (SMPS; Dunn et al., 2006) and the Multidimensional Inventory of Perfectionism in Sport (MIPS; Stoeber et al., 2006) were utilised. Prior to the perfectionism items, a stem was provided, which include; “Please read each statement and decide to what degree this characterises your attitudes toward your performance in sport by indicating how strongly you agree or disagree with the statement”.

To measure perfectionistic strivings, participants completed the seven-item SMPS subscale capturing personal standards (e.g., “I hate being less than the best at

things in my sport"), and the five-item MIPS subscale capturing striving for perfection (e.g., "I strive to be as perfect as possible"). These were then combined by averaging standardised scores to measure perfectionistic strivings. To measure perfectionistic concerns, the eight-item SMPS subscale capturing concern over mistakes (e.g., "I should be upset if I make a mistake in competition") was used, along with the five-item MIPS subscale capturing negative reactions to imperfection (e.g.' "I feel extremely stressed if everything does not go perfectly"), which were then combined to measure perfectionistic concerns. All perfectionistic strivings and concerns subscale were measured on a five-point Likert scale (1 = strongly disagree to 5 = strongly agree).

The four subscales have demonstrated reliability and validity in previous studies (Madigan, 2016; Stoeber et al., 2009). For example, Dunn et al. (2006) identified adequate levels of internal consistency, with coefficient alphas ranging from 0.76 to 0.89 for all scales. Additionally, the MIPS has displayed a Cronbach's alpha of .89 for both striving for perfectionism and negative reactions to imperfection (Madigan, 2016). Furthermore, both measurements are reliable and valid indicators of perfectionistic strivings and perfectionistic concerns (e.g., Gotwals et al., 2012; Stoeber & Madigan, 2016). This measurement approach has also been applied in previous research examining perfectionism and attitudes towards doping (e.g., Madigan, Stoeber & Passfield, 2016).

Achievement goal orientations. The Task and Ego Orientation in Sport Questionnaire (TEOSQ; Chi & Duda, 1995) were used to measure athletes' task and ego orientations. Before each individual answered the questions, a stem was provided, so that they could answer the questions appropriately ("The following questions relate to your performance in sport. Please indicate how strongly you agree or disagree with the statement. I feel most successful in sport when"). The TEOSQ features 13 items, with a

five-point Likert scale (1 = strongly disagree to 5 = strongly agree). This measurement included six ego-oriented items (e.g., "I can do better than my friends"), and seven task-oriented items (e.g., "I learn a new skill and it makes me want to practice more"). The two subscales have demonstrated validity and reliability in previous research (Chi & Duda, 1995; Li et al., 1998) For example, previous research has shown that the composite reliability was .88 for the task subscale and .86 for the ego subscale (Li et al., 1998).

Attitudes towards doping. The PEAS (Petróczi & Aidman, 2009) was used to measure attitudes towards doping. Prior to this section being answered a stem was used to help the individual answer the questions ("The following questions are related to your attitudes towards banned performance-enhancing substances/ methods in sport. Please indicate to what extent you agree to the questions").

The original PEAS are a unidimensional questionnaire that consists of 17 items to determine attitudes towards doping. For the present study, the recently validated PEAS-short form was used (Nicholls, Madigan, & Levy, 2016). This version comprises eight items (e.g., "Doping is not cheating since everyone does it", "Doping is necessary to be competitive."). Statements are rated on a 6-point Likert scale from 1 = "strongly disagree" to 6 = "strongly agree". The measure has demonstrated validity and reliability in previous research (e.g., Nicholls, Madigan, & Levy, 2016).

2.4 Preliminary Data Analysis

The data was analysed using the following steps. First, following Tabachnick & Fidell (2007), the data were screened for missing values, out of range values and assumptions of multivariate and univariate outliers using IBM SPSS statistics (Version 24). Second, in order to examine the relationships between perfectionism, achievement goals and attitudes towards doping, descriptive statistics, and Pearson's bivariate

correlations were calculated for all variables. Correlations were judged based on Cohen's (1992) effect size classifications: small (.10), medium (.30), and large (.50) which allows for a greater interpretation of the magnitude of the relationships.

2.5 Path analysis

Next, path analysis with manifest variables was used to test the hypothesised model (see Figure 1). In order to test the path analysis, data were analysed in AMOS (Version 20.0). The path analysis was tested using manifest variables and the analysis was conducted using robust maximum likelihood estimation (ML; Arbuckle, 2011). The manifest variables used in this study were perfectionistic strivings, perfectionistic concerns, task orientation, ego orientation and attitudes towards doping. These were calculated by averaging the item scores of each subscale (except for perfectionism, see measures section for details). This analysis was accompanied by the mean-adjusted chi-square test statistic, which is robust to test deviations from normality. In order to evaluate model fit, the following fit indices were chosen: Comparative Fit Index (CFI), Tucker-Lewis Index (TLI; this is also known as non-normed fit index, NNFI), Standardised Root Mean square Residual (SRMR), and the Root Mean Square Error of Approximation (RMSEA; see Marsh, Hau & Wen, 2004). In line with Marsh, Hau & Wen (2004), the following conventional criteria were used in order to assess the model for adequate (CFI and IFI > .90, SRMR < .10, RMSEA < .10) and a good fit (IFI and CFI > .95, SRMR < .08, RMSEA < .08). Finally, to examine mediation, bias-corrected bootstrapping (5000 samples) was used to estimate indirect effects (Rucker et al., 2011). The indirect effects are significant ($p < .05$) if the 95% Confidence Interval (CI) does not contain zero (Rucker et al., 2011).

3. Results

3.1 Preliminary Analysis

First, the data were screened for missing items, as a few items were missing (i = 14), the missing values were replaced with the mean value of the non-missing items from each individual case (Graham, Cumsile & Elekfisk, 2003). The data was then screened for univariate and multivariate outliers (Tabachnick & Fidell, 2007). No cases were identified outside the standardised z score range (± 3.29, $p < .001$) or a Mahalanobis distance larger than the critical value of $\chi 2$ (8) = 26.12, $p < 0.001$.

