Projet Levy

Exploring the processes through which personality traits affect doping responses

The primary aim of this exploratory project is to explore the predictive ability of personality traits upon various doping responses and to determine whether coping can act as a mechanism to account for this relationship. The Big-5 personality taxonomy, openness, conscientiousness, extraversion, agreeableness, neuroticism (McCrae & Costa, 1987), is adopted due to its mainstream acceptance and lack of use in the context of doping in sport. Gaudreau and Blondin's (2002) Hierarchical Model of Coping (e.g., task, distraction, and disengagement coping) is utilized due to its specific development for sporting contexts. To date, research has been primarily directed at predicting doping behavior. However, in order for interventions to be optimally effective it is important that research considers an array of other cognitive and affective doping responses. Accordingly, the present study is inclusive of varying behavioral, cognitive and affective responses that are salient to doping in sport. Furthermore, in view that doping engagement is consistent across playing status (Backhouse, McKenna, Robinson, & Atkin, 2007) the present study investigated competitive athletes across a range of ability levels. Both personality and coping, as operationalized in this study, have been given scant attention in the doping literature. As such, the current research can, potentially, make a useful contribution to our understanding of how individual differences influence doping responses in sport. In particular, this research can help identify personality profiles whereby athletes who are dispositionally susceptible to maladaptive doping responses can be targeted for intervention. In addition, the exploration of a mechanism, coping, to account for personality profiles has the potential to actually inform educational intervention content through the effective teaching of coping strategies. Therefore, this project can make a useful contribution to reduce the likelihood of doping in competitive sport. In addition, the exploratory findings of this project will facilitate hypotheses that can inform future experimental research, further aiding our understanding of doping responses in sport.

Edge Hill University

Report to the World Anti-Doping Agency

Exploring the Processes through which Personality Traits affect Doping Responses

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Executive Summary

Gaining a competitive advantage through the use of doping is not a new phenomenon, however it remains a significant contemporary issue in the pursuit of performance excellence in sport. Accordingly, the primary aim of this project was to explore the predictive ability of personality traits upon various doping related responses (e.g., behavioral, cognitive, and affective) and to determine whether coping can act as a mechanism to account for this relationship. The Big-5 personality taxonomy, openness, conscientiousness, extraversion, agreeableness, neuroticism (McCrae & Costa, 1987), was adopted due to its mainstream acceptance and lack of use in the context of doping in sport. Gaudreau and Blondin's (2002) Hierarchical Model of Coping was utilized due to its specific development for sporting contexts. Using a cross sectional sample of 447 athletes and after controlling for social desirability, findings revealed an inverse direct association between extraversion and doping attitudes. Additionally, neuroticism was inversely directly predictive of negative doping affect and openness was linearly directly associated with positive doping affect. In terms of indirect findings, reduced usage of disengagement coping was found to be a salient mediator to account for a number of indirect findings between the Big-5 personality traits and doping intention and behavior. This included the indirect relationships between 1) neuroticism and both doping intention / behavior; 2) agreeableness and both doping intention/ behavior, and finally; 3) conscientiousness and doping intention. Of note, some of the direct and indirect findings were paradoxical in nature, and thus were explained in the context of explicit versus implicit approaches for the measurement of doping responses, in particular doping attitudes and affectivity. From an applied perspective, this study identified particular personality traits that can potentially pre-dispose athletes to being dispositionally susceptible to various maladaptive doping responses. Furthermore, identifying the significant mediational role of disengagement coping has the potential to inform anti-doping related interventions. In order

to provide a greater evidence-basis for such interventions, the current study has laid the foundation for further experimental research that empirically investigates causality of the findings reported.

Introduction

Theoretical Development

Over the last decade there has been a plethora of research investigating psychological predictors and determinants of doping behavior in sport. A social-cognitive paradigm underpins much of the research conducted to date. The social- cognitive approach assumes that human beings are goal-directed and capable of rational decision making, forethought and planning (Conner & Norman, 2005). A common social-cognitive construct explored extensively in the doping literature is attitudes. Backhouse, McKenna, Robinson, and Atkin (2007) identified sixty-nine papers that investigated doping attitudinal-based research amongst various sporting populations. In view that a large proportion of these studies were atheoretical, there has been a shift towards the exploration of attitudinal expectancy-value based theories in order to better understand doping behavior in sport. Such theories include the Theory of Planned Behavior (TPB; Ajzen, 1991), Drugs in Sport Deterrence Model (DSDM; Strelan & Boeckmann, 2003), and The Sport Drug Control Model (SDCM; Donovan, Egger, Kapernick, & Mendoza, 2002)

Theory of Planned Behavior

The Theory of Planned Behavior (TPB) variables that include attitude, subjective norms, and perceived behavioral control have been found to predict 66% (Lazuras, Barkoukis, Rodofinos, Tzorbatzoudis, 2010), 55% (Lucidi, Zelli, Mallia, Grano, Russo, & Violani, 2008) and 39% (Goulet, Valois, Buist, & Cote, 2010) of the variance in doping intentions. However, the variance percentage for predicting doping behavior is relatively low. For example, in accordance with the TPB, Lucidi et al. (2008) and Goulet et al. (2010) found intention predicted 15 % and 16% of the variance in doping behavior respectively. Therefore, a large percentage of variance of doping behavior remains unexplained by the TPB. As such, it can

be argued that the TPB may have limited efficacy with respect to informing interventions that minimalize the use of doping behavior in sport. Similar conclusions about the TPB have been drawn with respect to numerous health behaviors (Hardeman, Kinmonth, Michie, & Sutton, 2011).

Drugs in Sport Deterrence Model

The Drugs in Sport Deterrence Model (DSDM) asserts that athletes' decisions to engage in doping behavior are predicted by individual appraisals of deterrents (e.g., legal, social, and self-imposed sanctions) and benefits (e.g., material, social and internal). Strelan and Boeckmann (2006) did find some support for deterrents to aid decision making with respect to not engage in doping. However, this was a hypothetical based study and as such, its findings should be viewed with caution. In addition, due to the ambivalent nature of doping attitudes, deterrent sanctions can be ineffective with respect to preventing decisions to engage in doping behavior. Although the DSDM was designed as a starting point to simulate research to date, scholars have not systematically empirically tested the DSDM. This may due to the overly simplistic nature of the deterrent vs. benefit analysis in order to predict the complex decision making associated with the nature of doping behavior.

