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**Revised MS# PEH-D-15-00012**

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**Nicholls, A. R., Perry, J. L., Levy, A. R., Meir, R., Jones, L., Baghurst, T., Sanctuary, C., Thompson, M. A. (in press). Coach Perceptions of Performance Enhancement in Adolescence: The Sport Drug Control Model for Adolescent Athletes. *Performance Enhancement & Health*.**

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Coach Perceptions of Performance Enhancement in Early and Middle Adolescence: The

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Sport Drug Control Model for Adolescent Athletes

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## 1 Abstract

2 *Aim:* We qualitatively explored the Sport Drug Control Model (SDCM; Donovan, Egger,  
3 Kapernick, & Mendoza, 2002), in order to examine coaches' perceptions of adolescent  
4 athletes' attitudes and susceptibility towards doping.

5 *Methods:* Eleven coaches ( $M = 10$ ) from four countries, who worked in seven different sports  
6 (athletics, basketball, kayaking, racquetball, rowing, rugby league, and rugby union) were  
7 recruited to take part in semi-structured interviews. Transcribed interviews were analyzed via  
8 a three-stage inductive and deductive coding process, which allowed us to identify common  
9 themes among the participants.

10 *Results:* The coaches believed that adolescents' attitudes towards doping were influenced by  
11 perceptions of threat and benefit appraisals, morality, self-esteem, legitimacy, and reference  
12 group opinion. We also identified additional factors, which included age/maturation, sport  
13 level, pressure, country of residence, and ethnicity.

14 *Conclusions:* Our findings provide qualitative support for the SDCM, but also offer fresh  
15 insight into some of the nuances specific to adolescent athletes from different countries and  
16 cultures. Further research is required to test our proposed model with larger samples of  
17 adolescent athletes.

18 *Keywords:* Attitudes; Coaches; Doping; Performance Enhancing Drugs; Youth

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1 Coach Perceptions of Performance Enhancement in Early and Middle Adolescence: The  
2 Sport Drug Control Model for Adolescent Athletes

3 According to the World Anti-Doping Agency's most recent code (WADA, 2015),  
4 doping is defined as the occurrence of anti-doping rule violations. This includes the presence  
5 of a prohibited substance, its metabolites or markers within an athlete's sample, which will be  
6 referred to in this article as performance enhancing drugs (PEDs). The use of PEDs  
7 represents a problem to sport, because it gives athletes an unfair performance advantage and  
8 has the potential to cause ill health (Johnson, 2012). In recent years there has been an increase  
9 in the number of studies that have examined the risk factors associated with doping among  
10 athletes. Attitudes and susceptibility are two risk factors that have received substantial  
11 attention. Attitudes have been described as a tendency to act or react in either positive or  
12 negative way to an object (Eagly & Chaiken, 1993), whereas doping susceptibility has been  
13 defined as "the absence of a firm resolve not to engage in doping activities or to give any  
14 consideration at all to an offer to do so" (Gucciardi, Jalleh, & Donovan, 2010, p. 481). In  
15 their recent meta-analysis, Ntoumanis, Ng, Barkoukis, and Backhouse (2014) revealed that  
16 positive attitudes towards doping were strong correlates of doping intentions and behaviors.  
17 This finding has been echoed by Lazuras, Barkoukis, and Tsorbatzoudis (2015) among a  
18 sample of adolescent athletes. There is, however, less empirical data among early and middle  
19 adolescent athletes' attitudes towards doping, in comparison with adult athletes. Early and  
20 middle adolescence is the period in which a person is aged between 12 and 18 years of age  
21 (Weiss & Bredemeier, 1983). The limited amount of research with adolescents is surprising,  
22 because adolescence is thought to be the time when attitudes are formed (Backhouse,  
23 Patterson, & McKenna, 2012; Hartan & Latane, 1997). Adolescence is also a period when a  
24 person is at risk of doping (Schirlin et al., 2010). In this study, we examined coach  
25 perceptions of early and middle adolescents' attitudes and susceptibility towards doping. In

1 light of recent recommendations for more theory informed research (e.g., Ntoumanis et al.,  
2 2014), the Sport Drug Control Model guided the current study (SDCM; Donovan, Egger,  
3 Kapernick, & Mendoza, 2002).

#### 4 **SDCM**

5 In order to provide a more parsimonious understanding of the psycho-social  
6 determinants underpinning doping in sport, Donovan and colleagues (2002) developed the  
7 SDCM, which involved the integration of three behavioral science frameworks (i.e., social  
8 cognition, threat (or fear) appeals, and instrumental and normative approaches). A key  
9 premise of Donovan et al.'s (2002) SDCM is that an athlete's attitude to engaging in doping  
10 behavior is influenced by six constructs. These include threat appraisals (i.e., the deterrents of  
11 doping in relation to the perceived likelihood of being caught, the potential costs, and the  
12 negative health consequences) and benefit appraisals (i.e., gains that can occur from doping  
13 such as winning competitions, increased earnings, or fame). Other constructs within the  
14 SDCM include reference group opinions (i.e., importance of parents, coaches, friends, or  
15 spouses approval or disapproval of doping), morality (i.e., whether doping is right or wrong),  
16 legitimacy (i.e., the perceived authority of organizations that monitor doping), and  
17 personality traits (e.g., optimism or self-esteem). Attitudes towards doping influence a  
18 person's intentions to dope, which is governed by two *market factors* (e.g., affordability and  
19 availability). These inhibit or facilitate the transformation of attitudes towards doping into  
20 behaviors (Jalleh et al., 2014).

21 Two studies have quantitatively examined the SDCM (Gucciardi et al., 2010; Jalleh et  
22 al., 2014). Gucciardi et al. (2011) measured the accuracy of SDCM using either items from  
23 established questionnaires or those developed for the study. The sample comprised of 670  
24 elite Australian athletes, who were aged between 14 and 66 years of age. They found some  
25 support for the SDCM. Morality (cheating), benefit appraisals, and threat appraisals were

1 strongly related to attitudes towards doping, but self-esteem, legitimacy, and reference group  
2 opinion were not associated with doping attitudes. Doping attitudes were positively  
3 associated with susceptibility to doping. With a sample of 1237 elite athletes, Jalleh et al.  
4 (2014) also examined the SDCM. These authors reported that legitimacy, reference group  
5 opinion, and morality were related to doping attitudes. As such, there was some conflicting  
6 evidence between these two studies. These discrepancies may be due to Gucciardi et al. and  
7 Donovan et al. using different survey items in their respective studies. It should be noted, as  
8 acknowledged by Jalleh and colleagues, that these samples comprised exclusively of elite  
9 Australian athletes. Therefore, the SDCM was not tested among athletes of different levels  
10 nor people living outside of an Australian culture. Researchers have found some cultural  
11 differences in respect to some of the key components of the SDCM. These include morality  
12 (e.g., An & Trafimow, 2014), appraisals (e.g., Imada & Ellsworth, 2011), social norms (e.g.,  
13 Shen, Wan, & Wyer, 2011), and self-esteem (e.g., Brown & Cai, 2010). As such, it could be  
14 argued that the culture of an athlete may influence their attitude towards doping. To date,  
15 however, scholars have failed to explore cultural differences in doping attitudes or behaviors.