3.2 Descriptive Statistics and Bivariate Correlations

Means and standard deviations can be found in Table 1. Athletes reported an above neutral level perfectionistic strivings (M = 3.42) and slightly below neutral level for perfectionistic concerns (M = 2.91). Task orientations averaged above the neutral level, but below the high level (M = 3.88), while ego orientations were below the neutral level, but above the low level (M = 2.76). On average, attitudes towards doping were above the very low threshold, but below the low level (M = 1.76). Correlation between variables can also be found in Table 1. Perfectionistic concerns had a small, positive and significant correlation with attitudes towards doping. Ego orientation also had a small, positive and significant correlation with attitudes towards doping. Perfectionistic strivings had a small, positive and significant correlation with task orientation and a moderate, positive and significant correlation with ego orientation. Perfectionistic concerns had a moderate, positive and significant correlation with ego orientation.

In terms of reliability, all scales showed adequate internal consistency (i.e., alpha > .70; Nunnally, 1978). The combination of the striving for perfection subscales in MIPS and SMPS provided a strong reliability indicator ($\alpha = .80$), while negative reactions to imperfection also had a very strong reliability indicator ($\alpha = .86$).

Additionally, both elements of the task and ego orientation in sport questionnaire displayed strong reliability for this study ($task$: $\alpha = .81$ & ego: $\alpha = .85$). Finally, the PEAS also displayed a strong level of reliability in this study ($\alpha = .83$).

Table 1. *Descriptive statistics, bivariate correlations and reliability estimates.*

Variable	*M*	*SD*	α	1	2	3	4
1. Perfectionistic Strivings	3.42	.71	.80				
2. Perfectionistic Concerns	2.91	.76	.86	.71**			
3. Task Orientation	3.88	.59	.81	.21*	.04		
4. Ego orientation	2.76	.93	.85	.43**	.43**	.15	
5. Attitudes towards doping	1.77	.79	.83	-.14	.26**	-.10	.28**

Note. $N = 135$. * $p < .05$. ** $p < .01$. α = Cronbach's alpha.

3.3 Path analysis

The hypothesised model provided an adequate fit to the data ($\chi 2\ (3) = 5.57$, $p > .13$, CFI = .98, TLI = .94, RMSEA = .08). The size and significance of model paths can be found in Figure 4. The model explained 9% of the variance in attitudes towards doping in athletes. The model showed that perfectionistic strivings were a negative predictor of attitudes towards doping, but task orientation was a positive mediator of this relationship. Perfectionistic strivings were, however, a positive predictor of attitudes towards doping when ego orientations were the mediator. The relationship of perfectionistic concerns was stronger than perfectionistic strivings towards attitudes towards doping when ego orientation was the mediator. Perfectionistic concerns and perfectionistic strivings were strong positive predictors of each other.

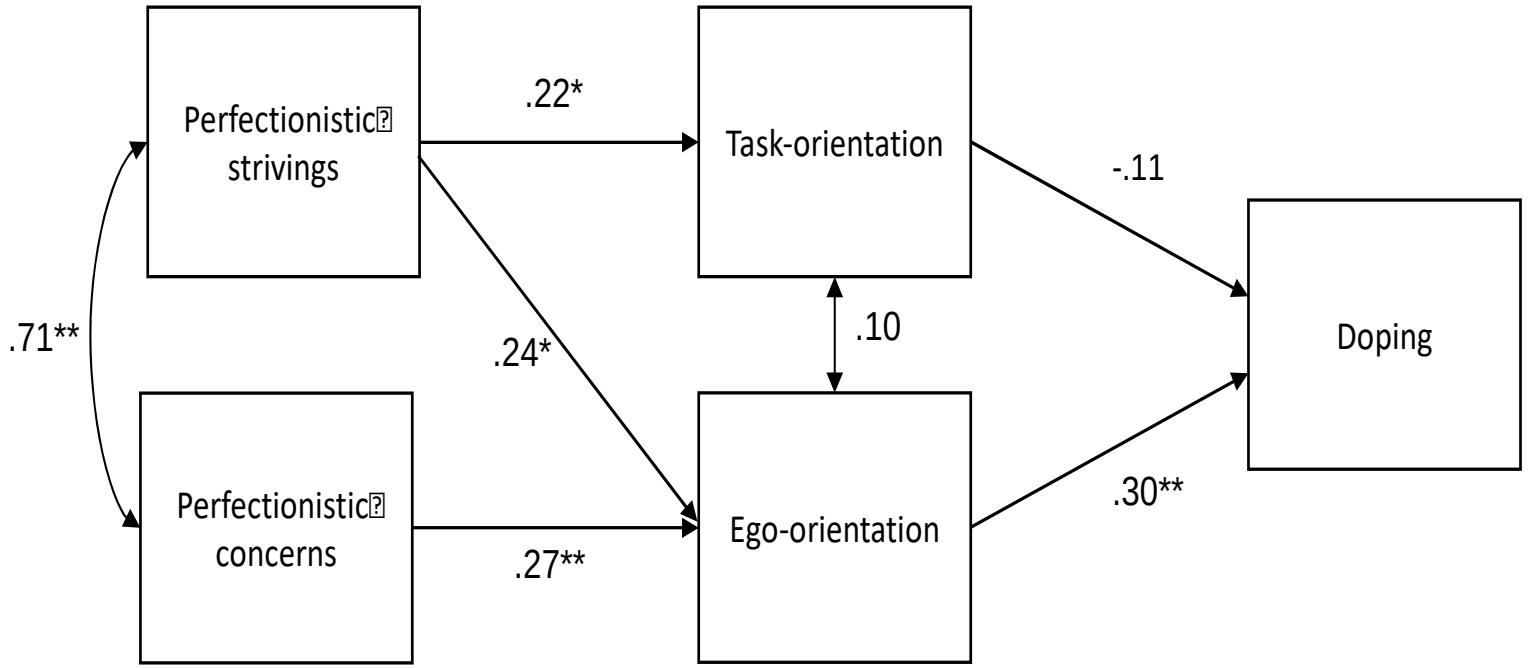

Figure 4. Empirical model. Path analysis of perfectionistic strivings, perfectionistic concerns, task orientation, and ego orientation predicting attitudes towards doping. Path coefficients are standardised. $N = 135$. * $p < .05$. ** $p < .01$.