The Sport Drug Control Model

The SDCM is a more comprehensive model compared to the DSDM. This is because the SDCM is more inclusive of other social-cognitive constructs that are determined to predict doping attitudes and intention. Preliminary research findings suggested appraisals of threat, benefit and morality were predictive of doping attitudes, the latter, in turn, predicted doping susceptibility (Gucciardi, Jalleh, & Donovan, 2011). A key limitation with this study is that the SDCM proposed by Donovan and colleagues (2002) was not tested in its entirety by Gucciardi et al. (2011) Therefore, the capacity for SDCM for predicting doping intentions and

behavior remains speculative. On a conceptual note, as with the TPB, the SDCM does not account for how doping intentions are translated into doping behavior. This limits the applicability of the SDCM to adequately develop interventions that actually inform and sustain doping behavior change.

Research Development

An over emphasis on social-cognitive constructs (e.g., attitudes) may have contributed to the limited efficacy of the aforementioned theories to comprehensively predict doping behavior. Furthermore, despite the growing amount of research exploring social-cognitive constructs upon doping behavior, no causal link has been found (Backhouse et al., 2007). Notably, personality is a construct not considered by many expectancy-value based theories. This is a significant limitation, as Petroczi and Aidman (2008) hypothesized personality to be a salient factor that may help reduce vulnerability to engage in doping behavior. Furthermore, Petroczi and Aidman (2008) recommended the need for future research to explore personality traits that are linked to doping with a view to assisting in the design of anti-doping interventions. In order to assist with the latter it is necessary to consider the relationship between personality and an array of doping responses (e.g., cognitive / affective), and not merely doping behavior *per se*.

To date, the study of personality traits in general have been given scant attention in the doping sport literature. Some notable exceptions are, tough-mindedness, self-consciousness (Vajiala, 2007), and perfectionism, trait confidence, goal orientations (Moran, Guerin, Kirby, & MacIntyre, 2008). However, in the main, there are a number of salient personality traits that have not been considered in the context of doping. In the mainstream psychology literature it has been argued that an important advancement in the psychology of personality has been the emerging consensus that personality characteristics can be organized in terms of five broad trait domains (Marsh, Ludtke, Muthen, Asparouhov, Morin, Trautwein, &

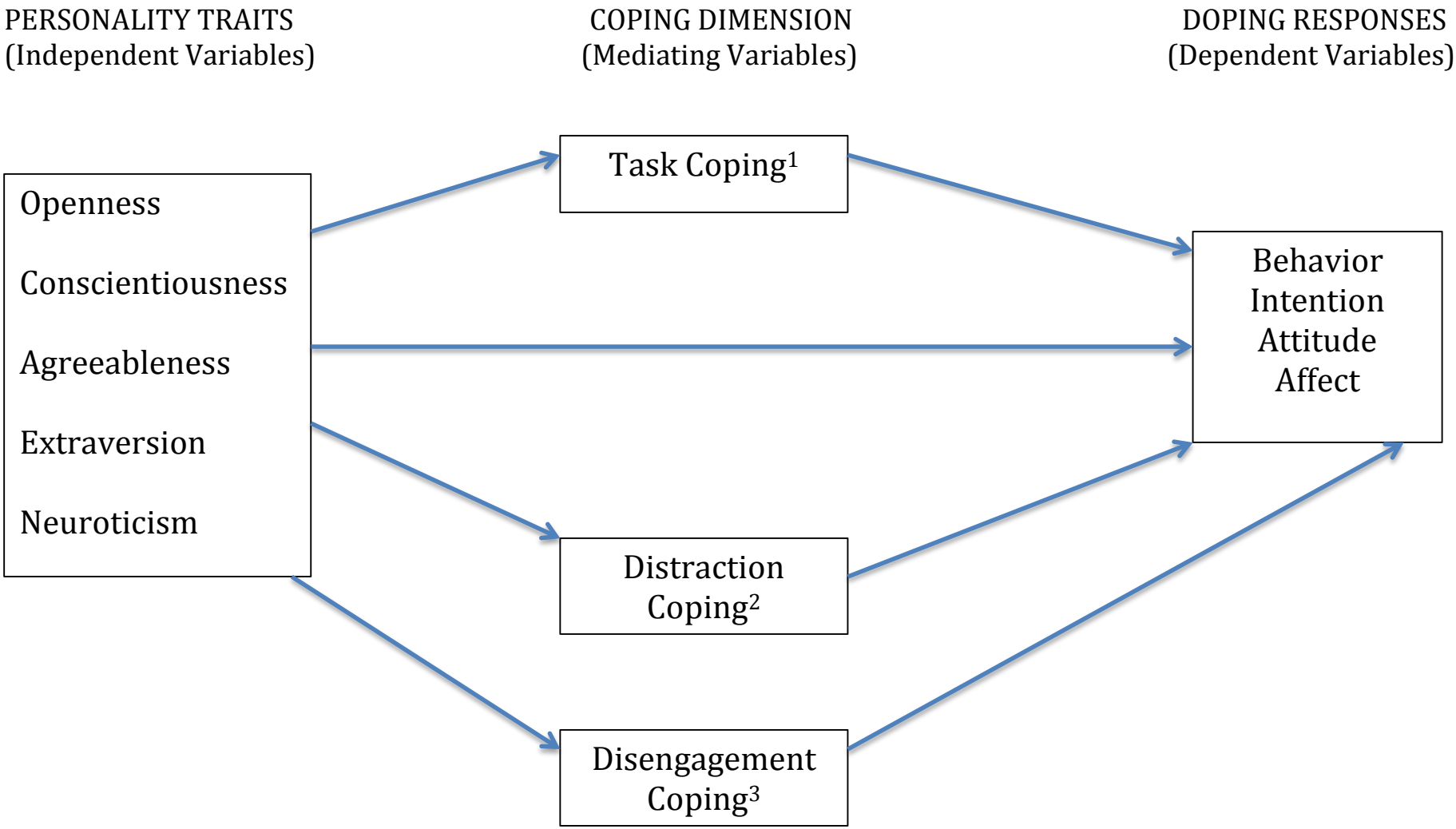
Nagengast, 2010). These include openness, conscientiousness, extraversion, agreeableness and neuroticism, all of which are considered to be the Big-5 personality traits. The Big-5 personality traits represent personality in its broadest level on differing bipolar dimensions. For example, 1) *openness* distinguishes between those who are open to new experiences and those who like familiarity; 2) *conscientiousness* distinguishes those who are conscientious from those who are lackadaisical; 3) *extraversion* distinguishes between those who are introverted and those who are extroverted; 4) *agreeableness* distinguishes between those who are compassionate and those who antagonize, and finally; 5) *neuroticism* distinguishes between emotional stability and emotionally unstable individuals. The Big-5 personality framework suggests individual differences in human personality can be derived from the aforementioned trait dimensions. A plethora of research has supported the stability and predictive validity of the Big-5 personality trait domains (see McCrae & Costa, 1997).