16 Furthermore, and of particular interest to the current research, neither Gucciardi et al.  
17 (2011) nor Jalleh et al.'s (2014) sample featured adolescent only samples. Adolescents were  
18 included in the Gucciardi et al. study, but the age range of participants was not reported in the  
19 Jalleh study. As such, little is known about the suitability of the SDCM for adolescent  
20 athletes. It is plausible that differences in doping attitudes and susceptibility between adults  
21 and adolescents may exist. Although researchers have not specifically examined differences  
22 between adults and adolescents, scholars have found differences in relation to smoking (i.e.,  
23 Kosmidou & Theodorakis, 2007) and substance attitudes (e.g., The Henry Kaiser Family  
24 Foundation, 2002). Furthermore, scholars have also reported differences between adults and  
25 adolescents in regards to some of the key components of the SDCM, such as self-esteem

1 (e.g., Potard, Amoura, Kubiszewski, Le Samedy, Moltrecht, & Courtis, 2015), personality  
2 (e.g., McCrae, Martin, & Costa, 2005), and threat appraisals (Britton et al., 2013).

### 3 **Doping Attitudes among Adolescents**

4 Backhouse, McKenna, Robinson, and Atkin (2007) identified eight studies that  
5 examined early and middle adolescents' attitudes towards doping. They concluded that the  
6 majority of adolescent athletes had a negative attitude towards PEDs and that doping would  
7 be dangerous to their health. Since the Backhouse et al. (2007) report, more contemporary  
8 studies have explored doping attitudes among early and middle adolescent athletes. In  
9 agreement with Backhouse et al.'s overall summary, Bloodworth, Petroci, Bailey, Pearce, and  
10 McNamee (2012) also found that the majority of adolescent athletes had a negative attitude  
11 towards doping. Nevertheless, other researchers have found that at best, adolescent athletes  
12 may be ambivalent to PEDs (Dodge & Jaccard, 2008) or have have favorable attitudes to  
13 PEDs (e.g., Lazuras et al., 2015; Lucidi et al., 2008, 2013; Zelli, Mallia, & Lucidi, 2010a;  
14 Zelli, Lucidi, & Mallia, 2010b). It is also important to note that these studies neither drew  
15 from nor tested the SDCM. Many of the constructs identified in the SDCM, therefore, have  
16 not been assessed in these studies. This makes it difficult to assess how relevant the SDCM is  
17 to adolescent athletes and whether any refinements are needed (e.g., Ntoumanis et al., 2014).  
18 Further, the athletes in these studies self-reported their attitudes, intentions, and behaviors. In  
19 other domains of psychology, teachers have been used to provide new insight about problem  
20 gambling attitudes among their adolescent students (Sansanwal, Derevensky, Ramona Lupu,  
21 & Lupu, 2015). Exploring coaches' perceptions of adolescent athletes' attitudes towards  
22 doping may offer new insight into this problem.

23 The overreaching aim of our paper was to explore the suitability of the SDCM  
24 (Donovan et al., 2002) for adolescent athletes of different cultures and abilities. Although  
25 previous literature has quantitatively tested this model with elite Australian athletes (e.g.,

1 Gucciardi et al., 2011; Jalleh et al., 2014), we adopted a different approach. We wanted to  
2 explore which component parts of the model were suitable, whether particular parts needed  
3 modifying, or even new parts adding, due to there being differences in some of the key  
4 constructs between adult and adolescent athletes (Britton et al., 2013; McCrae et al., 2005;  
5 Potard et al., 2015). To achieve this aim, we deemed qualitative methodology, which can  
6 yield rich, in-depth, contextual accounts as being appropriate. In addition to adopting a  
7 different methodology from Gucciardi et al. (2011) or Jalleh et al. (2014) to assess the model,  
8 we wanted to explore the model with coaches who resided in different continents, thus  
9 providing cross-cultural perspectives. We decided to interview coaches rather than adolescent  
10 athletes themselves, because previous research has suggested that self-report data in regards  
11 to doping is vulnerable to social desirability (Gucciardi et al., 2010). As such, we felt that  
12 interviewing coaches might yield more honest and accurate data. It should be noted that  
13 coaches have previously been interviewed within other domains (i.e., mental toughness) to  
14 explore a construct and to formulate a new model (e.g., Gucciardi, Gordon, & Dimmock,  
15 2008).

## 16 Method

### 17 Participants

18 Eleven (10 males) coaches who were currently or had previous experience of working  
19 with adolescent athletes of all abilities participated in this study, and who had considerable  
20 playing experience. The ages of the participants ranged from 34 to 76 years of age ( $M =$   
21 47.45 years,  $SD = 12.33$ ), with the number of years coaching experience ranging from 10 to  
22 43 years ( $M = 19$  years,  $SD = 10.44$ ). The coaches occupied a variety of roles such as regional  
23 coach ( $n = 2$ ), international coach ( $n = 5$ ), national team manager ( $n = 1$ ), state development  
24 officer ( $n = 1$ ), academy director ( $n = 1$ ), and national performance director ( $n = 1$ ). The

1 participants resided in the United Kingdom ( $n = 6$ ), the United States ( $n = 2$ ), Hong Kong ( $n$   
2  $= 2$ ), or Australia ( $n = 1$ ), and were directly involved in sports such as rugby union ( $n = 4$ ),  
3 rugby league ( $n = 2$ ), basketball ( $n = 1$ ), racquetball ( $n = 1$ ), track and field ( $n = 1$ ), rowing ( $n$   
4  $= 1$ ), and kayaking ( $n = 1$ ). In order to protect the participants' confidentiality, pseudonyms  
5 have been used for each participant.

## 6 **Procedure**

7 A departmental university ethics committee provided ethical approval for this study.  
8 Following this, potential participants were contacted via members of the research team, who  
9 provided information on the subject nature of the study and requirements of each participant.  
10 Individuals who expressed a willingness to participate were sent an information letter  
11 detailing the nature of the study and provided written informed consent before participating  
12 in the research. Due to the practical constraints of conducting research with time-pressured  
13 individuals, who have very busy lives, one-shot interviews were conducted (Cruickshank,  
14 Collins, & Minten, 2014). These one-shot interviews were conducted via video  
15 telecommunications or telephone, due to the geographical spread of the participants. Each  
16 interview was audio-recorded and conducted by the same research assistant. In accordance  
17 with previous research, data collection continued until theoretical saturation achieved was  
18 reached, whereby conducting more interviews would be unlikely to yield new insights (Coté,  
19 Samela, Baria, & Russell, 1993).

## 20 **Interview Guide**

21 Each interview followed a semi-structured guide, which is available upon request  
22 from the first author, and was based upon the SDCM (Donovan et al., 2002) and relevant  
23 research (e.g., Gucciardi et al., 2011; Jalleh et al., 2014). The coaches were encouraged to  
24 share their experiences and opinions from their entire coaching career throughout the

1 interview. We developed a semi-structured interview to collect the data, with the use of  
2 probing questions. This enabled the interviewer to probe the participants about the SDCM,  
3 but also explore other areas of perceived importance in regards to doping attitudes among  
4 adolescent athletes (Sparkes & Smith, 2014). Indeed, Potter and Hepburn (2005) argued that  
5 the conversational and open-ended approach with semi-structured interviews facilitates the  
6 identification of new themes, which is important in assessing the suitability of a model that  
7 has not previously been tested with a specific population.

8         On average, the interviews lasted 50 minutes ( $SD = 9.14$ ). The interviews started with  
9 assurances of confidentiality, the nature of the topic and definition of doping, followed by  
10 obtaining more information about each participant's coaching background. The subsequent  
11 part of the interview contained questions around the key predictors of doping attitudes  
12 identified by Donovan et al. (2002): (a) benefit appraisals (e.g., "From your dealings with  
13 adolescent athletes, to what extent do you believe that they think it is necessary to take  
14 performance enhancing drugs at some point to perform at the highest level possible?"), (b)  
15 threat appraisals (e.g., "To what extent do you believe that adolescent athletes would believe  
16 that they would be able to take banned substances out of competition and get away with it,  
17 because the tests would not detect the substance?"), (c) personal morality, (e.g., "If an  
18 adolescent athlete knew other people were cheating, describe whether you think that would  
19 make them want to cheat or not?"), (d) legitimacy (e.g., "Overall, how effective do adolescent  
20 athletes think that doping authorities are in preventing banned substances being taken?"), (e)  
21 reference group opinion (e.g., "To what extent would views of parents or friends about an  
22 athlete if they were caught doping act as a deterrent?"), and (f) self-esteem (e.g., "To what  
23 extent will an athlete's self-esteem influence whether they might take a performance  
24 enhancing drug?"). Furthermore, Gucciardi et al. (2011) also identified a relationship  
25 between doping attitudes and susceptibility, so there were also questions about doping

1 susceptibility in the final part of the interview (e.g., “To what extent do you think that a coach  
2 who encourages an adolescent athlete to dope would influence whether he/she does so or  
3 not?”).