3.4 Indirect Effects

Finally, the indirect effects were calculated. The indirect effects are displayed in Table 2. The positive relationship between perfectionistic striving and attitudes towards doping was mediated by ego orientation. However, the negative relationship between perfectionistic strivings and attitudes towards doping was not mediated by task-orientation. In addition, the positive relationship between perfectionistic concerns and attitudes towards doping was also mediated by ego orientation. To note, in this study direct pathways were not included because this study intended to explore the indirect effects. Furthermore, the model would be just identified with the inclusion of direct pathways and therefore we would not be able to test model fit.

Table 2. *Standardised indirect effects of perfectionism on attitudes towards doping via achievement goals (task and ego orientations).*

	Indirect effect	95% CI
Perfectionistic strivings → Ego → Doping	.07	.01, .18
Perfectionistic concerns → Ego → Doping	.08	.01, .20
Perfectionistic strivings → Task → Doping	-.01	-.08, .03

4. Discussion

The aim of the present study was to examine the relationship between perfectionism and attitudes towards doping and to determine if achievement goal orientations were a mediating factor in this relationship. Using structural equation modelling with manifest variables, the study found that ego orientation mediated the positive relationship between perfectionistic concerns and attitudes towards doping and the positive relationship between perfectionistic strivings and attitudes towards doping.

The findings of this study indicate that achievement goals may, in fact, mediate the relationship between perfectionism and attitudes towards doping. The present findings imply that athletes high in perfectionistic concerns may have more favourable attitudes towards doping, because of their belief that success is defined by beating others. The findings also suggest that the same is true for athletes high in perfectionistic strivings. It may be that "dark striving" is fuelled partly by an athlete's need to beat other athletes by being hypercompetitive and willing to do whatever it takes to do so. As such, the present findings suggest that perfectionistic athletes may be more likely to dope than non-perfectionistic athletes.

4.1 Perfectionism and Doping

Several studies have now examined the relationship between perfectionism and attitudes towards doping in athletes. In the context of the other research within perfectionism and doping, Zucchetti, Candela & Villosio. (2014) also found a significant positive relationship ($\beta = 0.25$) between perfectionism and attitudes towards doping. Zucchetti, Candela & Villosio. (2014) stated that athletes with higher levels of perfectionism are more inclined to dope. However, Zucchetti, Candela & Villosio. (2014) did not differentiate between the facets of perfectionism and instead used a total perfectionism score. Therefore, it is unclear which facet of perfectionism is responsible

for the observed relationship. Considering that Zucchetti, Candela & Villosio. (2014) was the first study to provide an insight into the relationship between perfectionism and doping. This was a useful step in the process of determining how psychological characteristic's such as perfectionism can have an impact of an athlete's willingness to engage in doping. Although, previous studies have already highlighted the causality of perfectionism and the engagement of behaviours that can be deemed dangerous. For example, Fairburn et al. (1998) and Bachner-Melman et al. (2007) highlighted that perfectionism may lead to eating disorders, while perfectionism could also lead to obsessive-compulsive disorders (Coles et al., 2003). However, the conflict within the growing body of literature in perfectionism is whether it is adaptive or maladaptive (see Stoeber et al., 2011 for a review). Based on Bae et al. (2017) and Zucchetti, Candela & Villosio. (2014) it is evident that perfectionism could have a significant relationship with attitudes towards doping when testing athletes.

Research on athletes from various sports suggests that perfectionism may be related to an individual's attitudes towards doping. In a study by Bahrami et al. (2014) on bodybuilders, it was found that they reported high levels of positive attitudes towards doping, with an average score of 50.09 (SD = 4.58). The bodybuilders used in this study had a positive relationship between perfectionistic strivings and concerns with attitudes towards doping. However, in bodybuilding doping is a widely used practice and part of the culture when these athletes train and compete. Therefore, it could suggest that these particular athletes would be more likely to use performance-enhancing substances. However, based on the way the sport is assessed completely (i.e., based on aesthetics) it could suggest that bodybuilders, in particular, are more likely to be perfectionistic due to their goals and how they are critiqued. Therefore, this could explain the positive relationship between perfectionism and attitudes towards doping. This may also stem

from their concern about making mistakes, which then impact the ability to prepare and perform in competitions. Ultimately, this could lead to their positive attitudes towards doping if they determine that it is necessary for their competition. This may also allow them to achieve the standards they are striving to while allowing them to deal with any concerns about making mistakes. This could be because perfectionistic athletes are having significant doubts over their own performance and display a lot of cognitive ruminations (Williams & Leffingwell, 1996).

Similarly, this can be used to explain the relationship between the athletes of this study. The athletes in this study were more likely to have positive attitudes towards doping if they displayed higher levels of perfectionistic concerns. This development of perfectionistic concerns could possibly lead to them making behavioural based decisions about how they want to succeed in their chosen sport. If these athletes have concerns about their performance and know certain other opponents or even teammates that are challenging for their place, then this may explain why they could be more likely to use performance-enhancing substances. Therefore, this reiterates that dark striving is potentially another avenue that may explain the variance between the athlete's engagement in doping. Additionally, the fact that the mean age of both the study by Bahrami et al. (2014; m = 27.1 years) and this study (m = 24.39 years) were similar is another suggestion that the study is a useful insight to explain the development of this study and the role of perfectionism and attitudes towards doping. Additionally, Bae et al. (2017) and Zucchetti, Candela & Villosio. (2015) mean age of their participant group was 26.02 years and 31.5 years respectively. Therefore, the age groups of these three studies and this study are similar, which could also be a variable in the findings of this study and could explain the relationship between perfectionism and attitudes towards doping.

A study that examined the relationship between perfectionism and attitudes towards doping, but had a different participant group was a study by Madigan, Stoeber & Passfield. (2016). In this study, the mean participant age group was 17.3 years, which could explain their results. Madigan, Stoeber & Passfield. (2016) found that their junior athlete's had a negative non-significant relationship with perfectionistic strivings and attitudes towards doping. While, perfectionistic concerns had a positive, but a non-significant correlation with attitudes towards doping. However, they did find that parental pressure to be perfect did have a positive moderate correlation with attitudes towards doping ($r = 0.36$, $p = < 0.001$). This could suggest that perfectionism in athletes works differently when age is taken into account. Athletes that are younger may be concerned with parental pressure, which could result in doping-related behaviours. However, based on this study and Bahrami et al. (2014), Zucchetti, Candela & Villosio. (2015), and Bae et al. (2017) athletes have more independent perfectionistic tendencies and rely more independently on their attitudes towards doping. Although, it is difficult to statically state that based on this study because no measurement was used to determine parental pressure to be perfect. However, this was not used in this study on the principle that athletes who are over 18 are less likely to be influenced by their parents. In terms of reliability, all scales used in this study showed Cronbach's alphas above the .8 threshold. Therefore, this indicates that these scales were an appropriate choice for the present study. Future studies, therefore, may benefit from using a similar approach to measuring these variables. With this in mind future studies can provide further knowledge around doping or even cheating in sport in relation to these characteristic's (i.e. perfectionism and achievement goals).

