



Athletes' perceptions of performance enhancing substance user and non-user prototypes

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ABSTRACT

Aim: This study explored athletes' perceived prototypes of performance enhancing substance (PES) users and non-users to facilitate a broader understanding of the risk/protective factors for doping use.

Method: A cross-sectional study was conducted involving n=147 current/ex-competitive athletes. Following ethical approval, athletes (mean age = 25.51, SD = 8.47 years; 40.8% male) from 30 sports completed an online open-ended questionnaire. Participants were required to describe their perceived positive and negative images of PES users and non-users. Inductive content analysis established the main themes within the data.

Results: The perceived prototypes of PES users and non-users were most commonly related to: motivation to succeed, confidence, commitment, temperament, fear of competition, rule abiding, reliability and sociability. Characteristically, PES users were seen as motivated, confident, unreliable and rule breakers, whereas non-users were perceived to be role models, reliable and risk averse.

Conclusion: The results suggest athletes' perceptions of PES user characteristics may not be solely negative. Athletes who perceive PES user prototypes favourably may be vulnerable to doping via motivation that is elicited from future possible selves. Therefore, athletes' perceptions of PES user and non-user prototypes may act as risk/protective factors for doping.

Implications: Tailored anti-doping should target athletes' prototype perceptions to enhance the prevention of doping in sport.

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Despite the efforts of the World Anti-Doping Agency (WADA), the International Olympic Committee and sports federations, doping continues today with athletes employing more sophisticated doping regimes to evade the testers (Fainaru-Wada & Williams, 2006). Owing to the clandestine nature of doping, the potential health risks for athletes, particularly long-term, are largely unknown (Kayser & Smith, 2008). Regardless of the much improved detection methods and significant increase in the number of doping tests conducted over the past seven years, the proportion of cases producing adverse analytical findings has remained around 2% (WADA, 2009a). Yet, an investigation based on the Athlete Biological Passport found the overall prevalence of blood doping among Track and Field athletes to be estimated at 14%, with some disciplines reaching as high as 48% (Sottas, Robinson, Fischetto, Dollé, Alonso, & Saugy, 2011). These findings suggest that current detection methods are ineffective in deterring athletes from

using performance enhancing substances (PES). Furthermore, current anti-doping policy does not serve health protection as it merely attempts to catch those who are using PES rather than prevent use. Thus, the figures indicate that a high proportion of athletes are at risk of suffering from potential doping-related health complications in the future (Kayser, Mauron, & Miah, 2007). Nevertheless, in recognition of the limitations of detection-based deterrence, the WADA has placed more emphasis on prevention-based deterrence (Fahey, 2009).

Prevention-based approaches aim to stop the use of PES before it occurs. Such an approach is more suited to efforts aimed at preventing potential health consequences associated with doping. However, to be effective, prevention needs to be tailored and monitored. As a result, we need to identify which athletes are most vulnerable to doping and what makes these athletes more vulnerable than others. Research has highlighted the need to understand the underlying psychosocial mechanisms of PES use, including the decision making processes athletes go through when determining performance enhancement methods (Petróczy & Aidman, 2008). Consequently, the prototype/willingness model (Gibbons, Gerrard, Blanton, & Russell, 1998; Gibbons, Gerrard, & Lane, 2003)