#### 4 **Pilot Study**

5 The interview guide was developed by the first author and reviewed by two members  
6 of the research team. Minor changes were made, before the interview guide was presented to  
7 two different coaches, with experience of coaching adolescent athletes. Changes were made  
8 to the phrasing of three questions. For example, the question “Do you think that adolescent  
9 athletes think drug testing is secure” was changed to “Describe how secure you believe  
10 adolescent athletes think testing procedures are for drug testing? Following these minor  
11 changes, a pilot interview was conducted with another coach who had experience of coaching  
12 adolescent athletes for over 15 years. Four questions were altered to enable the participants to  
13 expand upon their answers. The question “Describe whether adolescent athletes are aware of  
14 health consequences of doping” was changed to the following “to what extent are adolescent  
15 athletes aware of the perceived health consequences of taking performance enhancing drugs,  
16 such as the severity of illnesses, the likelihood of getting ill, or whether any effects would be  
17 reversible? Probing questions were developed in order for the interviewer to tease out new  
18 themes, which were specific to adolescent athletes in relation to the SDCM (Donovan et al.,  
19 2002). The pilot interview was not transcribed and nor was it included in the final analyses,  
20 but notes were made by the first author.

#### 21 **Data Analysis**

22 Three members of the research team analyzed the data and provided critical  
23 evaluation throughout this process. As the interviews were conducted by a research assistant,  
24 the first author familiarized himself with the content through a process known as in-dwelling  
25 (Maykut & Morehouse, 1994), which involved him reading each interview transcript three

1 times to allow concepts and themes to develop.

2           In accordance with previous doping research (Erickson, McKenna, & Backhouse,  
3 2015), data was analyzed using the three-stage coding process (Smith et al., 2010). This  
4 involved summarizing individual interviews to identify the most important issues, pooling  
5 evidence to create a narrative for each theme, and structuring thematic groupings around  
6 stanzas. Sentences from the interview transcripts were segmented into phrases that  
7 encompassed the participants' opinions regarding adolescents' attitudes towards doping and  
8 susceptibility. This resulted in a narrative for each participant, which was then pooled with  
9 the other narratives to reveal themes among the sample. These pooled commonalities were  
10 deductively linked to the SDCM and new themes were inductively categorized.

### 11 **Establishing Trustworthiness**

12           Trustworthiness refers to how much trust can be given that everything possible was  
13 done to ensure that data was appropriately and ethically collected, analyzed, and reported  
14 (Carlson, 2010). According to Carlson, trustworthiness can be used interchangeably with  
15 authenticity, goodness, and credibility. We employed two techniques to maximize the  
16 trustworthiness of our data. Peer-debriefing (Cresswell & Miller, 2000) was conducted  
17 throughout the data analysis procedure by three of the authors, who provided guidance,  
18 critical evaluation, and challenged the primary researcher's opinions. Peer debriefing  
19 occurred via meetings between the primary researcher and another researcher or in one  
20 instance between all three members present. Furthermore, peer debriefing also occurred via e-  
21 mails in some instances. Finally, a critical friend who was not involved in the research  
22 provided feedback on our results and cast a critical eye, after the analysis had been  
23 completed.

## 24 **Results and Discussion**

1           There was support for much of Donovan et al.'s (2002) SDCM model, although there  
2 were some subtle nuances that appear specific to adolescent athletes, and some new themes  
3 emerged. These variables were depicted in direct quotes and stanzas from the coaches, which  
4 were thought to influence an adolescent's attitudes towards doping (see Figure 1). Threat,  
5 benefit, self-esteem, morality, legitimacy, and reference group influenced doping attitudes  
6 among adolescent athletes. We also found that participation level, age/maturation, ethnicity,  
7 pressure, and country of residence also influenced attitudes to doping. Further, three themes  
8 emerged that were thought to influence susceptibility to doping: i) coaches, iii) family, and  
9 iii) friends and family. The coaches believed that doping behaviors are influenced by: i)  
10 availability and ii) affordability. Each of these themes is presented with an emphasis given on  
11 how it impacted and influenced attitudes and susceptibility towards doping among adolescent  
12 athletes.

### 13 **Attitudes towards Doping**

14           **Threat.** In their SDCM, Donovan et al. (2002) suggested that the threat of  
15 enforcement from drug testing and the negative health consequences acted as a deterrent from  
16 doping. There was conflicting support for this theme from the coaches. This mirrors the  
17 conflicting findings of Gucciardi et al. (2011) who found a positive and significant path from  
18 threat to doping attitudes, whereas Jalleh et al. (2014) did not find a significant path between  
19 these constructs. It should be noted that Gucciardi et al. explored only the threat of  
20 enforcement and not negative health consequences, whereas Jalleh et al. explored both of  
21 these threat appraisals. The minority of coaches argued that enforcement and health  
22 consequences were strong deterrents, whereas others argued that this was less applicable to  
23 adolescent athletes, due to a lack of testing and the adolescents believing that any negative  
24 consequences of doping were over exaggerated. One coach commented: "I simply don't think  
25 they would be overly aware of what possible consequences could materialize with doping"

1 (Rob, rugby union). Another coach said: “There is a bit of a myth that there is health risks  
2 associated with doping, and they think it is a little over-exaggerated” (Matt, rugby union).  
3 Indeed there was a feeling among coaches that athletes thought negative consequences would  
4 not happen to them “The outlook of young people, which is 'it won't happen to me', or 'it'll  
5 happen to me further down the line, so there's a risk to come [but] it doesn't bother me  
6 [now]” (George, rugby league). However, other coaches believed that players have a general  
7 awareness of the negative health consequences: “They're probably aware of 'yeah it's, look  
8 its not good for you,' but I wouldn't have said they would know how severe it would be and  
9 the long term effects they could suffer” (Ron, rugby union). These findings suggest that those  
10 reported in Melia et al. (1996) and Laure et al. (2004) may have even underestimated  
11 adolescent athletes' knowledge of the potential negative effects that PEDs can cause. This is  
12 particularly concerning and could suggest that more education is required to adolescent  
13 athletes, across all participation levels.

14 In terms of the threat of enforcement, one coach argued that there is less testing  
15 among adolescent athletes: “A kid is not going to get tested in the off season as much as  
16 potentially as a senior level who's on y'know a WADA list.” He commented further that  
17 adolescent athletes think, “the chances of getting caught are small” (Ed, kayaking). However,  
18 the threat levels may vary depending on the nature of season and the competitions the players  
19 are participating in: [in the] “Last Junior World Trophy, we had boys tested for every  
20 game...but at other smaller competitions that are throughout Asia, there is no actual testing  
21 done” (Matt, rugby union). Interestingly, these coaches suggested threat levels may change  
22 throughout the year and whether the adolescent athlete is in the competitive or off-season.  
23 Consequently, it would appear that longitudinal research that tracks threat levels is warranted  
24 in order to identify when threat levels dissipate. This may help identify the periods in which  
25 athletes might be more likely to dope.