4.2 Perfectionism and Achievement Goals

With regards to perfectionism and achievement goals, the results of this study indicate that they could be related. In particular, perfectionistic strivings has been found to have a small positive significant correlation with task orientation and also a moderate positive significant correlation with ego orientation. This clearly states that it is possible that there are some clear distinctions between both perfectionistic strivings and both achievement goals. Perhaps this is due to athlete's willingness to engage in both types in order to meet their intended goals. These results have been reported in similar studies. In a study by Dunn, Dunn & Syrotuik. (2002) they found that perfectionistic strivings were related to both ego and task orientations in adolescent football players. This suggests that in their ability to strive for perfection comes down to both mastery of skills, but also displaying competence over others.

With regards to perfectionistic concerns, the findings of this study indicate that athletes merely engage in predominately ego orientations. In this study, perfectionistic concerns only had a trivial positive non-significant correlation with task orientation. However, perfectionistic concerns had a moderate positive significant correlation with ego orientations. This suggests that athletes who are more concerned about their own mistakes could be because they are concerned about outperforming others and less interested in the mastery of their chosen skill. These findings are similar to other studies. In a study by Hall et al. (2007), which was conducted on middle distance runners they displayed more task orientations when they strived for perfection and ego orientations when they were concerned about making mistakes. Hall et al. (1998) also conducted research within perfectionism and achievement goals, which was based on high school cross-country athletes who were measured one week and 30 minutes before competition. In both measurements concern over mistakes (perfectionistic concerns) had a small positive significant correlation with ego goal orientations and a negative trivial

correlation with task goal orientations. However, personal standards perfectionism (perfectionistic strivings) was related to both task and ego orientations 30 minutes before the competition. Personal standards perfectionism had a small positive correlation with ego orientation and a small positive significant correlation with task orientation. This provides further evidence of the relationship between perfectionism and achievement goals and indicates the need for athletes to be more concerned about making mistakes if they are solely focused on beating other opponents.

There is a consistent finding between research across many years linking perfectionism and achievement goals. In particular, the link between perfectionistic concerns and ego orientations are clear. This suggests that athletes who are so driven to win by beating others and be perfect in their sport but are concerned about making mistakes. With this in mind and the research of this study, the link between perfectionism and achievement goals are clear. However, the mediation between these and attitudes towards doping and then doping in itself need further discussion.

To discuss the link between these three variables it is important to discover the findings of previous studies to determine the link. In particular, the findings of this study were also displayed in a meta-analysis by Ntoumanis et al. (2014). Ntoumanis et al. (2014) identified that doping intention was a weak negative predictor of task orientation ($r = -.08$). Although, when analysing doping intention and ego orientation a weak positive predictor was identified ($r = .14$). Additionally, doping use was a weak negative predictor of task orientation ($r = - .09$), but had no prediction for ego orientations ($r = .04$). Despite the difference in doping (i.e. intentions compared to attitudes), there is still a link between ego orientations and doping. Additionally, these findings were consistent with another meta-analysis (Lochbaum et al., 2016) who also found similar results between doping and goal orientations.

In the context of elite level sport, a study based on Greek athletes by Barkoukis et al. (2011) found that athletes who displayed more mastery-based achievement goals (task) reported lower intentions to dope in the future, but they also reported lower past doping use. It seems evident that in the context of doping and ego orientated that individuals may be more likely use performance-enhancing substances because the "preoccupation of winning may well be accompanied by a lack of concern about justice and fairness" (p. 133, Nicholls, 1989). This lack of concern for other athletes and the desire to beat others at all costs and the hypercompetitive nature seems to provide a clear insight into the decisions athletes make in taking performance-enhancing substances. Therefore, this link with the combination of perfectionism can indicate the mediation that achievement goals have with perfectionism and attitudes towards doping.

4.3 The Mediating Role of Achievement Goal Orientations

The main research that is closely related to this study is the study by Bae et al. (2017). Bae et al. (2017) found that attitudes towards doping had a small positive and significant relationship with both perfectionistic concerns and ego-involving climate. Additionally, attitudes towards doping had a small negative and trivial relationship with both perfectionistic strivings and task-involving climate. These findings replicate the findings of this study and show the variables that are associated with the athlete's decisions to engage in doping behaviours. This suggests that athletes who are concerned with their performance, making mistakes and engaging in an ego-involving climate by setting out to outperform others could have an influence on athletes' attitudes towards doping. Perhaps the relationship between both of these variables and doping has a relationship with dark striving. Dark striving is the engagement of unacceptable behaviours in order to win or be great (Flett & Hewitt, 2014). This can be from the win at all costs environment that athletes often participate in. Based on the findings of this

study and previous research the concept of dark striving is clear. Conceptually it was previously noted by several researchers that achievement goals were related to both dimensions of perfectionism. Therefore, with the findings of this study and previous research, it can be suggested that there could be a link between perfectionistic concerns, ego orientations and that concept leading into a dark form of striving. However, if athletes have more tendencies to strive for perfection, and are also more concerned about mastering a task, then this limits the concept of pursuing all methods of winning (in this case doping). This concept of dark striving has been also been stated within the other studies around perfectionism, achievement goals and doping (Bae et al., 2017; Madigan, Stoeber & Passfield, 2016; Zucchetti et al., 2015).

Despite researching the concepts of perfectionism and achievement goals on attitudes towards doping Bae et al. (2017) did not use a structural equation model. Therefore, the relationships between perfectionistic concerns and ego orientation towards attitudes towards doping are merely a relationship of the individual variables and their direct relationship to attitudes towards doping. Therefore, it is not clear whether they are both correlated to the reasoning behind the athlete's attitudes towards doping. However, comparisons can be made with this study and the findings of Bae et al. (2017), such as how with perfectionistic concerns, ego orientations mediate the role in which athletes determine their attitudes towards doping.