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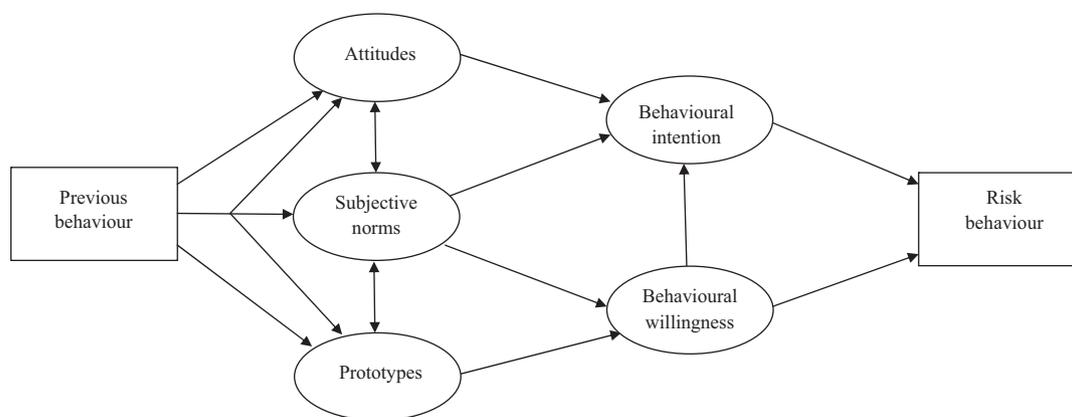


Figure 1. Prototype Willingness Model (Gibbons et al., 1998; Gibbons et al., 2003).

could be effectively applied to gain an understanding of athletes' decisions to use PES and help to recognise the type of athletes who are most vulnerable to doping. Given the dearth of research exists on what characterises a PES user (Backhouse, McKenna, Robinson, & Atkin, 2007), it is necessary to contrast athletes' perceptions of PES users and non-users in order to determine which characteristics could act as risk/protective factors for doping use. The present study assesses athletes' perceptions of what characterises PES users and non-users in an attempt to inform efforts aimed at building doping behaviour models. Focusing on athletes' prototype perceptions offers a new approach to investigating the driving forces behind doping. In turn, targeted anti-doping interventions aimed at preventing doping may be enhanced and the number of athletes at risk of potential health problems in the future reduced.

Previous research into PES use in sport has focused on attitudes towards and reasons for using PES rather than on the characteristics that represent PES users. Counteracting this trend, Burnett and Kleiman (1994) investigated whether differences exist between the psychosocial characteristics of adolescent anabolic androgenic steroid (AAS) users and non-users. By interviewing AAS users and non-users, they found that although AAS users appeared more forceful and impulsive but less cooperative than non-athletes, they were relatively similar to non-AAS using adolescent athletes. Similarly, Wichstrom and Pedersen (2001) found no difference in sport or appearance related characteristics of AAS users compared with non-users. In contrast, Chantal, Soubranne and Brunel (2009) found AAS users were seen to be less self-determined, have fewer concerns for opponents and display less commitment to sport in comparison to non-users. This differs from the committed and dedicated social images that misusers of AAS use to describe themselves (Probert & Leberman, 2009). However, Chantal et al. (2009) suggested that a negative halo effect may have resulted in participants rating AAS misusers highly on undesirable characteristics because they were made aware of their drug taking behaviour. Nevertheless, an individual's prototype perceptions of the type of person who engages in a behaviour influence their willingness to perform the same behaviour (Gerrard, Gibbons, Houlihan, Stock, & Pomery, 2008). Therefore, an individual's prototype perceptions theoretically influence willingness to use PES irrespective of whether they truly reflect a PES user. Subsequently, how favourable/unfavourable an individual's prototype perceptions are of a PES user and non-user affect willingness to dope. In addition, favourable/unfavourable perceptions of a PES user and non-user then influence an individual's future possible selves (i.e., what they expect to become, hope to become and want to avoid becoming; Norman & Aron, 2003; Quinlan, Jaccard, & Blanton, 2006), which act as a motivator for behaviour.