1           **Benefit.** There was an acceptance among some of the coaches that adolescent athletes  
2 were aware of the benefits of doping, which they thought might influence their attitude,  
3 which provides support for Gucciardi et al. (2011), although not for Jalleh et al. (2014) who  
4 did not find a significant relationship. One coach commented “The youngsters that are in a  
5 club environment now, fourteen, fifteen, sixteen, seventeen, eighteen are more aware of the  
6 benefits of [doping].” This coach commented further that players are aware of how doping  
7 could lead to changes in body size, and has regularly heard players saying ““He’s gotta be on  
8 growth [hormones], he was never that big last year”” (George, rugby league).

9           Another coach revealed that adolescent players might have a more favorable attitude  
10 when they are striving for a professional contract or have sustained an injury and are worried  
11 about slipping behind: ““It’s almost like a short-term fix to get me back to where I need to be’  
12 and I and in my experience they talk about that a lot” (Phil, rugby league). Despite the health  
13 risks and threat of being caught doping, one reason why athletes still might have a positive  
14 attitudes to doping is because adolescents tend to focus on the benefits of risky behavior  
15 rather than the costs (Gardner & Steinberg, 2005).

16           **Self-Esteem.** All of the coaches felt that low self-esteem among adolescent athletes  
17 would be reason why they might develop a more favorable attitude towards doping, which  
18 supports Schirlin et al.’s (2009) earlier findings. Indeed, one coach commented that he  
19 thought self-esteem is the most important factor that influences doping and whether  
20 adolescent athletes “Ignore the deterrents and go for it or whether they think 'you know what,  
21 this isn’t for me because I don't wanna go down that road”” (Mike, rugby union).

22           One coach even argued that doping could be seen as short-term fix for low self-  
23 esteem when performance is going poorly: “Performance enhancing drugs might give them  
24 that performance boost what will or could in their eyes get them out of that like low self-  
25 esteem” (Christine, racquetball). Although Schirlin et al. (2009) identified physical self-

1 esteem as a risk factor for doping, our findings indicate that self-esteem in general is a risk  
2 factor and thus provides support for Donovan et al.'s SDCM. Gucciardi et al. (2011) did not  
3 find a significant path between doping attitudes and self-esteem. However, perhaps self-  
4 esteem is more of a risk factor for doping attitudes among adolescent athletes. Research is  
5 required to assess this assertion.

6 **Morality.** Gucciardi et al. (2011) and Jalleh et al. (2014) reported the strongest paths  
7 between morality and doping, indicating that this might be the most important influence on  
8 doping attitudes. In agreement with these past findings, all of the coaches felt that adolescent  
9 athletes knew that doping is wrong, but would dope if they knew they would not test  
10 positively. Indeed, one coach would ask his players whether they would dope if they could  
11 guarantee they would be at the top of their sport for three years, but not be able to play again,  
12 and he said that: "About fifty percent [would dope]. We're talking about fifteen, sixteen year  
13 old kids here" (George, rugby league).

14 Another coach agreed with this sentiment "There's athletes out there who have  
15 winning at all costs, I don't think they would hesitate to dope if they knew they weren't  
16 gonna get caught" (Rob, rugby union). Lucidi et al. (2008) also found a significant  
17 relationship between moral disengagement regarding doping and a positive attitude towards  
18 doping use and Lucidi et al. (2013) found a positive relationship between moral  
19 disengagement and doping intentions. Some coaches, however, thought that adolescent  
20 athletes would not dope, even if they knew they would not test positive: "There was just no  
21 way I was going down that road, so I chose to accept that I wasn't gonna perform at a certain  
22 level in my sport" (Ed, rugby union). Overall though, it appears that morality is a key factor  
23 in influencing the attitudes of adolescent athletes. In accordance with Donovan et al. (2002),  
24 the influence of morality can be both negative and positive in relation to doping attitudes.

1           **Legitimacy.** In support of Donovan et al.'s (2002) SDCM, there was a strong belief  
2 among the coaches that adolescent athletes feel doping organizations are legitimate and that  
3 the testing procedures were fair. Indeed one questioned the number of adolescents tested, but  
4 commented "I don't think any of them would be worrying that there was going to be  
5 tampering or anything like that" (Christine, racquetball). One coach commented on an anti-  
6 doping education program he attended with adolescent players: "A tester has explained it to  
7 them and shown them the kit. The players are then left in no doubt that this is a very secure,  
8 sterile procedure" (Phil, rugby league).

9           Another coach commented that "They're still always nervous and they're always  
10 [worried] that things can happen, but I think they're happy in the process that it's safe" (Jos,  
11 rowing). These findings are in agreement with Jalleh et al. (2014) who also found a  
12 significant path between legitimacy and doping attitudes. As commented by Jalleh and  
13 colleagues, this is an important finding because it illustrates that adolescents are aware of the  
14 thoroughness of testing procedures, which is likely to influence compliance to anti-doping  
15 rules. It would be interesting to examine whether this is the case across all levels of  
16 adolescent sport, particularly among athletes not exposed to anti-doping education programs.

17           **Reference Group Opinion.** The coaches believed that the opinions of those close to  
18 the athlete, such as coaches, parents, and friends influence attitudes towards doping. This  
19 influence can be positive or negative, which is in agreement with Donovan et al. (2002). One  
20 coach stated "A parent's view would act as deterrent to that [doping], but I've also known  
21 y'know where a parent has allegedly given his lad banned substances" (Phil, rugby league).  
22 However, one coach thought it acted as a deterrent, because an athlete would not want to be  
23 known as a cheater among friends: "I don't think any of the lads would want to be perceived  
24 as a cheat. The whole stigma around drug use in sport is a deterrent" (Ron, rugby union).  
25 Jalleh et al. (2014) found support for this aspect of the SDCM. Interestingly, peers might be

1 particularly important, among adolescents, because peer influence is thought to play a more  
2 significant role in determining behavior among adolescents than it does adults (Gardner &  
3 Steinberg, 2005).

4 **Age and Maturation.** Although not identified in the SDCM (Donovan et al., 2002),  
5 the findings from these interviews suggested that the age and maturation level of an athlete  
6 might influence their attitude towards doping. Some of the coaches suggested that late  
7 developers might be more likely to have a favorable attitude towards doping: “Some kids are  
8 trying to gain more weight quicker, cos they need to otherwise they’re going to get hurt or  
9 they won’t get selected as a result [be]cause they’re too small” (Matt, rugby union).

10 One coach suggested if an early developer gets over taken by his peers, when they  
11 start puberty they might be more likely to have a favorable attitude towards doping: “A  
12 prodigy kid at fourteen fifteen sixteen, and then, your buddies hit puberty and then they start  
13 beating you and you’re not winning anymore” (Ed, kayaking). Although the relationship  
14 between doping and maturation has not been examined before, researchers have examined the  
15 relationship between substance use and the onset of puberty. A recent systematic review by  
16 Hummel, Shelton, Heron, Moore, and van den Bree (2012) revealed that early developers are  
17 more likely to abuse substances. More work is required to address the relationship between  
18 early and late developers and the relationship with doping attitudes.

19 **Participation Level.** Participation level was not cited within the SDCM (Donovan et  
20 al., 2002), but the coaches identified it as factor that might influence an athlete’s attitudes  
21 towards doping. In particular, the coaches felt that adolescent athletes who participated at  
22 lower levels would have more favorable attitudes to doping due to the lack of education and  
23 testing at lower levels: “At the sub-elite level in the community game, I think that there could  
24 be a bigger problem there, because the chances are that they could get away with it” (Phil,  
25 rugby league).