Research exploring these traits, in the context of doping, would help aid understanding with respect to those individuals who may be pre-disposed to maladaptive doping responses. Accordingly, there is a need for research to consider the independent effects of the aforementioned personality traits upon behavioral, cognitive and affective doping responses. The investigation of the Big-5 personality traits as determinants of doping behavior, doping attitudes, doping intentions and doping affect is a significant caveat in the doping literature. In addition to this, the doping literature in sport has not given any attention to variables that may mediate the relationship between personality traits and doping responses. That is, further research is required to ascertain the mechanisms that account for why certain independent personality traits predict various doping behavioral, cognitive and affective responses. One possible mechanism, yet to be considered in the context of doping, is coping. Coping has been described as the cognitive and behavioral efforts of a person to manage external and internal demands encountered in a stressful situation (Lazarus & Folkman, 1984). Gaudreau and

Blondin (2002) have introduced a Hierarchical Coping Model in order to classify coping dimensions and coping strategies that are contextually specific to competitive sport. This comprised of 10 coping strategies that represented three higher-order dimensions, 1) *task-oriented*: strategies that directly alter the source of stress (e.g., thought control); 2) *disengagement-oriented*: strategies employed to disengage oneself from a task (e.g., resignation); 3) *distraction-oriented*: strategies directed at unrelated aspects of a task (e.g., distancing). Support for the three factor higher order coping dimensions and the subsequent second order strategies have been established (Gaudreau et al., 2005; Louvet et al., 2007).

With respect to coping-personality link, DeLongis and Holtzman's (2005) conceptual framework suggested coping mediates the relationship between personality and outcomes (e.g., behavior/ cognition/ affect). That is, personality can directly influence coping responses that in turn predict doping responses. The identification of salient coping dimensions and or strategies could help inform interventions targeted at personality traits susceptible to unfavorable doping responses in sport. Accordingly, the primary aim of this study is to explore the predictive ability of the Big-5 personality traits upon various doping responses (e.g., behavior, intention, attitude, affect) and to determine whether coping can act as a mechanism (i.e., mediator) to account for this relationship. The independent and mediating effects are currently unknown due to no prior research being conducted using the Big-5 personality taxonomy (McCrae & Costa, 1987) and the Hierarchical Model of Coping (Gaudreau & Blondin, 2002) in the context of doping in sport. As such, no explicit directional hypotheses are provided. However, some general associations between measured constructs can be sought from the conceptual model underpinning the current study (see figure 1 below).

Figure 1. Conceptual Model Underpinning the Study



LOWER ORDER COPING STRATEGIES

[1]Mental Imagery, Effort Expenditure, Thought control, Seeking Support, Relaxation, Logical Analysis

[2]Distancing, Mental Distraction

[3]Venting, Resignation

Method

Participants

The present study consisted of 447 athletes aged between 18-58 years (*mean* = 26.11; *standard deviation* = 8.52). The sample consisted of 238 males and 209 females who competed at international/ national (*n* = 150), county (*n* = 142), club/ university (*n* = 132) and beginner (*n* = 23) standard. Participants in this study took part in both team (*n* = 273) and individual sports (*n* = 174). Consent was provided by all participants and ethical approval gained from a university research ethics committee.

Measures

Personality Traits

The Ten Item Personality Inventory (TIPI) was used to measure the Big-5 personality traits that being openness, conscientiousness, extraversion, agreeableness, neuroticism. Each of the 10-items consisted of a paired descriptors that were rated on a 7-point Likert-type scale ranging from 1 (*disagree strongly*) to 7 (*agree strongly*). The paired descriptors represented both a positive and negative pole for each of the Big-5 personality traits measured. Good evidence for construct validity and acceptable test-re-test reliability has previously been reported (Gossling, Rentflow, & Swann, 2003), in addition the TIPI factor structure and convergent validity has also been established (Ehrhart, Holcombe-Ehrhart, Roesch, Chung-Herrea, Nadler, & Bradshaw, 2009).

Coping

The 37-item Dispositional Coping Inventory for Competitive Sport (DCICS; Hurst, Thompson, Visek, Fisher, & Gaudreau, 2011) was used to assess trait coping strategies. Specifically, the DCICS measured three broader coping strategies that were underpinned by

ten lower order coping strategies, 1) Task-oriented coping (thought control, mental imagery, relaxation, effort expenditure, logical analysis, seeking support); 2) Distraction-oriented coping (distancing, mental distraction), and; 3) Disengagement-oriented coping (resignation, venting of unpleasant emotions). Participants rated how they typically coped during competitions on a 5-point Likert scale ranging from 1 (*does not correspond at all to what I do or think*) to 5 (*corresponds very strongly to what I do or think*). Hurst et al. (2011) have reported acceptable reliability and validity for the DCICS, advocating its use as a trait coping measure specific to the context of competitive sport.

Doping responses

Self-Reported Doping Behaviour: A hypothetical decisional-based scenario was used to gauge perceptions of doping behavior. The scenario provided was as follows:

> In a training session you sustain a serious knee injury. Your specialist says you will most likely be out of action for the rest of the season. You will certainly miss out on playing in all major competitive events. This injury will also have serious consequences as to whether you will fully recover and place in jeopardy your ability to compete again in your sport. In addition, due to the extent of the injury your coach has doubts as to whether you will return to the same playing level prior to picking up this career threatening injury.

In response to the above scenario, participants were provided with two hypothetical responses

> 1) Would you take a course of human growth hormone (HGH), a drug that radically enhances the repair process, knowing this would ***definitely*** facilitate your quick return to competition and ***guarantee*** successful performance? However, there is the likelihood that you will experience short-longer term damaging health side effects.

2) Would you take a course of nutritional supplements, to enhance your general health, knowing they would *not* facilitate a quick return to competition and have no impact upon improving your performance? However, you will experience *no* short-longer term damaging health side effects.

Participants were given the option of choosing one of the above responses. Option one denoted the use to engage in doping behavior and option two indicated no attempt to engage in doping behavior.

Attitudes: The 17-item Performance Enhancement Attitude Scale (PEAS; Petroczi & Aidman, 2009) was used as a one-dimensional measure of attitudinal beliefs towards doping in sport. Participants were required to indicate their attitudinal beliefs on a 6-point Likert-type scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Lower scores reflect less favorable explicit attitudes towards doping whereas higher scores reflect a more favorable explicit attitude. Petroczi and Aidman (2009) found the PEAS to have good reliability and acceptable validity estimates.