1. Prototype/willingness model

The prototype/willingness model considers decision making across two pathways: the reasoned action pathway and the social reaction pathway (Figure 1). The reasoned path focuses on behavioural intentions and consists of elements from the theory of reasoned action (TRA; Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975) and the theory of planned behaviour (TPB; Ajzen, 1985, 1991). The TPB is an extension of the TRA where intentions to perform a specific behaviour are seen to be the key determinant of behaviour (Dodge & Jaccard, 2008). The TPB represents the association between attitudes and behaviour whilst taking into account the influence of subjective norms (what an individual perceives significant others think they ought to do) and perceived behavioural control (the amount of control an individual perceives they have over a given behaviour). Previously, the TPB has been used in the health domain to predict substance use over and above other health behaviour models (Armitage & Conner, 2000). The TPB has also been used to investigate doping use in sport. A number of authors utilising the TPB (Lucidi, Zelli, Mallia, Grano, Russo, & Violani, 2008; Wiefferink, Detmar, Coumans, Vogels, & Paulussen, 2008) have demonstrated the ability of doping attitudes and subjective norms to predict doping behaviour. This conclusion is partly supported by Petróczi (2007) showing that doping attitudes and beliefs, even when combined with sport orientation, leave a significant proportion of unexplained variance in doping behaviour. These findings suggest that other factors play an influential role in decisions about doping.

In contrast, the social reaction path, which focuses on behavioural willingness, suggests that certain situations facilitate risky behaviours (Gerrard, Gibbons, Stock, Vande Lune, & Cleveland, 2005). Behavioural willingness reflects an individual's openness to opportunity (Thornton, Gibbons, & Gerrard, 2002), and is influenced by attitudes, subjective norms, prototype perceptions and past behaviour. Furthermore, behavioural willingness acknowledges that an individual may perceive a given behaviour to be unfavourable and have no intention of engaging in it, but would consider performing the behaviour under certain (risk-conducive) circumstances. For example, an adolescent may have no intention to drink alcohol, but may be willing to drink alcohol when they attend an unsupervised party where alcohol is readily available. Behavioural willingness may therefore explain why some athletes dope when they previously declared no intention of using PES. At present, there is limited research examining willingness to dope and the research which does exist (Bloodworth & McNamee, 2010; Bloodworth, Petróczi, Bailey, Pearce, & McNamee, 2010) has not assessed the factors conceptualised in the social reaction pathway of the prototype willingness model. Therefore, before willingness

to dope can be assessed using the prototype willingness model, it is necessary to consider the factors which may influence willingness by paying particular attention to prototype perceptions.

Prototypes form part of the social reaction pathway of the prototype/willingness model and refer to the images an individual has of the type of person they think engages in a particular behaviour (e.g., images of the 'typical' drug user). There are two aspects of prototype perception which are seen to influence an individual's decision to perform a risky behaviour: how favourable/unfavourable the overall evaluation of the image is (prototype favourability) and how similar an individual feels they are to the image (prototype similarity). Social comparison occurs whereby individuals compare themselves to the prototype and the positive and negative attributes that accompany it. The more an individual perceives the prototype to be favourable and similar to themselves, the more willing they are to engage in the behaviour (Zimmermann & Sieverding, 2010). Prototypes influence behavioural willingness, and as a result, changes in prototype perception could lead to changes in risk behaviour (Thornton et al., 2002). Consequently, the prototypes athletes associate with PES users and non-users may act as risk/protective factors for doping use and help to identify which athletes are most vulnerable to doping in the future.

The prototype willingness model has previously been applied to risk behaviours (e.g., smoking, drinking; Gerrard et al., 2005; Gibbons et al., 1998; Piko, Bak, & Gibbons, 2007; Zimmermann & Sieverding, 2010), health-promoting behaviours (e.g., condom use, exercise, healthy eating; Gerrits, de Ridder, de Wit, & Kuijer, 2009; Keresztes, Piko, Gibbons, & Spielberger, 2009; Ouellette, Hessling, Gibbons, Reis-Bergan, & Gerrard, 2005; Ravis & Sheeran, 2003) and altruistic behaviours (e.g., organ donation; Hyde & White, 2009; Hyde & White, 2010). Typically, studies have focused on the prototypes associated with a single behaviour (e.g., Gerrard et al., 2005; Keresztes et al., 2009; Ravis & Sheeran, 2003). Others have investigated the prototypes associated with both the behaviour in question (e.g., smoking) and the comparison behaviour (e.g., non-smoking). For example, college students identified distinct images of the typical student who uses or does not use condoms (Blanton, Vanden den Eijnden, Buunk, Gibbons, Gerrard, & Bakker, 2001). Similarly, adolescents identified significantly different prototypes for healthy and unhealthy eaters (Gerrits et al., 2009). Based on this literature, differences in the characteristics of PES users and non-users may emerge when athletes are asked to reflect on their perceived prototypes of PES users and non-users. Furthermore, research suggests risk and non-risk images play a role in predicting behaviour (Piko et al., 2007; Ravis, Sheeran, & Armitage, 2006). Consequently, it is important to identify the prototypes of PES users and non-users so that both actor and abstainer prototypes can be utilised in the future to predict willingness to use PES and tailor anti-doping programmes aimed at behaviour change. Therefore, the aim of this study was to gain an understanding of respondents' social images of athletes who do and do not use PES in sport. Emphasis was placed on freely identifying athletes' stereotypes of PES users and non-users using a prototype willingness approach.