The findings of this study support the notion of achievement goals as a mediator in the process of the relationship between perfectionism and attitudes towards doping. In particular, ego orientation is a positive mediator for both perfectionistic strivings and perfectionistic concerns. However, task orientation negatively mediated the relationship between perfectionistic strivings and attitudes towards doping. It is evident that ego orientation has a degree of variance from both perfectionistic strivings and

perfectionistic concerns. This could suggest that displaying both perfectionistic characteristics means that athletes are almost equally indicating that they are likely to want to beat others if they either strive for perfection or are more concerned about making mistakes.

Upon further analysis, the process from perfectionistic concerns to attitudes towards doping via ego orientations provides some context in line with existing research. There seems to be a distinction between athletes who are concerned about making mistakes and are engaging in doping behaviours. In the context of 'dark striving', this process is logical. The concept of athletes being concerned about making mistakes and wanting to overcome the "human obstacle's" and being hypercompetitive may lead them to want to use performance-enhancing substances (Flett, Hewitt & Sheery, 2016). Flett & Hewitt (2014) highlighted that athletes may take up doping in a desire to win at all costs. However, with the findings of this research, it could also be stated that athletes are doping to limit the mistakes they are making. The hypercompetitive nature of athletes may be put into question if they are making mistakes, which will add to the concerns they already face. Therefore, winning, outperforming others, and overcoming obstacles could explain their rationale for using performance-enhancing substances.

The findings of this study also state that there is a negative and non-significant variance between perfectionistic concerns and task. This could suggest that athletes who display more perfectionistic concerns are less likely to be concerned about mastering a task. This could be explained by the fact most of the athletes are from team-based sports (i.e. football, rugby, and American football). This could suggest that the need to outperform others is a well-developed trait based on the conditions that they play in, for example, most players in a team would have to compete for their own place. Therefore,

the need to outperform others is essential to maintain their position in the team. However, if they master a task this may not have such a big influence on the position in their squad. Furthermore, when these players are in a game environment, they may also need to maintain the need to outperform others in order to win the game. This may act as a double reinforcement of the need to outperform others due to the environment these players are in.

Based on the variance explained ($R^2 = .09$) in the structural equation model (figure 4) it suggests that perfectionism and achievement goals have very little influence on the role involved with athletes and their engagement with doping or in this case their attitudes towards doping. However, based on the SDCM (figure 2; Donovan et al., 2002) athletes' willingness to engage in doping stems from multiple factors, such as threat appraisal, benefit appraisal, personal morality, legitimacy, availability, behaviour compliance/ non-compliance, affordability, reference group, and their personality. Therefore, there are a number of factors that influence players attitudes towards doping, which may explain the variance. The aim of this study was to determine whether personality, in this case, perfectionism, which is one factor of the SDCM and if it has an effect on athletes' attitudes towards doping. This could be used as a predictor of actual behaviours to dope.

This suggests based on the SDCM that athletes have at least nine factors that act in their decision-making process to use performance-enhancing substances. While perfectionism and achievement goals themselves explain 9% of that decision seems like a significant step in explain athlete's attitudes towards doping and the likelihood of perfectionism and achievement goals on that decision. The variance will never fully explain why individuals make these decisions. However, to understand different aspects and how they, in turn, affect the athlete's decision if only a small fraction can be useful

from a practical standpoint and also from an academic point of view. This suggests that personality could have an influence on an athlete's decision making with regards to doping. Therefore, this should be highlighted to coaches, sports scientist and governing bodies to be used as preventative measures. In the context of perfectionism, both achievement goals and both dimensions of perfectionism have negative aspects associated with them. This could be detrimental to teams if certain individuals have high levels of both. Therefore, having programs in place to reduce these factors will be beneficial in preventing a multitude of negative outcomes.

Madigan, Stoeber & Passfield. (2016) conducted a slightly different study featuring a structural equation model on the effects of coach's pressure to be perfect, parental pressure to be perfect, perfectionistic striving, perfectionistic concerns and attitudes towards doping. In this study, an overall variance was found of 28% in the effects of coach's pressure to be perfect, parental pressure to be perfect, perfectionistic striving on attitudes towards doping, with perfectionistic concerns extracted from the end model. The difference between this study and the study by Madigan, Stoeber & Passfield. (2016) was that it was based on junior athletes and did not feature achievement goals. However, again it is evident across different ages, genders, and level of participation that perfectionism may have an effect on attitudes towards doping. Although, in Madigan, Stoeber & Passfield. (2016) study because they were junior athletes more emphasis was on the pressure from coaches and parents, rather than the higher order model of perfectionistic strivings and concerns.

Zucchetti et al. (2015) study, which incorporated perfectionism, self-confidence, intrinsic motivation, extrinsic motivation, and life satisfaction explained 26% of the variance in attitudes towards doping. This was a 15% increase from their step one phase of the control variables, such as gender and type of sport. Therefore, this suggests that

factors similar to Zucchetti et al. (2015) study were similar to this study (i.e. perfectionism and motivational aspects). The variance of this study and that of Zuchhetti et al. (2015) displayed similar variance levels when the control variables are taken out of the equation. Considering both findings it is evident that there could be an association with perfectionism and motivation when researching attitudes towards doping. Zucchetti et al. (2015) also had similarities in terms of sample size, gender sample group and level of participation in sport. Therefore, it should be considered that based on a similar methodology and similar findings that there is, in fact, a variance or association between personality variables such as perfectionism and motivational aspects, such as achievement goals. The underlying link between personality and doping is developing, as previous research is being analysed and compared to the findings of this study. Therefore, more research should focus on other factors that perfectionism and motivational aspects can have on other aspects along with doping.

With this in mind in a similar study by Nicholls et al. (2017) who explored other associations of personality and doping. Nicholls et al. (2017) examined the dark triad of Machiavellianism, psychopathy, and narcissism and found these traits to explain 29% variance in athletes' attitudes towards doping. This was one of the first studies to focus on personalities and their influence on attitudes towards doping. Considering the findings of this research it is evident that personalities may have an effect on attitudes towards doping and could lead to a gateway towards doping behaviours. Therefore, it is important for organisations, such as WADA to consider this when providing anti-doping education as a preventative measure.