Intention: Doping intention was measured via three items, 1) "I *intend* to use performance enhancing drugs to improve my performance during this season; 2) " I *plan* to use performance enhancing drugs to improve my performance during this season, and; 3) "I am *determined* to use performance enhancing drugs to enhance my performance during this season. Participants indicated their intention on a 7-point Likert scale. Item 1 was anchored from 1 (*strongly agree*) to 7 (*strongly disagree*), while items 2 and 3 were anchored from 1 (*extremely likely*) to 7 (*extremely unlikely*). At present, no current standardized psychometric exists to measure doping intention in sport.

Doping Affectivity: The Positive Affect-Negative Affect Schedule (PANAS; Watson,

Clark, & Tellegen, 1988) is a 20-item instrument that measures two orthogonal affective dimensions, positive affect and negative affect. In the current study the instructions provided were modified in order to measure doping specific dispositional affective responses: Accordingly, the instruction was: "For each item below rate how you generally feel about the use of performance enhancing drugs in sport". Participants indicated their feelings on a 5-point Likert scale ranging from 1 (*very slightly or not at all*) to 5 (*extremely*). There has been no attempt in the sport doping literature to measure affective disposition. As such, no specific measurement of this construct was available to use. Therefore, the use of a modified generic measure in the form of the PANAS was necessary. Watson et al. (1988) have demonstrated the PANAS to be both reliable and valid.

Social Desirability: A shorter 20-item version of the Marlow-Crowne Social Desirability Scale (MCSD-20; Strahan & Gerbasi, 1972) was used to measure social desirability. Participants were required to indicate "true" or "false" regarding general personal attitudes and characteristics. For example, "I never hesitate to go out of my way to help someone", "I am always willing to admit I make a mistake", " I never resent being asked to return a favour". Socially desirable answers were scored 1, and answers that were not socially desirable were scored 0. Scores were summed, thus total scores ranged from 0 (low social desirability) to 20 (high social desirability). Research has demonstrated adequate factor structure for shorter versions of the MCSD (Fischer & Flick, 1993; Loo & Thorpe, 2000). Satisfactory reliability has been demonstrated concerning the MCSD-20 (Strahan & Gerbasi, 1972).

Procedure

Ethical approval was obtained by a University Research Ethics Committee. A research assistant, trained in quantitative data collection techniques, recruited athletes engaging in competitive sport across various sports clubs in the UK. Athletes who wished to partake in

this study were sent an information letter, to detail the nature of the study and their ethical rights as a research participant. After providing informed consent, participants completed a questionnaire pack that contained TIPI, DCICS, PEAS, PANAS, MCSD-20, and self-reported doping intention and behaviour. All measures were completed in the same order and took approximately 30 minutes to complete.

Results

Descriptive analysis

Table 1 presents the score ranges, means, standard deviations, alpha coefficients and estimates of normality for each of the subscales measured. Less than 0.1% of the data was missing and no troublesome outliers were detected from Q-Q plots. All variables demonstrated satisfactory skewness (< 2) and kurtosis (< 2), apart from intention. After a reflect and logarithm transformation, intention demonstrated a better distribution (skewness = 2.74; kurtosis = 6.94) but remained marginal.

Table 1. Descriptive Statistics, Reliability and Normality

Subscale	Score Range	Mean	SD	Alpha	Skewness	Kurtosis
Social desirability	0-20	17.15	1.83	.51	-.62	.47
Personality						
Extraversion	2-14	10.06	2.58	.60	-.67	-.01
Agreeableness	2-14	9.46	2.30	.27	-.20	-.20
Conscientiousness	2-14	11.23	2.25	.51	-.82	.40
Neuroticism	2-14	10.11	2.53	.59	-.52	-.48
Openness	2-14	10.72	2.03	.33	-.44	-.35
Coping						
Task	23-115	71.69	12.72	.87	-.33	.00
Distraction	6-30	12.54	4.13	.72	.36	-.63
Disengagement	8-40	17.55	5.14	.76	.29	-.59
Doping Responses						
Attitude	17-102	36.12	11.41	.84	.87	.71
Intention	1-7	6.69	0.92	.89	-3.96	17.43
Behavior	1-2	1.90	0.30	-	-	-
Positive affect	10-50	17.53	8.00	.86	1.53	1.79
Negative affect	10-50	20.24	8.61	.87	.94	.26

- not obtainable

Path analysis

Path analysis was conducted to examine whether the effects of personality traits on doping-related responses were mediated by coping strategies. In the path analysis, we initially specified a model (Model 1) in which (i) personality traits were treated as exogenous variables (ii) coping strategies were specified as mediating-dependent variables and (iii) affect and doping-related variables as outcome variables (dependent variables). In addition, Model 1 assumed that coping strategies mediated completely the effects from personality because it assumed that direct effects from personality traits on affect and doping related variables were zero. However, we also conducted a Lagrange Multiplier Test (LMT) to examine whether the fit of Model 1 could be improved if direct effects form personality traits on affect and doping related variables were assumed to be different than zero.

Results of this analysis revealed that parameters of Model 1 reproduced observations satisfactorily (x^2 (25) = 40.64, p = .02). The Comparative Fit Index (CFI) was .98 and the Standardized Root Mean Square Residual (SRMSR) was .03 (Hu & Bentler, 1999). However, the LMT revealed that the fit of Model 1 could be improved if four direct effects were assumed to be different form zero (x^2 (4) = 25.53, p = .001). These were effects that described direct influences (i) from extraversion to attitudes toward doping, (ii) from agreeableness to doping susceptibility (iii) from neuroticism to negative affect and (iv) from openness to experience to positive affect. Given these results, we decided to test a second model (Model 2- see figure 2) that was identical to the structure of Model 1 but it assumed the direct effects that were identified by the LMT, to be different from zero. Results from this second analysis revealed that parameters of Model 2 explained observations satisfactory (x^2 (21) = 17.32, p = .66, CFI = 1.00, SRMSR = .02). In addition, Model 2 was more parsimonious than Model 1. This was supported by Akaike Information Criterion (AIC), which was lower for Model 2 than Model 1 (-26.28 *vs*. -9.35). Given that our a-priory hypotheses predicted both direct and

indirect effects form personality traits on doping related responses, we present parameters of Model 2.

Table 2 presents statistically significant and statistically non-significant parameters of Model 2. For sake of clarity, we also present a diagram (figure 2) that exemplifies only statistically significant parameters. Additionally, Table 3 presents statistically significant indirect effects of personality traits on doping-related responses. As it is shown in Tables 2 and 3 and Figure 2, Model 2 supported negative indirect effects of neuroticism on doping attitudes. Doping intentions were also predicted positively by agreeableness, conscientiousness and neuroticism. Agreeableness and neuroticism did exert positive indirect effects on doping behavior but the equivalent indirect effects for conscientiousness were not statistically significant. Interestingly Model 2 pointed out that while the indirect effects for agreeableness and conscientiousness were mediated by disengagement, the indirect effects for neuroticism were mediated by disengagement and distraction. Finally, Model 2 supported positive indirect effects of openness to experience on positive affect via task coping and negative indirect effects of neuroticism and agreeableness on positive affect.