1           Indeed another coach thought that positive attitudes were more prevalent among  
2 amateur athletes than professionals. “There’s an innate risk with junior [amateur] players,  
3 because they’re taking lots of supplements to get themselves an advantage and they’re not  
4 getting tested” (George, rugby league). Previous research has identified that adult supplement  
5 users are more likely to have a positive attitude towards doping (Backhouse, Whitaker, &  
6 Petróczy, 2013). This relationship may extend to adolescent athletes too. Participation level  
7 has not previously been considered as a factor that might influence doping attitudes among  
8 adolescent athletes. Indeed, there are many studies that have focused upon elite or high-level  
9 athletes (e.g., Bloodworth et al., 2012; Gucciardi et al., 2011; Jalleh et al., 2014), but perhaps  
10 doping and positive attitudes to doping might be more prevalent within lower level sport.

11           **Ethnicity and Country of Residence.** Our findings suggest that an athlete’s ethnicity  
12 may also influence their attitude towards doping. Indeed, one coach suggested that athletes of  
13 certain ethnicities might have a natural advantage, which influences attitudes towards doping  
14 “I come from a New Zealand background where the Polynesians are very big people, and  
15 through all that age group, y’know they’re predominately a lot larger than your average  
16 Caucasian young man.” This natural size advantage helps these players according to the  
17 coach: “they seem to get through to the representative teams a lot more because coaches are  
18 looking for size more than skill at that young age” (Matt, rugby union). Another coach  
19 suggested some players have an advantage, which might make others want to dope: “In the  
20 southern hemisphere with the Polynesians versus particularly the Australians. There are  
21 players running around that at thirteen and fourteen are eighty-seven kilograms. I think  
22 maybe there’s an impact there” (George, rugby league).

23           Although some coaches thought that athletes might be tempted to dope in order to  
24 deal with disadvantages from being a smaller race, one coach said that the beliefs of a  
25 particular ethnic group might be a deterrent against doping, because athletes do not want to

1 bring shame upon their family name: “Shaming your own name is such a big thing over here”  
2 (Rob, rugby union). The relationship between doping attitudes and ethnicity has not been  
3 explored among adolescent athletes and requires further attention.

4 One coach experienced different doping attitudes within different countries “In my  
5 experience of junior rugby in South Africa, there’s more pressure and a higher incidence of  
6 use of PEDs... than what goes on in the UK.” This coach commented “It was very common  
7 for sixteen or eighteen year old schoolboys to take steroids” (Mike, rugby union). There is a  
8 lack of research involving athletes from different countries in relation to doping among  
9 adolescent athletes. There are studies that contain large samples of adolescent athletes (e.g.,  
10 Laure et al., 2004; Melia et al., 1996), but these contain athletes from the same country.  
11 Nonetheless, these findings indicate that doping is a worldwide problem, but understanding  
12 any differences in doping attitudes among athletes from different countries and possible  
13 reasons for such differences may help increase compliance levels.

14 **Stress.** Coaches mentioned that a prolonged period of stress influenced attitudes  
15 towards doping. Indeed one coach argued that stress encountered over a season influenced  
16 such attitudes: “At the eighteen level, within the course of a season, it can become quite  
17 strenuous. I would argue that they would maybe look to other forms of support and the  
18 dangers of doping increase” (Dan, basketball). Indeed, another coach associated higher stress  
19 levels with positive doping attitudes: “The higher expectations with bigger events may create  
20 the circumstances whereby a youngster makes a poor decision about what they're taking”  
21 (Mike, rugby union). Researchers have failed to specifically examine the relationship  
22 between stress and doping attitudes among adolescent athletes. Scholars indicated that  
23 decision-making was impaired during stressful incidents that were appraised as threatening  
24 within the Theory of Challenge and Threat States in Athletes (TCTSA; Jones, Meijen,  
25 McCarthy, & Sheffield, 2009). In support of the TCTSA, our findings indicate that

1 adolescent athletes might use PEDs when athletes experience threat within stressful  
2 encounters, because decision making is influenced. Understanding more about the  
3 relationship between doping attitudes and threat states might enable researchers and  
4 practitioners to identify periods of seasons or competition cycles when athletes are more  
5 likely to dope.

## 6 **Susceptibility towards Doping**

7 The coaches identified three main sources that were related to an adolescent's  
8 susceptibility towards doping. These were: i) coaches, ii) parents, and iii) peers. These were  
9 cited as influencing attitudes to doping too, so will be touched upon briefly, but in relation to  
10 doping susceptibility.

11 **Coaches.** Many of the coaches felt very strongly that the coach influences an  
12 adolescent athlete's susceptibility towards doping: "I think the coach has an absolutely  
13 massive part to play in that. At an adolescent age, at a younger age, coaches or people in  
14 authority have a lot of sway." The coach commented further: "These guys will listen to what  
15 we say and if we're actively encouraging that [doping], and we put pressure on the players to  
16 dope, I believe on the whole, they would probably respond by doing what the coach wants  
17 them to" (Rob, rugby union).

18 This sentiment was echoed by another coach, who felt that coaches can exert even  
19 more influence over his or her athletes. He said that adolescent athletes "Would do whatever  
20 you tell them to do because they believe in you and trust you." He said that some coaches  
21 will not initially tell the athlete what they [are] doing, but will then say 'well, you're getting  
22 the results.' I think a coach has a huge influence" (Jos, rowing). This finding is in agreement  
23 with Diacin et al. (2003) and Erickson et al. (2015) who reported that the coach was very  
24 powerful in determining whether athletes take a PED. In addition to adolescent athletes being

1 more susceptible to peer influences (e.g., Gardner & Steingberg, 2005), it appears that they  
2 might also be more susceptible than adult athletes to coach influences.

3         **Parents.** As previously documented in the attitudes to doping section of the results,  
4 parents were found to influence susceptibility to doping. This influence could be positive or  
5 negative, which is in partial agreement with previous research among adult athletes. Erickson  
6 et al. (2015) found that parents could have a positive impact on attitudes towards doping.  
7 Some coaches, however, thought that parents could increase susceptibility to doping,  
8 particularly in countries where the stakes were high for adolescent athletes and parents. One  
9 coach believed that adolescent athletes who are close to getting a full scholarship within the  
10 United States may be susceptible to doping, and could be influenced by their parents:  
11 “Parents see it as a way of getting a scholarship to university which is a massive expense  
12 here. I think parents would enable that to happen.” Furthermore, this coach also thought that  
13 parents know that if their child gets a scholarship and that he or she gets “Super good at either  
14 baseball, basketball or football, then if they make it to the program, then y’know – you’re in  
15 the big time” ( Ed, kayaking).

16         **Peers.** Peers were also thought to influence whether an athlete is susceptible to doping  
17 or not: “If other people in the squad have been doping and they’ve seen success, I think it  
18 becomes a lot easier to go 'oh I'll have a little dabble as well, why not?' If it’s helped them,  
19 why can't it help me?’ This coach also said “Temptation will certainly be heightened if  
20 members of the squad or team or friends are doping” (Rob, rugby).

21         These sentiments were echoed by another coach: ““He hasn’t been touched, he hasn’t  
22 been in trouble or anything, he’s looking in great shape, I should give it a shot.’ There’s  
23 definitely going to be those temptations of course.” This particular coach suggested “vanity  
24 becomes an issue at that young age, trying to impress the ladies” (Matt, rugby union). These

1 findings are in agreement with Gardener and Steinberg (2005) who found that peer influence  
2 is strongest during adolescence.