4.4. Limitations and Future Research

The present study has several limitations. This is the first study to examine the mediating role of achievement goal orientations in the perfectionism-attitudes towards

doping relationship. Therefore, it is important that the findings are replicated before concrete conclusions are made. Here, the use of different samples may be appropriate to determine if the findings generalise to other populations (e.g., junior athletes). Furthermore, whereas the correlations were considered small-to-medium-sized, the structural equation model explained only a small amount of variance in attitudes towards doping. However, this may still be notable given the small variance of scores that athletes reported on attitudes towards doping (see *SD* in Table 1).

The present study was cross-sectional, meaning that it is difficult to claim the present findings as either temporal or causal relationships. Also, cross-sectional studies have a certain risk of report bias (Sedgwick, 2014). Therefore, future studies should adopt a longitudinal design to determine if there are changes across time (i.e. over a season) and if certain changes in time have an effect on attitudes towards doping along with the other variables. This would highlight whether athletes with perfectionism (perfectionistic striving or perfectionistic concerns) and achievement goals (task or ego) are at constant risk of engaging in doping behaviours, or whether it was an at the moment thought process based on their current circumstances.

Considering that nutritional supplements have been found to be a gateway for doping use (Backhouse, Whitaker, & Petróczi, 2013) future research could explore the effects that perfectionism and achievement goals have on individuals using supplements. Supplement use in sport has been found to be high (70.1%; Ulrich et al., 2018). Therefore, by providing further research on perfectionism and achievement goals and their influence on individual's decision making could provide a greater insight to why individual's make certain decisions that could potentially be detrimental in their careers and ruin the integrity of the sport.

Future research could also explore other negative aspects associated with sport, such as alcohol intoxication (Wichstrøm, 2006), or other forms of cheating. Because doping is considered a form of cheating this research could be replicated in other forms of cheating in sport, such as match-fixing, illegal betting, equipment tampering and spying that have become an increasing concern in sport (Shields & Bredemeier, 1995; Eklund & Tenenbaum, 2014; Ring & Kavussanu, 2018a). This would provide a developed insight into the effects of perfectionism and achievement goals and how they can negatively influence individuals and the effect they can have on sports.

This research could now be used as a platform for other researchers to determine if perfectionism and achievement goals as a mediator have an effect on athlete's decision making with regards to other forms of cheating or negative behaviours. Given that perfectionistic concerns and ego orientations could influence other negative behaviours, such as anti-social behaviour and cheating future research could replicate the methodology of this study. However, focusing on other negative aspects with regards to athletes to determine how at risk they are to engage in potentially other negative behaviours. This research may provide coaches, sports scientists and medical staff with the required knowledge to safeguard their athletes against any potential negative behaviours besides doping.

Like most models, the higher order model has several limitations. Due to the unified approach of the higher order model the nuances of each individual models and dimensions are replaced for the more general approach. Additionally, despite the higher order model having a statistical advantage, this is not the case conceptually. This is because when analysing other orientated perfectionism, which has been found to load perfectionistic striving actually has an ill fit with other dimensions (Frost et al., 1993; Cox, Enns & Clara, 2002; Bieling, Israeli & Anthony, 2004). Therefore, other orientated

perfectionism is often not included as an indicator of perfectionistic strivings (Hill, 2016). Furthermore, the lack of a formalized theory to understand two higher order dimensions and its effects is another limitation of this model (Hill, 2016). Formalized theories are essential in order to distinguish a hypothesis, test the confidence of the model and its moderating factors and identify and examine its mediating factors. Having a formalized theory is also essential so the model can be critiqued.

In addition to the previous limitations, this study was also limited to the factor that perfectionism, achievement goals and attitudes towards doping used certain measurements. Therefore, for a more concrete outcome on perfectionism and attitudes towards doping with achievement goals as a mediator, other measures should be used in future studies. This will determine if the findings can be replicated using other methods, which will provide a stronger view on whether perfectionism and attitudes towards doping are mediated by achievement goals.

The present study examined full mediation and therefore did not include direct pathways from perfectionism to attitudes towards doping. Future studies should, therefore, examine if there are still direct effects however because the present model would be "just identified" with these paths we were not able to test the model for fit against the data. Further studies with a greater number of degrees of freedom including perhaps additional mediators may help to add to our understanding of these relationships.

The final limitation of this study is the use of self-report scales. These types of scales have the possibility of producing self-report bias, with individuals wanting to perceive themselves with what is currently desirable within their group. Therefore, the social desirability scale (Stöber, 2001) would have been a useful tool in this study. This scale allows the researcher to understand if the questions based on doping are being

answered truthfully. A social desirability scale is a useful tool within research because it suggests that athletes could hold back certain undesirable attitudes, but then respond in a way which will perceive them as socially desirable (Goldstein, 1960; Taylor, 1961). Self-reported questionnaires are a prominent methodological process for psychological based research within doping (Backhouse et al., 2007). Therefore, because of the nature of doping within sport, this method of determining social desirability seems warranted. This stems from research which has found self-bias when dealing with illicit drug and alcohol use (see, Tourangeau & Yan, 2007) and doping in sport (see, Backhouse et al., 2007) when dealing with questionnaires.

4.5. Practical Implications

The findings of the present study have several practical implications. As perfectionism and goal orientations may predict attitudes towards doping, it could be beneficial to profile athletes for these constructs. By psychologically profiling their player's staff and clubs can understand and potentially prevent any of their athletes from engaging in doping or any other negative behaviours. With that in mind, it is important for researchers, coaches and other staff involved within research and sport to understand that having ego orientations and perfectionistic concerns does not indicate that they will definitely engage in these behaviours. However, this should be used as a tool to potentially eradicate doping in sport in this case and any other negative behavioural responses in other existing or future research.

An approach to reduce the impact of an athlete's ego orientations may be to modify the coach-created motivational climate. A motivational climate is formed based on the coaches training environment and achievement evaluations, which is then perceived by the athlete(s) within their athletic environment (Duda & Whitehead, 1998; Xiang & Couningham, 2005). This can be based on a coach's behaviour in training,

competition and their reaction to failure or success. There are two distinct types of motivational climates based on the achievement goal theory, which include; mastery orientated motivational climate (task orientation) and performance-orientated motivational climate (ego orientation; Nicholls, 1989). If coaches are producing a more performance-orientated climate this may influence the athletes and may be a contributing factor in an athlete's decision making with PES's. Consequently, reducing performance-orientated climates and instead promoting a mastery-orientated climate based on rewarding effort over performances may help reduce the change that athletes may dope. A mastery or task involving climate is characterised by a coach providing a task-involving, autonomy supportive, socially supportive and lower order features (Duda, 2013).