Additional Analysis

We also conducted a series of hierarchical regression analysis to examine whether the more specific coping strategies mediated effects of personality traits on doping-related responses. In all analysis, results did not support mediating effects. We followed Baron and Kenny's (1986) recommendation to test mediation. Specifically a mediation is supported if (i) personality traits predicts outcome variables (doping attitudes, positive affect, negative affect, susceptibility, doping intentions and doping behavior), (ii) the hypothesized mediators (indicators of task coping, disengagement coping and distraction coping) predict the outcome variables (iii) the personality traits predict mediators and (iv) the effect of personality traits on the outcome variables is reduced after controlling for effects of the mediators.

Results from this analysis did not support any mediating effects. The reason for this is that when personality traits predicted any of the outcome variables the hypothesized mediators did not reduce the effects of personality traits on outcome variables. For example, regression analyses showed that while extraversion (*beta* = -.13, *t* = 2.81, *p* = .005) and agreeableness predicted doping attitudes (*beta* = -.18, *t* = 3.75, *p* = .001), the effects of extraversion (*beta* = -.13, *t* = 2.66, *p* = .008) and agreeableness (*beta* = -.16, *t* = 3.41, *p* = .001) on doping attitudes remained statistically significant after controlling for more specific effects of coping strategies indicating mental imagery, effort expenditure, thought control, seeking support, relaxation, and logical analysis, distancing, mental distraction, venting or resignation. . Likewise, whereas openness to experience predicted positive affect (*beta* = .14, *t* = 2.91, *p* = .004), the effects of openness (*beta* = .10, *t* = 2.11, *p* = .004), on positive affect remained statistically significant after controlling for mental imagery, effort expenditure, thought control, seeking support, relaxation, and logical analysis distancing, mental distraction, venting or resignation.

Table 2. Parameters of Model 2 Representing Direct and Indirect Effects from Personality on Doping Responses

	Task coping	Distraction coping	Disengagement coping	Attitudes	Positive affect	Negative affect	Intentions	Behavior
Extroversion	.08	-.08	-.02	-.09*				
Agreeableness	-.06	-.09	-.25*	-.12				
Conscientiousness	.10	-.07	-.14*					
Neuroticism	.05	-.17*	-.26*			-.11*		
Openness	.26*	.09	.08		.10*			
Social desirability	.11	.06	-.09	.15*	-.02	.11*	.01	.10*
Task coping				-.04	.14*	.15*	.01	-.09
Distraction				.16	.12*	-.02	-.13*	-.04
Disengagement				.09	.12*	.08	-.12*	-.14*

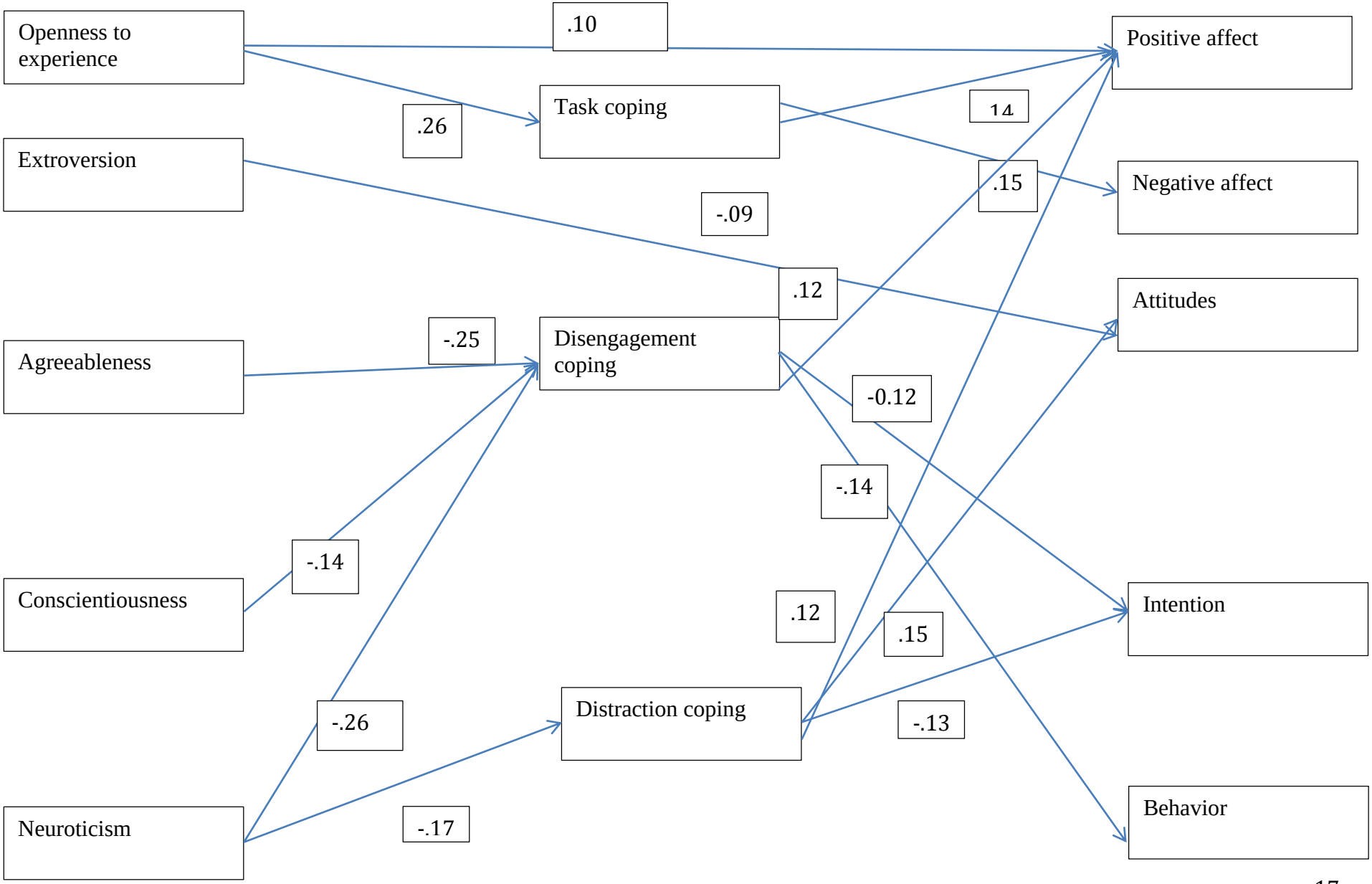
Note. Parameters are standardized beta weights. Parameters with an asterisk are statistically significant at $p < .05$ level.