2. Method

2.1. Participants

Of the 247 responses, 96 provided demographic responses only. These participants were removed from the sample, along with those who had never participated in competitive sport. This left a valid sample of 147 athletes over the age of 18, which was approximately balanced for gender (60 male, 69 female, 18 did not report gender) with a mean age of 25.5 years ($SD=8.47$). Of the 147 participants, 92.5% ($n=136$) participated in competitive sport at the time

Table 1

Frequency and percentage of participants per sport.

Sport	N	(%)	Sport	N	(%)
Athletics	5	(3.4)	Basketball	2	(1.4)
Fencing	1	(0.7)	Tennis	5	(3.4)
Flat water canoeing	1	(0.7)	Thai boxing	1	(0.7)
Football	17	(11.6)	Triathlon	1	(0.7)
Freestyle skiing	1	(0.7)	Underwater hockey	1	(0.7)
Golf	1	(0.7)	Climbing	1	(0.7)
Gymnastics	3	(2.0)	Powerlifting	1	(0.7)
Hockey	9	(6.1)	Weightlifting	2	(1.4)
Badminton	52	(35.4)	Ice hockey	1	(0.7)
Netball	9	(6.1)	Biathlon	2	(1.4)
Race walking	4	(2.7)	Bobsleigh	1	(0.7)
Rowing	2	(1.4)	Body building	1	(0.7)
Rugby	7	(4.8)	Cricket	4	(2.7)
Running	3	(2.0)	Curling	5	(3.4)
Snooker	1	(0.7)	Cycling	3	(2.0)
Total individual sports	91	(61.9)	Total team sports	56	(38.1)

of the data collection. The sample included a large range of sports including badminton, athletics, football, curling, hockey, netball and tennis (Table 1). Athletes had competed at a range of competitive levels (club/university= 27.2%, county= 27.9%, national= 18.4%, international= 25.9%), with 61.9% participating in individual sports. The majority of participants (88.4%) were of 'White British' ethnicity.

2.2. Procedure

Following ethical approval from the University research ethics committee, participants were recruited via a convenience sample clustered around a number of gatekeepers including coaches, known athletes, support staff and the social networking site Facebook. A convenience sampling method was adopted owing to the challenges facing researchers studying a clandestine behaviour such as doping in sport. It was felt that the inclusion of a number of gatekeepers would enhance the study's ability to reach a large proportion of athletes who were willing to take part in doping-related research. Athletes were sent an invitation to participate in the study via these networks and were asked to act as gatekeepers, inviting their athlete contacts to participate. The invitation provided a link to an online questionnaire which contained open-ended questions. Participants were notified that implied consent was considered to be given if they chose to proceed with their involvement in the study. Participants could withdraw from the study at any time by ceasing completion of the questionnaire. However, participants were informed that because of the anonymous nature of the questionnaire it was not possible to remove data once the questionnaire had been submitted. The questionnaire consisted of four questions which asked participants to describe the positive and negative characteristics they perceived to be associated with athletes who do and do not use PES. Prior to answering each question, participants were provided with example characteristics relating to binge/non-binge drinkers and reminded that there were no right or wrong answers:

- Please list the positive characteristics you think an athlete who USES prohibited performance enhancing substances will possess (There are no right or wrong answers). For example, a positive characteristic of a binge drinker might be 'outgoing'.
- Please list the negative characteristics you think an athlete who USES prohibited performance enhancing substances will possess (There are no right or wrong answers). For example, a negative characteristic of a binge drinker might be 'drinks all the time'.
- Please list the positive characteristics you think an athlete who DOES NOT USE prohibited performance enhancing substances

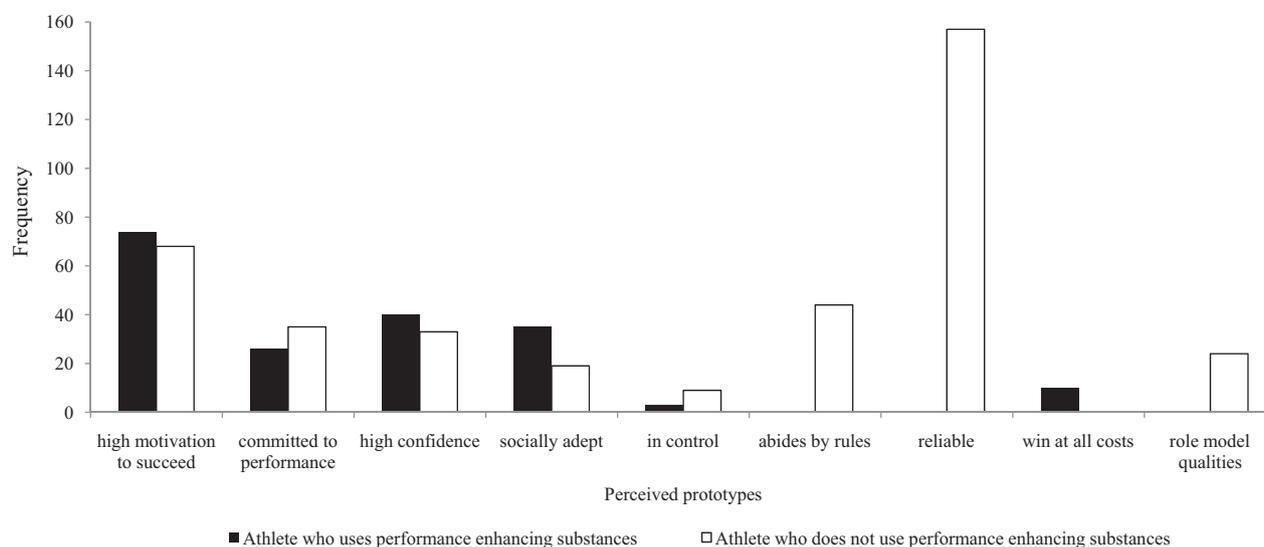


Figure 2. Most common positive characteristics identified for performance enhancing substance users and non-users.

will possess (There are no right or wrong answers). For example, a positive characteristic of a non-binge drinker might be 'responsible'.

- Please list the negative characteristics you think an athlete who DOES NOT USE prohibited performance enhancing substances will possess (There are no right or wrong answers). For example, a negative characteristic of a non-binge drinker might be 'uptight'.

Participants were also provided with the following definition of PES as presented in the World Anti-Doping Agency code (WADA, 2009b) to enable them to respond to the questions:

An illegal performance enhancing substance is classified as any substance that appears on the WADA prohibited list. A substance that is prohibited by WADA fulfils at least two of the three following criteria: 1) the substance has the potential to enhance performance, 2) use of the substance represents an actual/potential health risk to the athlete and 3) use of the substance violates the spirit of sport (WADA, 2009b; pp.33).

2.3. Data analysis

Inductive content analysis was used to identify the main themes in the data. Microsoft Word and Excel 2007 were used to manage the data. Level one codes represented the key words from each response. At this point, data remained in a raw state. Similar characteristics were then grouped together and labelled with a suitable phrase. Categories emerged as a result of the groupings and were not pre-determined. The prototypes identified for PES users and non-users were then compared to determine the similarities and differences between them.