In addition to adopting a mastery-oriented climate reducing the effects of perfectionism that an athlete exhibit could also be a useful strategy. A method in which psychologists working with athletes could implement is the use of cognitive behavioural therapy. In a randomised control trial it was found that that cognitive behavioural therapy reduces perfectionism effectively and is maintained up to a 6 month follow up (Handley et al., 2015). This study found that CBT reduces concerns over personal standards, mistakes, doubts about actions and Dysfunctional Attitude Scale self-criticism scores (Handley et al., 2015). However, this study is based on clinical patients and the generalisability could not be determined for the athletic population. Therefore, future studies could explore how perfectionism and in particular perfectionistic concerns could be reduced in athlete populations.

4.6. Conclusion

The present study is the first to show that achievement goal orientations have a mediating role in the relationships between perfectionism and athletes' attitudes towards

doping. Both perfectionistic strivings and concerns may predispose athletes' to engaging in doping behaviours and these relationships may be explained by an ego-orientation, which is the need to outperform others (and a belief that one should). Because many athletes do not understand or are not aware of the health risks associated with doping it is important for organisations to continue with providing education on the possible outcomes of using banned performance-enhancing substances in sport. From the present research, athletes with high ego orientations may potentially be a more at-risk hypercompetitive athlete. Therefore, these athletes should be provided with targeted education surrounding the risk associated with doping. This could help deter athletes from doping, which will ensure the sport remains fair and safe.

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Appendix A: Ethics Approval Reference

Ethical approval for this study was granted by York St John University's Cross-School Ethics Committee.

Reference number: 140116881/08122017

Appendix B: Gatekeeper

Dear

I am a student at York St John University and I am completing a research project for my MSc by research on the relationship between perfectionism attitudes towards doping when athletes are injured. This study is being conducted with Daniel Madigan and Andy Hill who are lecturers at York St John University. I would like to request your permission to use your club to complete my research study.

What does the study involve?
Participants will be required to complete a questionnaire measuring perfectionism, goal orientation, attitudes towards doping.

What happens with the study findings?
Only the research team will have access to the information from this study. Participants names will not be disclosed in the study and clubs will be provided with a pseudonym to maintain anonymity.

Who can I contact if I have any questions?
My details are at the top of the page. If you have any concerns, queries or complaints regarding the research project please contact Professor Howard Hall, Chair of the Sport Research Ethics Committee, on 01904 876302 or h.hall@yorksj.ac.uk.

Please sign below if you are happy for me to complete my research in your club.

I have read and understand the above information and **do give my consent** to this study taking place.

Print Name: …… Date: .....

Signature: .....

Appendix C: Athlete Information Sheet

We would like you to take part in a research project. Before you decide whether or not you would like to, you need to understand why the research is being done and what it will involve. Please read this sheet and ask questions if there is anything that is not clear.

Purpose of the study: The purpose of the study is to examine the relationship between personality and doping.

Why have I been chosen? You have been asked to take part because you are a sports participant.

Do I have to take part? You do not need to take part if you do not want to and you can stop at any time. You do not need to explain why. We can also remove your data from the study if you contact us up to one month after you complete the questionnaire. To do so, please use the contact details below.

What do I have to do if I take part? You will be asked to complete a questionnaire. This should take no longer than 15 minutes. The questionnaire includes questions about your personality and about your attitudes and perceptions of doping.

What are the possible disadvantages and risks of taking part? The risks are considered minimal. However, the study will include a debrief with further information about anti-doping.

What are the possible benefits of taking part? There are no immediate benefits to the athletes. However, we hope that the research will provide us with a better understanding of personality in athletes.

Will my questionnaire be shared with others? No one will see specific content of your questionnaire except the research team.

What will happen to the results of the research project? We may use your questionnaire when reporting the findings of the study. However, you will not be identifiable. Team names will not be disclosed and will be provided with a pseudonym. We will store all data securely at York St John University and destroy it after we report the findings.

Who is conducting the research? The research is being conducted by a student researcher and two lecturers at York St. John University.

Contact for further information: For further information about the research please contact Ben Hardwick, MSc by research student in Sport and Exercise Science, School of Sport, York St John University, on ben.hardwick@yorksj.ac.uk

If you have any questions/concerns, during or after the investigation, or wish to contact an independent person to whom any questions may be directed or further information may be sought from, please contact: Nathalie Noret, Chair of the Cross School Research Ethics Committee York St John University, on 01904 876311 or n.noret@yorksj.ac.uk.

Appendix D: Informed consent form

Please tick (✓) all boxes and date and sign where indicated below (X):

A. I confirm that I have read and understood the information sheet for the above study and understand what is expected of me ☐

B. I confirm that I have been given the opportunity to ask questions regarding the study and, if asked, my questions were answered to my full satisfaction ☐

C. I understand that my participation is voluntary. I also understand that I may withdraw at any time prior to the finalised data input process without giving a reason for my withdrawal and without penalty ☐

D. I understand that all information about me will be treated in strict confidence and that, I will not be named in any written work arising from this study ☐

Your name (PRINT)	Date	Signature **X**
Researcher's name (PRINT)	Date	Signature

<u>Data Protection Act</u>

I understand that data collected about me during my participation in this study will be stored on a password-protected computer and that any files containing information about me will be made anonymous.

Signature: **X** _____ Date: _____

Appendix E: Questionnaire

Instructions

We would like you to answer some questions about doping.

The questions are designed to measure attitudes people have towards the use of "banned performance enhancement substances." Banned performance enhancement substances are drugs and substances (e.g., steroids, EPO) that are banned by the World Anti-Doping Agency. The present study does not investigate attitudes towards performance enhancement substances that are not banned like creatine and caffeine.

There are no right or wrong answers. We are interested in all responses. No names are requested on the questionnaire so please respond honestly.