Table 3. Statistically Significant Indirect Effects of Personality on Doping Responses

	Attitudes	Positive affect	Intentions	Behavior
Agreeableness	-	-.05	.04	.05
Conscientiousness	-	-	.03	-
Neuroticism	-.04	-.05	.04	.04
Openness	-	.05	-	-

Note: Effects from agreeableness and conscientiousness are mediated by disengagement coping. Effects from neuroticism are mediated by disengagement coping and distraction coping. Effects from openness are mediated by task coping.

Figure 2. A Path Diagram that Presents Effects of Personality Traits on Doping Responses



Discussion

Key Findings

The aim of this study was to investigate the direct effects of the Big-5 personality traits upon an array of doping responses, which included doping behavior, intention, attitude, and affect. Furthermore, the indirect effects of the Big-5 upon the aforementioned doping responses, via coping at both dimensional and strategy level, were also investigated. Accordingly, this study adds to the extant doping in sport literature that to date has not comprehensively considered the role of individual differences using the Big-5 personality taxonomy (McCrae & Costa, 1997) and the hierarchical model of coping (Gaudreau & Blondin, 2002).

In terms of direct effects, findings from this study revealed extraversion was inversely predictive of doping attitudes. This suggests that those individuals who are high in trait extraversion are likely to have an unfavorable/ disapproving explicit doping attitude. A common finding in the personality literature is the notion of extraversion being linearly associated with positive affect (Watson & Clark, 1997). It has been postulated that extraverts tend to seek positive affect through frequent engagement in pleasant and enjoyable social situations by attracting positive social attention (Ashton, Lee, & Paunonen, 2002). Therefore, extraverts are motivated to seek out favorable social attention to facilitate positive affective feelings, hence their active engagement in social endeavors. In the context of doping, it is possible that extraverted athletes may seek favorable social attention by endorsing disapproving explicit attitudes towards doping use in social situations. Gaining favorable social attention for endorsing disapproving doping attitudes could lead to enhanced social interactions thereby facilitating more pleasurable and enjoyable social experiences for extraverted athletes. Further research is required to ascertain a more conclusive understanding of the relationship between extraversion and doping attitudes. In view of prior research

indicating that extraverts have a propensity to engage and enjoy favorable social attention (Ashton et al., 2002), future doping-relating research is warranted to explore whether social attention can explain the direct link between extraversion and doping attitudes as found in the current study.

Another direct effect found in this study was higher trait neuroticism being associated with lower negative affect. That is, neurotic individuals had fewer negative feelings (i.e., do not get distressed feelings) towards doping. Conversely, previous research has indicated negative affect to be generally associated with neuroticism (Watson & Clark, 1992). In particular, this body of research suggests a positive linear association, therefore those individuals with neurotic tendencies will experience greater negative/ distressed feelings. This is in accordance with the view that neurotic individuals experience the world as threatening/ distressing and therefore prone to greater negative emotionality (Caspi, Roberts, & Shiner, 2005). In contrast, the current study suggests an inverse association between neuroticism and doping negative affectivity. This contrast may partly be due to the present study investigating dispositional affectivity that was contextually doping relevant. For example, in the athletic domain, given the performance enhancing properties of doping, having fewer negative feelings towards doping may act as a stress buffer for neurotic athletes who are predisposed to being self-critical, sensitive to criticism, and feelings of personal inadequacy. It should be noted that conflicting aspects of neuroticism have also led to contrasting findings in health-related behavior research (Friedman, 2000). The conflicting findings of neuroticism may be due to its operationalization as a broad trait measure. It is possible that some lower order trait facets of neuroticism are more salient in particular contexts. Therefore, future doping-related research may want to consider exploring facet-level neuroticism.

A final direct finding from the current study was the positive association between openness to experience and positive doping affect. Specifically, athletes high in trait openness

were more likely to have positive feelings relating to doping (i.e., likely to feel enthusiastic). According to Caspi et al. (2005) openness to experience is the least understood trait out of the Big-5 taxonomy. For instance, openness has been positively associated, albeit weakly, with both general positive and negative affect (McCrae & Costa, 1991). However, Watson and Clark (1992) found the openness trait to be inversely associated with negative affect. Furthermore, their regression findings revealed openness was the only Big-5 trait not to consistently predict positive or negative affect, consistently, across four independent samples. Despite some of the inconsistent findings in the mainstream psychology literature, the current study does suggest a significant linear association between openness and positive affect in the context of doping. In view that high trait openness individuals' appreciate the merits of trying new things and have a greater willingness to experiment and to be less risk averse (McCrae & Costa, 1997), it is plausible that such individuals may feel a positive affiliation towards doping. This is not to say that high trait openness athletes would engage in doping, as the current findings did not suggest a direct link with doping behavior. Rather, some of the personal characteristics that denote high openness may predispose an athlete to have positive feelings towards doping. Further research is required to corroborate this finding at both broad and facet levels of trait openness. Additionally, in view of high trait openness being generally associated with a willingness to change attitudes and behaviors after being exposed to new ideas or conflicting information (McCrae & Costa, 1997), future research may wish to explore the openness and attitude/ doping behavior relationship further.

In the current study, some of the Big-5 personality traits were found to have indirect effects upon numerous doping responses, via the mediating influence of various higher-order coping dimensions. With respect to neuroticism, disengagement and distraction coping both inversely mediated the linear indirect relationship between neuroticism and doping intention. Furthermore, disengagement-oriented coping, alone, inversely mediated the linear indirect

relationship between neuroticism and doping behavior. Specifically, these findings suggest higher neurotic individuals are more likely to have an intention to dope as a result of reduced use of disengagement and distraction coping dimensions, and a propensity to engage in doping behavior as a result of reduced use of disengagement-oriented coping. Previous research investigating the relationship between personality and coping has found a positive linear association between high trait neuroticism and disengagement coping (Connor-Smith & Flachsbart, 2007; Allen, Greenlees, & Jones, 2011). That is, neurotic individuals are more likely to adopt disengagement-oriented coping. Conversely, the current study suggests the reduced use of disengagement coping accounts for the indirect relationships between neuroticism- doping intention and neuroticism-doping behavior. In order to explain our finding it is important to consider the fundamental reasoning for athletes' engagement with doping, that being to gain a competitive edge over their opponents and therefore ultimately excel in their sporting performance endeavors. As such, for an athlete who dopes, it would seem strange to use coping strategies that disengage them from their achievement goals. Accordingly, the current study suggests neurotic athletes are less likely to disengage from their athletic goals and in doing so are potentially at more risk of intending to/ or engaging in doping behavior. It is possible this is a unique contextual finding, as previous research exploring neuroticism-coping relationship has not done so specifically in the context of sport doping (Connor-Smith & Flachsbart, 2007; Allen, Greenlees, & Jones, 2011).