3. Results

Respondents perceived a range of characteristics to be associated with athletes who do and do not use PES (Figures 2 and 3). The positive social images athletes had of those that use PES included being confident, motivated and committed. Negative prototypes of PES users as perceived by athletes included breaking the rules of sport, being unreliable and being reliant on PES. Respondents also suggested PES users had a win at all costs attitude. In contrast, positive prototype perceptions of non-users included being reliable, having role model qualities and adhering to rules.

The negative social images perceived to be associated with non-users included being unwilling to try anything new and risk averse (Figure 3).

As well as the differences noted in the perceived prototypes of PES users and non-users, some characteristics were ambiguous. Respondents perceived social images related to both PES users and non-users to include commitment, sociability, self-confidence, ability to relax, temperament, motivation to succeed, reliability, fearing competition and locus of control. Some respondents perceived PES users and non-users to have the same characteristics (e.g., high motivation to succeed, high/low self-confidence, bad temperament), whereas others had opposing views. However, the prototypes reported by respondents did not appear to differ with respondents' gender, type of sport or level of competition. PES users were identified by some respondents as having low self-confidence, whilst others perceived non-users to be low in self-confidence. Similarly, PES users were described as fearing competition, whereas others associated fearing competition with non-users. In contrast, some respondents perceived the same prototypes for PES users and non-users, but believed they differed on valence (i.e., whether they were positive or negative). For example, it was noted that PES users were perceived to lack control, whereas non-users were said to be in control. Others perceived PES users to be socially adept and non-users to be socially inhibited. Some athletes also reported characteristics as positive and negative for PES users or non-users. For example, some respondents perceived PES users could be composed (positive) but also unable to relax (negative) or socially adept and socially inhibited. Equally, some respondents believed non-users were highly motivated to succeed (positive) but also unmotivated to succeed (negative) or high and low in self-confidence.

4. Discussion

The present study investigated athletes' prototype perceptions of PES users and non-users. A number of characteristics were identified as representative of the social images of both PES users and non-users. The inclusion of high self-confidence, motivation to succeed and commitment to sporting performance for both PES users and non-users may relate to the necessity of these characteristics for sporting success. Furthermore, the predominant characteristics identified as positive for both PES users and non-users represent the characteristics needed to become an Olympic champion (Gould,