### 3 **Availability and Affordability**

4 The main purpose of this study was to explore the coaches' perceptions of attitudes  
5 and susceptibility towards doping, rather than doping behavior per se. Although Jalleh et al.  
6 (2014) did not report significant paths between affordability and availability with doping  
7 behavior, we found some qualitative support for Donovan et al.'s (2002) SDCM. Our  
8 participants felt that availability and affordability were key factors in influencing behavior.  
9 Worryingly, many of the coaches thought PEDs were widely available to adolescent athletes:  
10 "I am aware of certain junior players being sent home from the club that have been supported  
11 afterwards [be]cause they've taken something that's had an adverse reaction" (George, rugby  
12 league). Another coach believes that PEDs are "widely available here. If someone wants  
13 them, especially with the internet, it's not difficult to get hold of" (Mike, rugby union).

14 The coaches thought that adolescents would be able to afford PEDs too: "They have a  
15 lot more disposable income, which opens up doors to be able to buy whatever they would be  
16 buying" (Rob, rugby union). One coach even thought that an athlete "From a wealthier  
17 background may also be more likely to dope because they just have the resources to be able  
18 to afford such drugs" (Ron, rugby union). Despite the findings by Jalleh et al. (2014), the  
19 coaches believed that PEDs were both available and affordable to many adolescent athletes.

### 20 **Conclusion**

21 We qualitatively explored coaches' perceptions of performance enhancement during  
22 adolescence and in relation to the factors identified within the SDCM (Donovan et al., 2002).  
23 We found qualitative support for the SDCM and therefore suggest that it is relevant to  
24 adolescent athletes from different continents, with a few minor additions. These include

1 age/maturation, participation level, stress, ethnicity, and country of residence. Our  
2 participants also thought that other coaches, parents, and peers influenced susceptibility to  
3 doping, which in turn was thought to impact upon doping behavior. By collecting our data  
4 from coaches, it may be less vulnerable to social desirability, which has been previously  
5 found to influence data on doping (Gucciardi et al., 2010).

6         It appears that additional research is required to understand more about doping  
7 attitudes, especially among adolescent athletes. For example, age/maturation, participation  
8 level, stress, ethnicity, and country of residence are not factors that have previously been  
9 considered in relation to doping. The coaches in our study suggested that these are factors  
10 that might influence attitudes among adolescent athletes. As such, researchers could  
11 quantitatively assess the relationship between constructs and attitudes to doping.  
12 Understanding more about the determinants of doping attitudes will enable at risk athletes to  
13 be targeted with doping education programs. Our findings echo recommendations from other  
14 domains, which led scholars (e.g., Compas, Connor-Smith, Saltzman, Harding Thomsen, &  
15 Wadsworth, 2001) to state that adolescents should not be treated as mini-adults. They also  
16 suggested that models should be specifically designed with the population in mind.

17         Gucciardi et al. (2011) did not report a significant path between self-esteem and  
18 attitudes to doping when they tested the SDCM. In this study, all of the coaches thought that  
19 self-esteem was highly related to attitudes towards doping, which is in agreement with  
20 Schirlin et al.'s (2009) findings. This may reflect the differences in self-esteem between  
21 adults and adolescents (e.g., Brown & Cai, 2010). Additionally, there might also be some  
22 subtle differences among adolescents and adults in relation to threat appraisals, which is  
23 consistent with non-doping research (Britton et al., 2013). Indeed, many of the coaches felt  
24 that adolescent athletes may disregard any negative health effects of PEDs more than adults.  
25 It is apparent that more research is required to explore components of the SDCM among

1 adolescent athletes, because less is known about how these constructs are related to doping  
2 attitudes among this age group of athletes.

3         In regards to doping susceptibility, there might be other subtle differences between  
4 adolescent and adult athletes. Researchers such as Gardener and Steinberg (2005) reported  
5 that adolescents were more likely to engage in risky behaviors and fall under the influence of  
6 their peers than adults. As such, adolescent athletes may also be more susceptible to negative  
7 influences than adults. It is therefore important that coaches are aware of the influence of  
8 other peers, but also how they themselves may influence adolescent athletes. This  
9 information could be portrayed within coach education programs.

10         A number of worrying findings have emerged from this research, which policy  
11 makers and national governing bodies could be made aware of. Firstly, other than adolescent  
12 athletes participating at elite levels, there appears to be very little or no doping education.  
13 This represents a significant concern, especially as some of the coaches suggested that doping  
14 may be much more prevalent at non-elite levels. Another potential issue relates to the lack of  
15 testing of adolescent athletes, even those participating at higher levels. Indeed, one coach  
16 stated that athletes were not tested when playing in their own country or continent, only when  
17 they played in world championships. Theoretically, an athlete could have taken a PED in the  
18 build up to a competition, which would have cleared his or her body by the time testing took  
19 place.

20         It is important to note the potential limitations of this study. Our sample contained  
21 mainly male participants, although all of the coaches had some experience of coaching  
22 females. This sample is also much smaller than both Gucciardi et al. (2011) and Jalleh et al.  
23 (2014), who used quantitative techniques with larger participant sizes to assess the SDCM.  
24 Furthermore, and similar to Erickson et al. (2015), we did not employ member-checking.  
25 This does not necessarily mean the data is less trustworthy than studies that employed this

1 technique. Morse, Barrett, Mayan, Olson, and Spiers (2000) argued that the data analysis  
2 process involves synthesizing, decontextualizing, and abstracting data across participants.  
3 Accordingly, Morse et al. (2000) stated that there is no reason for participants to recognize  
4 themselves or experiences. In order for researchers to address the concerns of participants,  
5 they may be forced to present the results at a very descriptive level, which could invalidate  
6 the work of the researcher and keeps the level of analysis very close to the data.

7         In spite of the aforementioned limitations, we have found evidence to suggest that the  
8 SDCM (Donovan et al., 2002), with some minor amendments, may be a suitable model to  
9 explain attitudes towards doping and susceptibility for adolescent athletes. Factors such as  
10 maturation, skill level, ethnicity, and country of residence may also influence attitudes to  
11 doping too. Researchers could test these findings with much larger samples. Finally, it  
12 appears that more doping education is required for athletes who do not participate at elite  
13 levels and more testing for those who do participate at elite levels.

14

## 1 **References**

- 2 An, S., & Trafimow, D. (2014). Affect and morality: A cross-cultural examination of moral  
3 attribution. *Journal of Cross-Cultural Psychology, 45*, 417-430. doi:  
4 10.1177/0022022113511298
- 5 Backhouse, S., McKenna, J., Robinson, S., & Atkin, A. (2007). Attitudes, behaviours,  
6 knowledge and education - Drugs in sport: Past, present and future. Research report  
7 submitted to the World Anti-Doping Agency, Canada.
- 8 Backhouse, S. H., Patterson, L., & McKenna, J. (2012). Achieving the Olympic ideal:  
9 Preventing doping in sport. *Performance Enhancement & Health, 1*, 83-85. doi:  
10 10.1016/j.peh.2012.08.001
- 11 Backhouse, S. H., Whitaker, L., and Petróczi, A. (2013). Gateway to doping? Supplement use  
12 in the context of preferred competitive situations, doping attitude, beliefs, and norms.  
13 *Scandinavian Journal of Medicine and Science in Sports, 23*, 244-252. doi:  
14 10.1111/j.1600-0838.2011.01374.x
- 15 Bloodworth, A. J., Petroczi, A., Bailey, R., Pearce, G., & McNamee, M. J. (2012). Doping  
16 and supplementation: The attitudes of talented you athletes. *Scandinavian Journal of*  
17 *Medicine and Science in Sports, 22*, 293-301. doi: 10.1111/j.1600-0838.2010.01239.x
- 18 Britton, J. C., Grillon, C., Shmuel, L., Norcross, M. A., Szuhany, K. L., Gang, C., Monique,  
19 E., . . . & Pine, D. S. (2013). Response to learned threat: An fMRI study in adolescent  
20 and adult anxiety. *The American Journal of Psychiatry, 170*, 1195-1204.  
21 <http://dx.doi.org/10.1176/appi.ajp.2013.12050651>