Neuroticism was found to have an inverse indirect relationship with both doping attitude and doping affect. Specifically, the former was linearly mediated by distraction-oriented coping, while the latter was linearly mediated by both disengagement and distraction coping dimensions. These findings indicate high neuroticism to be associated with unfavorable attitudes (low) towards doping as a result of increased use of distraction-oriented coping, and less (low) positive feelings towards doping due to increased use of both

disengagement and distraction coping dimensions. In the context of the current study, these findings indicate that distraction from athletic goals, among neurotic individuals, facilitates unfavorable doping attitudes, while both distraction and disengagement from athletic goals facilitates few positive feelings towards doping in neurotic individuals. These findings seem paradoxical in view of our previous findings indicating neuroticism to have a positive indirect relationship with doping intentions and behavior, via reduced disengagement and distraction-oriented coping. A possible explanation for this is that explicit beliefs and feelings are not always logically predictive of one's actual behavior or intent. Within the social psychology literature, there is a plethora of evidence to indicate that people may explicitly state what they believe to be socially acceptable attitudes but this may not reflect their true underlying attitudes (Greenwald, McGhee, & Schwartz, 1998; Greenwald, Poehlman, Uhlmann, Banaji, 2009). In the context of doping, it is not unusual to expect athletes to present their explicit attitudes towards doping in an unfavorable (disliking) manner, in order to present themselves in the most positive way possible. However, as recognized by Gregg (2008) explicit attitudes, which are highly conscious and reportable, can be subject to numerous social and cognitive biases. As such, it is possible that in the current study, unfavorable explicit attitudes towards doping among neurotic individuals did not indirectly translate into anti-doping intentions and behavior. The social and cognitive biases associated with explicit doping attitudes have the potential to generate paradoxical findings. Therefore, the exploration of alternative attitudinal measures is warranted by future research. One possible approach is the implicit approach to measuring doping attitudes. Implicit attitudes are unconscious, automatic evaluations that are rapid and not subject to the same kinds of biases as explicit attitudes (Gregg, 2008). Essentially, the IAT is a semantic-based decision task that draws upon a cognitive task-switching paradigm. To date, few studies have used the IAT in relation to doping, one exception being Petroczi, Aidman, and Nepusz (2008). In this study, Petroczi and colleagues

found preliminary evidence to support the use of an IAT to predict self-reported and hypothetical doping behavior. However, this was a pilot study and as such further refinement of the IAT protocol and validity for its use in the context of doping is required. Brand, Melzer, and Hagemann (2011) have more recently attempted to compare the measurement properties of two doping IATs. In view of their mixed findings, these authors put forward some insightful recommendations to inform the further development of doping IAT measurement (see Brand et al., 2011). In addition to implicit attitudes, future research may also want to consider implicit affect. Current findings suggest neurotic individuals displayed feelings that were not congruent with their doping intent and behavior. To date, no attempt has been made to explore implicit affect in the realm of doping. Potentially, this could be a fruitful area of investigation, alongside the further exploration of implicit attitudes.

In the current study agreeableness was found to have a linear indirect relationship with both doping intentions and behavior, mediated by disengagement coping dimension. This finding suggests these individuals who are highly trait agreeable are more likely to intend and engage in doping behavior, due to reduced utilization of disengagement-oriented coping. Individuals who have a disposition for high agreeableness tend to be, considerate, empathetic, polite and generally have a trusting and generous nature (Caspi et al., 2005). As such, there is a plethora of research associating agreeableness with various adaptive outcomes, one such example being pro-social behavior (Graziano, Habashi, Sheese, & Tobin, 2007). In contrast, the current study suggests high agreeableness to be indirectly associated with maladaptive outcomes (e.g., doping intention and behavior). One explanation for this finding is the recent association between trait agreeableness and social self-regulation (Cortes, Kammrath, Scholer, & Peetz, 2014). In their study, Cortes et al. (2014) reported highly trait agreeable individuals were more likely to engage in effortful behaviors to benefit somebody else rather than to benefit self. Therefore, in the current study, it is possible that high trait agreeable

athletes were more likely to intend and enact doping behavior in order to benefit other individuals in their sport environment (e.g., coach, team mates). It is possible, therefore, that agreeable people may gain greater gratification out of doping for others rather than doping for self. Agreeableness has generally been associated with less usage of disengagement coping (Connor-Smith & Flachsbart, 2007). The current study found reduced disengagement coping mediated both the indirect relationship between agreeableness and doping intention and doping behavior. In accounting for this finding, Carver and Connor-Smith (2010) asserted agreeable individuals use less disengagement coping because they experience less stress as a result of experiencing low interpersonal conflict. As such, agreeable individuals who intend or enact doping behavior to benefit others (i.e., high social self-regulation) are likely to experience low interpersonal conflict. Accordingly, engaging in doping behavior for the purpose of benefiting others may reduce stress as a result of negating interpersonal conflict and therefore reduce the need to adopt disengagement-oriented coping.

Another key finding concerning agreeableness was its inverse indirect association with positive affect, via the linear mediational influence of disengagement-oriented coping. This finding indicates high agreeableness to be associated with less (low) positive feelings towards doping as a result of increased use of disengagement-oriented coping. In the context of the current study, this finding suggests that disengagement from athletic goals, among highly agreeable individuals, facilitates few positive feelings towards doping. This finding seems paradoxical in view of our previous finding indicating agreeableness to have a positive indirect relationship with doping intentions and behavior, via reduced disengagement-oriented coping. Indeed, this resonates with the previously discussed paradox relating to neuroticism. Similarly, it is possible that agreeable individuals' explicit feelings about doping may be incongruent with their doping intention and behavior due to social and cognitive biases associated with the use of explicit measurements. Accordingly, this reinforces the earlier

recommendation of exploring doping affect, implicitly, via the use and development of the IAT paradigm.