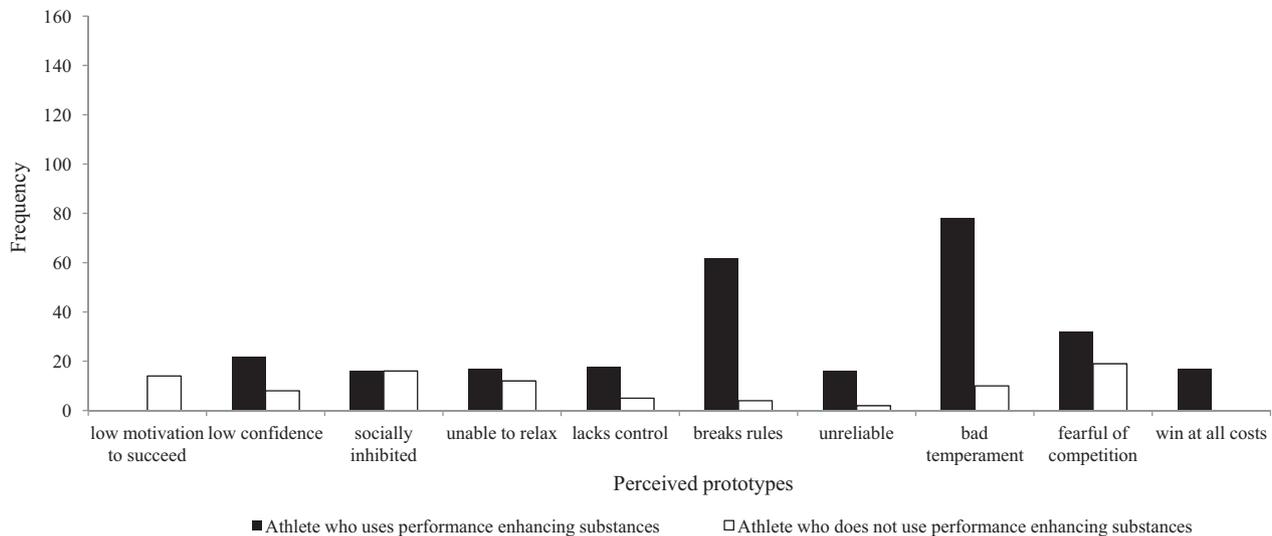


Figure 3. Most common negative characteristics identified for performance enhancing substance users and non-users.

Dieffenbach, & Moffatt, 2002) and excel in elite sport (MacNamara, Button, & Collins, 2010). On balance, PES user prototypes consist of elements that are desirable to an athlete's self image (e.g., self-confidence, motivation and commitment) despite efforts to portray the doper image as wholly negative. Possible selves act as a motivator for behaviour by providing an image of the self engaged in a specific behaviour as well as an image of the self being accepted or rejected by others. Moreover, how 'possible' a self is to achieve is dependent on its availability, accessibility and perceived control, which in turn influences the motivation to achieve/avoid that possible self (Norman & Aron, 2003). If athletes perceive PES users to have desirable characteristics, they may aspire to represent them (i.e., see them as a possible self). These possible selves then act as motivators of behaviour (Quinlan et al., 2006) and could therefore lead to doping dependent on the strength of the evaluation of the prototype. The stronger the evaluation, the more likely doping will be elicited.

Alternatively, athletes may perceive themselves to be low in self-confidence or becoming withdrawn as a result of the pressure they are under to perform (i.e., a possible self they want to avoid becoming). Negative attributes act as an avoidance mechanism, motivating the individual to ensure that they do not possess certain characteristics in the future. Therefore, the desire to avoid a possible self also motivates behaviour and may lead to doping. However, if an athlete expects to possess negative characteristics associated with a PES user, they may be more likely to engage in doping. This is because negative attributes can act as a 'confirmation function' where the desire to perform a risky behaviour is confirmed (Quinlan et al., 2006). Subsequently, athletes' prototype perceptions may help to identify who is vulnerable to doping and therefore enable us to intervene before an athlete embarks on a doping regime that may be detrimental to health. Furthermore, prototype perceptions may highlight where anti-doping education needs to be targeted to ensure that negative health implications from doping abuse are averted.

This study is not without limitations. Firstly, the perceptions of the social images associated with PES users and non-users portrayed by the athletes in this study may not be representative of all athletes. The study relied on convenience sampling to recruit participants, which may have led to sampling bias. However, owing to the clandestine nature of doping and the lack of whistleblowers, random sampling within doping research is not possible. Instead, the risk of sample bias was mitigated by the inclusion of a diverse

range of sports and levels of competition. This was achieved by cascading study information to a wide reaching network. Whilst diversity was achieved in sports samples and competitor level, the majority of the sample represented 'White British' ethnicity. Future research may consider including a more encompassing sample frame in an attempt to determine whether perceived prototypes of PES users and non-users vary with ethnicity. In addition, a follow-up to this study would involve further investigation to determine whether perceptions of PES users vary with sport, level of competition and PES use.

Another problem with the sample related to incomplete data. From the original sample, 39% dropped out after completing the demographic questions. This is likely to be related to the use of open-ended questions. Although open-ended questions allow respondents to express their views freely, without being limited to certain responses (Denscombe, 2008), they also have larger non-response rates compared to closed questions. Nevertheless, their inclusion ensured that the data collected was rich and enabled participants to identify all characteristics they felt were applicable to PES users and non-users.