- 1 Brown, J. D., & Cai, H. (2010). Self-esteem and trait importance moderate cultural  
2 differences in self-evaluations. *Journal of Cross-Cultural Psychology, 41*, 116-123. doi:  
3 10.1177/0022022109349509
- 4 Carlson, J. A. (2010). Avoiding traps in member checking. *The Qualitative Report, 15*, 1102-  
5 1113. Retrieved from <http://www.nova.edu/ssss/QR/QR15-5/carlson.pdf>
- 6 Compas, B. E., Connor-Smith, J. K., Saltzman, H., Harding Thomsen, A., & Wadsworth, M.  
7 E. (2001). Coping with stress during childhood and adolescence: problems, progress, and  
8 potential in theory and research. *Psychological Bulletin, 127*, 87-127.  
9 <http://dx.doi.org/10.1037//0033-2909.127.1.87>.
- 10 Coté, J., Samela, J. H., Baria, A., & Russell, S. J. (1993). Organizing and interpreting  
11 unstructured qualitative data. *The Sport Psychologist, 7*, 127-137. Retrieved from: [http://](http://journals.humankinetics.com/tsp)  
12 [journals.humankinetics.com/tsp](http://journals.humankinetics.com/tsp)
- 13 Creswell, J., & Miller, D. (2000). Determining validity in qualitative inquiry. *Theory Into*  
14 *Practice, 39*, 124-130. doi: 10.1207/s15430421tip3903\_2.
- 15 Cruickshank, A., Collins, D., & Minten (2014). Driving and sustaining culture change in  
16 Olympic sport performance teams: A first exploration and grounded theory. *Journal of*  
17 *Sport & Exercise Psychology, 36*, 107-120. 10.1123/jsep.2013-0133
- 18 Diacin, M. J., Parks, J. B., & Allison, P. C. (2003). Voices of male athletes on drug use, drug  
19 testing, and the existing order in intercollegiate athletics. *Journal of Sport Behavior, 26*,  
20 1.
- 21 Dodge, T., & Jaccard, J. J. (2008). Is abstinence an alternative? Predicting adolescent  
22 athletes' intentions to use performance enhancing substances. *Journal of Health*  
23 *Psychology, 13*, 703-711. doi: 10.1177/1359105307082460

- 1 Donovan, R.J., Eggar, G., Kapernick, V., & Mendoza, J. (2002). A conceptual framework for  
2 achieving performance enhancing drug compliance in sport. *Sports Medicine*, *32*, 269-  
3 284. doi: 10.2165/00007256-200232040-00005
- 4 Eagly, A. H., & Chaiken, S. (1993). *The psychology of attitudes*. Fort Worth, TX: Harcourt  
5 Brace Jovanovich.
- 6 Erickson, K., McKenna, J., & Backhouse, S. H. (2015). A qualitative analysis of the factors  
7 that protect athletes against doping in sport. *Psychology of Sport and Exercise*, *16*, 149-  
8 155. doi: 10.1016/j.psychsport.2014.03.007
- 9 Gardener, M., & Steinberg, L. (2005). Peer influence on risk taking, risk preference, and  
10 risky decision making in adolescence and adulthood: An experimental study.  
11 *Developmental Psychology*, *41*, 625-635. doi: 10.1037/0012-1649.41.4.625
- 12 Gucciardi, D.F., Gordon, S., & Dimmock, J. A. (2008). Towards an understanding of mental  
13 toughness in Australian Football. *Journal of Applied Sport Psychology*, *20*, 261-281. doi:  
14 10.1080/10413200801998556
- 15 Gucciardi, D.F., Jalleh, G., Donovan, R.J. (2010). Does social desirability influence the  
16 relationship between doping attitudes and doping susceptibility in athletes? *Psychology*  
17 *of Sport and Exercise*, *11*, 479-486. doi: 10.1016/j.psychsport.2010.06.002
- 18 Gucciardi, D., Jalleh, G., & Donovan, R.J. (2011). An examination of the sport drug control  
19 model with elite Australian athletes. *Journal of Science & Medicine in Sport*, *14*, 469-  
20 476. doi:10.1016/j.jsams.2011.03.009
- 21 Hartan, H.C. & Latané, B. (1997). Social influence and adolescent lifestyle attitudes. *Journal*  
22 *of Research on Adolescence*, *7*, 197-220. doi: 10.1207/s15327795jra0702\_5

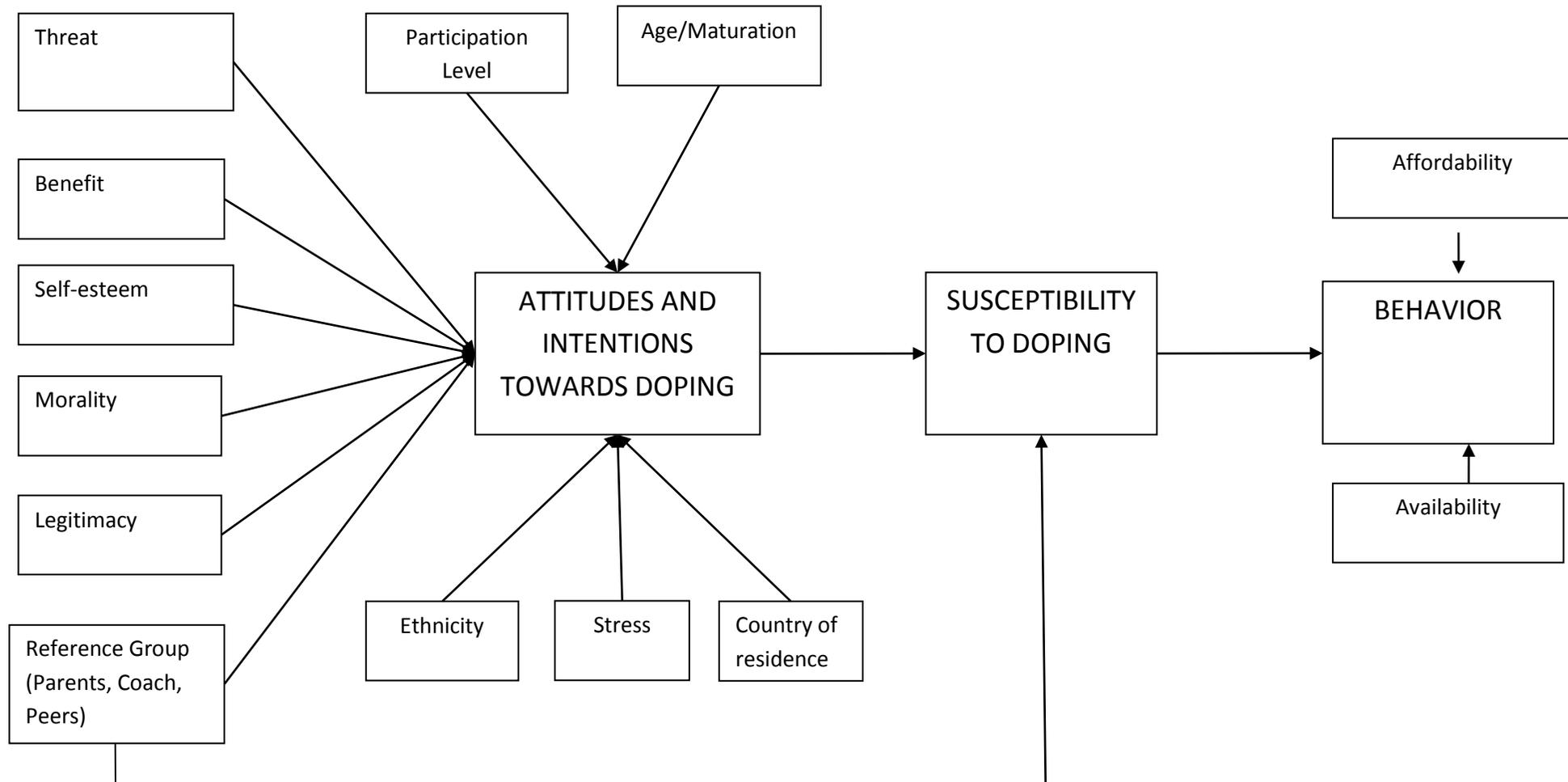
- 1 Hummel, A., Shelton, K. H., Heron, J., Moore, L., & van den Bree, M. B. M. (2012). A  
2 systematic review of the relationships between family functioning, pubertal timing and  
3 adolescent substance use. *Addiction, 108*, 487–496. doi: 10.1111/add.12055
- 4 Imada, T., & Ellsworth, P. C. (2011). Proud Americans and lucky Japanese: Cultural  
5 differences in appraisal and corresponding emotion. *Emotion, 11*, 329-345.
- 6 Jalleh, G., Donovan, R. J., & Jobling, I. (2014). Predicting attitudes towards performance  
7 enhancing substance use: A comprehensive test of the Sport Drug Control Model with  
8 elite Australian athletes. *Journal of Science and Medicine in Sport, 17*, 574-579.  
9 10.1016/j.jsams.2013.10.249
- 10 Johnson, M.B. (2012). A Systemic social-cognitive perspective on doping. *Psychology of*  
11 *Sport and Exercise, 13*, 317-323. doi: 10.1016/j.psychsport.2011.12.007
- 12 Jones, M., Meijen, C., McCarthy, P. J., & Sheffield, D. (2009). A theory of challenge and  
13 threat states in athletes. *International Review of Sport and Exercise Psychology, 2*, 161-  
14 180. doi: 10.1080/17509840902829331
- 15 Kosmidou, E., & Theodorakis, Y. (2007). Differences in smoking attitudes of adolescents and  
16 young adults. *Psychological Reports, 101*, 457-481.  
17 <http://dx.doi.org/10.2466/PR0.101.6.475-481>
- 18 Lazuras, L., Barkoukis, V., & Tsorbatzoudis, H. (2015). Toward an integrative model of  
19 doping use: An empirical study with Adolescent Athletes. *Journal of Sport & Exercise*  
20 *Psychology, 37*, 37-50. doi: 10.1123/jsep.2013-0232
- 21 Lucidi, F., Zelli, A., Mallia, L. (2013). The contribution of moral disengagement to  
22 adolescents' use of doping substances. *International Journal of Sport Psychology, 44*,  
23 331-350. doi: 10.7352/IJSP 2013.00.000