Although conscientiousness was not associated with doping behavior it did have a positive indirect relationship with doping intention, via the mediating effect of disengagement-oriented coping. That is, high trait conscientious individuals were more likely to have an intention to dope as a result of using reduced disengagement-oriented coping. Conscientious individuals tend to be persistent, self-disciplined, orderly and planful (Caspi et al., 2005). In addition, conscientious individuals tend to be achievement-oriented and typically display high levels of motivation (McCrae & Costa, 1997). Despite this favorable account for being conscientious, the current study found conscientiousness was indirectly associated with an intention to dope. Upon explaining this finding, Hogan and Ones (1997) found high conscientiousness was associated with a willingness to follow authority and conform to group norms. In highly competitive and achievement environments, such as sport where doping may be a part of a team's culture, it is possible conscientious individuals may develop an intention to dope in order to conform and obey to the normative doping culture of the group. It is important to assert that the current study found no indirect relationship between conscientiousness and doping behavior. This may be due to conscientious individuals having an ability to exert effortful control (Caspi et al., 2005) and thereby avoiding impulsive actions and risky behaviors, such as doping. Conscientiousness has generally been found to be predictive of less disengagement coping (Connor-Smith & Flachsbart, 2007). The current study found reduced disengagement accounted for the indirect relationship between conscientiousness and doping intention. In view that conscientious individuals are achievement-oriented, it would be expected that such individuals are less likely to disengage from their achievement goals and therefore display a reduced need to utilize this coping strategy. In addition, being high trait conscientiousness generally predicts low stress exposure

as a result of planning for predicable stressors (Carver & Conner-Smith, 2010). Therefore, in view of the demanding athletic environment in which athletes operate, the development of plans, for example an intention to dope, may reduce stress exposure and thus reduced the need for conscientious individuals to adopt disengagement-oriented coping.

In addition to openness being directly related to positive affect, as discussed earlier, openness was also found to have a linear indirect relationship with positive affect, via the mediating influence of task-oriented coping. This finding suggests that high trait openness individuals are more likely to feel positive about doping as a result of increased use of task-orientated coping. A common finding is the positive association between openness and engagement-oriented coping (also known as task-oriented coping) (Carver & Connor-Smith, 2010). In view that high trait openness denotes a tendency to be imaginative, creative, curious and a general inclination towards new activities and ideas, it would make sense that such individuals would use task-oriented coping strategies in order to actively manage a situation and/ or associated emotions. It is possible that in the context of doping, through the use of task-oriented coping, high trait openness individuals may be stimulated by such active coping endeavors and therefore experience positive feelings towards doping. Additionally, Connelly, Ones, and Chernyshenko (2014) recognized openness individuals tend to be non-traditionalist and therefore may hold unconventional moral values. In the context of doping, holding unconventional moral values may promote positive feelings of doping among highly trait openness individuals.

Practical recommendations

A key premise of this study was to better understand how individual differences in the form of personality and coping can help negate doping intentions and behavior by identifying particular personality traits and coping dimensions that may predispose athletes to doping risk. Accordingly, based on the findings of this study, it can be recommended that:

1. Neurotic athletes who reduce their use of disengagement coping are potentially more likely to engage in doping behavior.

2. Neurotic athletes who reduce use of both disengagement and distraction coping are potentially more likely to develop doping intentions.

3. Agreeable athletes who reduce their use of disengagement coping are potentially more likely to engage in doping behavior and form doping intentions.

4. Conscientious athletes who reduce their use of disengagement coping are potentially more likely to develop doping intentions.

The above recommendations suggest that athletes who are neurotic and agreeable in conjunction with not disengaging from their athletic goals are potentially at greater risk of doping behavior. Athletes who are neurotic and conscientious and also do not disengage or become distracted by their athletic goals are potentially at greater risk for developing intentions to dope. As such, it can be suggested that doping interventions aimed at reducing athletes' intent to dope would be most effective when targeting athletes who demonstrate low disengagement from athletic goals combined with a disposition for being neurotic/ conscientious. In addition, interventions that aim to reduce doping behavior should target athletes who demonstrate low disengagement from athletic goals combined with a disposition for being neurotic and agreeable. In terms of negating doping behavior itself, current findings suggest that interventions may want to consider goal disengagement among those athletes who are dispositionally sensitive for being neurotic and agreeable. For instance, the current study found that neurotic individuals who disengage from athletic goals have fewer positive

feelings towards doping. Thereby encouraging such athletes to give up on athletic goals could potentially render the use and or the need to dope. Wrosch, Scheier, Carver and Schulz (2003) have eloquently argued the importance of goal disengagement for effective self-regulation of behavior. In the domain of sport, the notion of giving up on athletic goals tends not to be advocated given its association with failure. However, in view of the current findings, it can be suggested that goal disengagement maybe adaptive for preventing doping in sport, particularly when targeted at neurotic and agreeable individuals. However, careful thought on its implementation is necessary as athletes' may find disengagement from athletic goals to be very difficult due to goals themselves being core to their sense of self and general well-being.

Limitations

It is important that the current findings are considered in the context of some study limitations. First, inferences regarding causality cannot be determined in view of the cross-sectional nature of this study. However given its novelty, the present findings will be able to inform further experimental research that can explore causality from the findings the obtained in this study. Second, the alpha coefficients for subscales on the TIPI scale were moderate to low. It should be noted that the TIPI was not designed to meet high standards of reliability (Gossling et al., 2003) but rather to create a short measure that did not sacrifice validity. More recent research using latent variable methodology has supported the validity of the TIPI measure (Ehrhart et al., 2011). Furthermore, it has been argued that alpha coefficients are misleading when using scales that include few items (Kline, 2000; Woods & Hampson, 2005). In view of the large number of items that required completion in this study, it was felt using longer measures of Big-5 personality traits may have increased the rate of random responding and thereby artificially increase/ decrease observed criterion validity. Future research that has no concern for obtaining a high number of item completions should use longer Big-5 related inventories. Finally, despite transforming doping intention its normality

remained marginal. It is not beyond reason to expect participants to explicitly reveal they are "unlikely" to intend to dope given the clandestine nature of this activity. As such, marginal normality relating to continuously explicit doping intention measures should not be unexpected. Implicit measurement of doping intention that limits bias has the potential to yield better normality.

Conclusion

In this study the Big-5 personality traits were not directly associated with doping intention and behavior. However, other direct associations found extraversion to be inversely predictive of doping attitudes, neuroticism inversely predictive of negative doping affect and openness being linearly associated with positive doping affect. These findings suggest that parts of the Big-5 personality taxonomy are better direct predictors of doping attitudes and affect as opposed to doping intention and behavior. Some of the Big 5 personality traits were found to indirectly predict doping intention and behavior, via coping. Indeed, as a result of a lack of disengagement coping, neurotic and agreeable athletes were found to be more likely to embark in doping behavior. The lack of disengagement among conscientious, agreeable and neurotic athletes was found to be associated with an intention to dope. As such, disengagement coping can be considered an important mechanism for explaining the relationships between the Big-5 personality traits and doping intention/ behavior found in this study. Based on these findings, interventions endeavoring to negate doping intention and behavior may have greater success by targeting those athletes who have a disposition for being neurotic and agreeable. Helping such athletes to disengage from their athletic goals could serve to reduce potential doping intention and behavior. For goal disengagement to form an effective part of doping prevention, further research is required to explore its effectiveness.

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