Section 1

Sex *(Please tick the appropriate box)*	Age
Male ☐ Female ☐	I am _____ years old.
Sport experience	
Which sport do you play: _____	
How many hours on average do you train per week? _____ Hours	
What is your current level of sport? (i.e., you participated / qualified for competitions in the level of …) ☐Recreational ☐Regional ☐National ☐International ☐World class (world top 20)	
Are you currently injured? Yes ☐ No ☐	

Section 2

Please read each statement and decide to what degree this characterises **your attitudes toward your performance in sport** by indicating how strongly you agree or disagree with the statement.

	Strongly Disagree		Neutral		Strongly Agree
1. If I do not set the highest standards for myself in my sport, I am likely to end up a second-rate player.	1	2	3	4	5
2. Even if I fail slightly in competition, for me, it is as bad as being a complete failure.	1	2	3	4	5
3. I strive to be as perfect as possible.	1	2	3	4	5
4. I feel extremely stressed if everything does not go perfectly.	1	2	3	4	5
5. I hate being less than the best at things in my sport.	1	2	3	4	5
6. I should be upset if I make a mistake in competition.	1	2	3	4	5
7. I am a perfectionist as far as my targets are concerned.	1	2	3	4	5
8. It is important to me that I be thoroughly competent in everything I do in my sport.	1	2	3	4	5
9. If a team-mate or opponent (who plays a similar position to me) plays better than me during competition, then I feel like I failed to some degree.	1	2	3	4	5
10. I have the wish to do everything perfectly.	1	2	3	4	5
11. I get completely furious if I make mistakes.	1	2	3	4	5
12. If I play well but only make one obvious mistake in the entire game, I still feel disappointed with my performance.	1	2	3	4	5
13. I think I expect higher performance and greater results in my daily sport-training than most players.	1	2	3	4	5
14. The fewer mistakes I make in competition, the more people will like me.	1	2	3	4	5
15. It is important to me to be perfect in everything I attempt.	1	2	3	4	5
16. People will probably think less of me if I make mistakes in competition.	1	2	3	4	5
17. I feel that other players generally accept lower standards for themselves in sport than I do.	1	2	3	4	5
18. I get frustrated if I do not fulfil my high expectations.	1	2	3	4	5
19. I have extremely high goals for myself in my sport.	1	2	3	4	5
20. If I fail in competition, I feel like a failure as a person.	1	2	3	4	5
21. I feel the need to be perfect.	1	2	3	4	5
22. If something does not go perfectly, I am dissatisfied with the whole competition.	1	2	3	4	5
23. I set higher achievement goals than most athletes who play my sport.	1	2	3	4	5

24. If I do not do well all the time in competition, I feel that people will not respect me as an athlete.	1	2	3	4	5
25. After competitions, I feel depressed if I have not been perfect.	1	2	3	4	5

The following questions relate to your performance in sport. Please indicate how strongly you agree or disagree with the statement.
I feel most successful in sport when ...

	Strongly Disagree		Neutral		Strongly Agree
1. I'm the only one who can do the play or skill.	1	2	3	4	5
2. I learn a new skill and it makes me want to practice more.	1	2	3	4	5
3. I can do better than my friends.	1	2	3	4	5
4. The others can't do as well as me.	1	2	3	4	5
5. I learn something that is fun to do.	1	2	3	4	5
6. Others mess up and I don't.	1	2	3	4	5
7. I learn a new skill by trying hard.	1	2	3	4	5
8. I work really hard.	1	2	3	4	5
9. I score the most points/goals/hits.	1	2	3	4	5
10. Something I learn makes me want to go and practice more.	1	2	3	4	5
11. I'm the best.	1	2	3	4	5
12. A skill I learn really feels right.	1	2	3	4	5
13. I do my very best.	1	2	3	4	5

The following questions are related to your attitudes towards banned performance-enhancing substances/ methods in sport. Please indicate to what extent you agree to the questions.

	Strongly Disagree					Strongly Agree
1. There is no difference between drugs, fibreglass poles, and speedy swimsuits that are all used to enhance performance.	1	2	3	4	5	6
2. The risks related to doping are exaggerated.	1	2	3	4	5	6
3. Legalising performance enhancements would be beneficial for	1	2	3	4	5	6
4. Doping is not cheating since everyone does it.	1	2	3	4	5	6
5. Athletes should not feel guilty about breaking the rules and taking performance-enhancing drugs.	1	2	3	4	5	6
6. Only the quality of performance should matter, not the way	1	2	3	4	5	6
7. Doping is necessary to be competitive.	1	2	3	4	5	6
8. Doping is unavoidable part of the competitive sport.	1	2	3	4	5	6

Appendix F: Debrief form

Thank you for taking part in our research project. We would be happy to answer any queries you have about our work now or at any point in the future.

Given the importance of anti-doping, we have prepared a short summary of key issues athletes should be aware of. For further information on anti-doping, you may wish to view the website of UK Anti-Doping: http://www.ukad.org.uk/athletes/

What is the purpose of anti-doping?
Anti-doping is about ensuring that athletes compete in sport based on their own talent, hard work and dedication, without cheating through the use of performance enhancing substances or methods.

Are there any anti-doping rules?
To help sport remain fair and competitive, there are rules for athletes and their athlete support personnel (e.g., coach, physio, sports doctor). These rules are the anti-doping rules. All athletes, whatever their sport and their level of competition, should abide by these rules.

How can I keep within anti-doping rules?
You would always check your sporting equipment to make sure it is safe to use. The same applies to the things you take such as medications and nutritional supplements. For example, checking a medication, such as a cold remedy from the chemist or antibiotics from a doctor, is safe to take is a core skill that athletes should learn how to do.

There is a long list of banned substances which athletes cannot take. This is known as the Prohibited List. It contains a range of substances you may have heard of including steroids, stimulants, and even methods such as blood doping.

The questions you should always ask yourself are: are these safe to take? And, who can help me decide?
Always:

- TELL people you are involved in sport and cannot take a banned substance
- CHECK medications are safe to take before you use them
- ASK someone for help if you are unsure

Make the right decisions to protect yourself as an athlete. As an athlete - whether you're choosing how to prepare for a competition or whether you are out with your friends - your decisions can affect your chances of making it to the top.

Thank you once again for participating in our research. If you have any questions about the project, please feel free to contact:

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Ben.hardwick@yorksj.ac.uk