- 1 Lucidi, F., Zelli, A., Mallia, L., Grano, C., Russo, P. M., & Violani, C. (2008). The social-  
2 cognitive mechanisms regulating adolescents' use of doping substances. *Journal of*  
3 *Sports Sciences*, 26, 447-456. doi: 10.1080/02640410701579370
- 4 Maykut, P., & Morehouse, R. (1994). *Beginning qualitative research: A philosophic and*  
5 *practical guide*. London: Falmer Press.
- 6 McCrae, R. R., Martin, T. S., & Costa, P. T. (2005). Age trends and age norms for the NEO  
7 Personality Inventory-3 in adolescents and adults. *Assessment*, 12, 363-373. doi:  
8 10.1177/1073191105279724
- 9 Morse, J. M., Barrett, M., Mayan, M., Olson, K., & Spiers, J. (2002). Verification strategies  
10 for establishing reliability and validity in qualitative research. *International Journal of*  
11 *Qualitative Methods*, 1, 13-22. Retrieved from:  
12 <http://creativecommons.org/licenses/by/2.0>
- 13 Ntoumanis, N., Ng, J., Barkoukis, V., & Backhouse, S. (2014). Personal and psychosocial  
14 predictors of doping use in physical activity settings: A meta-analysis. *Sports Medicine*,  
15 44, 1603-1624. doi: 10.1007/s40279-014-0240-4
- 16 Potard, C., Amoura, C., Kubiszewski, V., Le Samedy, M., Moltrecht, B., & Courtis, R.  
17 (2015). Psychometric properties of the French version of the short form of the  
18 Coopersmith Self-Esteem Inventory among adolescents and young adults. *Evaluation &*  
19 *the Health Professionals*, 38, 265-279. doi: 10.1177/0163278715568990
- 20 Potter, J., & Hepburn, A. (2005). Qualitative interviews in psychology: Problems and  
21 possibilities. *Qualitative Research in Psychology*, 2, 281-307. doi:  
22 10.1191/1478088705qp045oa.

- 1 Sansanwal, R., Derevensky, J. L., Ramona Lupu, I., & Lupu, V. (2015). Knowledge and  
2 attitudes regarding adolescent problem gambling: A cross-cultural comparative analysis  
3 of Romanian and Canadian teachers. *International Journal of Mental Health Addiction*,  
4 *13*, 33-48. doi: 10.1007/s11469-014-9507-0
- 5 Schirlin, O., Rey, G., Jouvent, R., Dubal, S., Komano, O., Perez-Diaz, F., & Soussignan, R.  
6 (2009). Attentional bias for doping words and its relation with physical self-esteem in  
7 young adolescents. *Psychology of Sport and Exercise*, *10*, 615-620. doi:  
8 10.1016/j.psychsport.2009.03.010
- 9 Shen, H., Wan, F., & Wyer, R. S. (2010). Cross-cultural differences in the refusal to accept a  
10 small gift: The differential influence of reciprocity norms of Asians and North  
11 Americans. *Journal of Personality and Social Psychology*, *100*, 271-281. doi:  
12 10.1037/a0021201
- 13 Smith, A. C. T., Stewart, B., Oliver-Bennetts, S., McDonald, S., Ingerson, L., Anderson, A.,  
14 et al. (2010). Contextual influences and athlete attitudes to drugs in sport. *Sport*  
15 *Management Review* (Elsevier Science), *13*, 181-197. doi: 10.1016/j.smr.2010.01.008
- 16 Sparkes, A. C., & Smith, B. (2014). *Qualitative research methods in sport, exercise and*  
17 *health*. Oxon: Routledge.
- 18 The Henry Kaiser Family Foundation. (2002). Substance use and risky sexual behavior:  
19 attitudes and practices among adolescents and young adults. *American Journal of Health*  
20 *Education*, *33*, 278-281, DOI: 10.1080/19325037.2002.10604743
- 21 Weiss, M.R., & Bredemeier, B.J. (1983). Developmental sport psychology: A theoretical  
22 perspective for studying children in sport. *Journal of Sport Psychology*, *5*, 216–230.  
23 Retrieved from <http://www.journals.humankinetics.com/jsep>.

- 1 World Anti-Doping Agency (2015). *World Anti-Doping Code*. Quebec, Canada.
- 2 Zelli, A., Mallia, L., & Lucidi, F. (2010a). The contribution of interpersonal appraisals to a  
3 social-cognitive analysis of adolescents' doping use. *Psychology of Sport and Exercise*,  
4 *11*, 304-311. doi: 10.1016/j.psychsport.2010.02.008
- 5 Zelli, A., Lucidi, F., & Mallia, L. (2010b). The relationships among adolescents' drive for  
6 muscularity, drive for thinness, doping attitudes, and doping intentions. *Journal of*  
7 *Clinical Sport Psychology*, *4*, 39-52. Retrieved from  
8 <http://www.journals.humankinetics.com/jcsp>

1 Figure 1. *Sport Drug Control Model for Adolescent Athletes (SDCM-AA)*



2