As well as the sampling issues, the study has two further limitations. Athletes were directly asked to report both positive and negative characteristics relating to PES users and non-users. This may have caused some athletes to provide characteristics which would not have come to mind without being prompted to identify positive and negative traits. However, the way participants responded to the questions (i.e., leaving either positive or negative characteristics blank) suggests that athletes did not feel forced to provide both positive and negative characteristics despite the way the questions were posed. Finally, no information was collected on whether an athlete (respondent) currently used or had ever used PES themselves. An athlete's PES use status is likely to affect their perceptions of a PES user and non-user. For example, those athletes who attribute positive characteristics to PES users may be more likely to use PES (or already be using PES) than those who perceive PES user prototypes to consist of negative characteristics. Future research should take this into account as past behaviour has been found to increase the favourability of the social images associated with that behaviour (Gerrard, Gibbons, Reis-Bergan, Trudeau, Vande Lune, & Buunk, 2002). Furthermore, previous behaviour was found to predict behavioural willingness, which in turn predicted subsequent behaviour (Thornton et al., 2002).

This research demonstrates that there are a number of different social images associated with PES users, some of which overlap with the prototypes of non-users. This suggests that universal PES user and non-user prototypes may not exist. Although the existence of universal PES user and non-user prototypes is unknown, individuals are able to make stereotypical judgements about the attributions and traits that represent the type of person associated with a particular behaviour label (Monin & Norton, 2003). However, in uncertain times, social projection is exacerbated as no one is sure of appropriate opinions or knows what anyone else is thinking, making it difficult to obtain consensus of 'the norm' (Monin & Norton, 2003). This may be why it could be difficult to identify universal PES user and non-user prototypes. Nevertheless, it is also important to acknowledge that a non-user prototype may not be distinctive given that most athletes represent non-users rather than PES users. As a result, it may be difficult to generate a clear social image of a non-user which encompasses every trait a non-user may possess (Gibbons et al., 2003). Therefore, future research should focus on prototype perceptions and how they relate to an athlete's future possible selves. If athletes aspire to become individuals who represent some of the positive characteristics associated with a PES user (e.g., commitment, self-confidence), their willingness to dope may increase. In turn, athletes may be more vulnerable to doping and any potential health risks that accompany it.

Although stereotypes are socially constructed, they indirectly influence behaviour. Athletes who perceive PES users favourably regardless of whether their perceptions are a true reflection of PES users may be more willing to use PES. Therefore, these athletes may be more prone to the health consequences surrounding doping. Focusing on prototype perceptions provides a new line of enquiry for researchers committed to preventing doping. Targeted interventions should aim to modify desired selves and place more emphasis on the feared selves related to doping. If athletes fear becoming possible selves which represent negative characteristics of dopers, theoretically, they will be less willing to dope. Furthermore, if desired selves are modified to represent non-users, athletes should be more willing to abstain from doping. Coupled with anti-doping programmes targeting perceptions aimed at inducing behaviour change (i.e., decreasing PES use), focus should also be on the development of core life skills such as effective decision making and resilience (Backhouse, McKenna, & Patterson, 2009; Botvin, Griffin, Wagner, & Waldron, 2001). Athletes may then be better equipped to cope with pressurised situations and therefore less willing to dope. In addition, altering athletes' doping-related prototype perceptions so that PES users are seen as unfavourable will theoretically decrease athletes' willingness to dope and prevent athletes from putting themselves at risk of acute and chronic negative health consequences.

Additional research is required to identify the types of athletes who may be vulnerable to doping before targeted intervention programmes can take place. With a continually changing doping landscape, the pressure is mounting for greater investment in doping prevention, which could help to protect athletes' health and well-being in the long term. Further research is already underway to examine the identified social images presented here in an attempt to enhance doping prevention. More specifically, an investigation is currently on-going to examine how favourable athletes perceive the prototypes associated with PES users and non-users to be and how similar they feel they are to themselves using the characteristics derived from this study. In addition, the relationship between PES user and non-user prototypes and willingness to use PES is being examined.

Conflicts of interest

The authors have no conflicts of interest

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References

- Ajzen, I. (1985). From intentions to actions: A theory of planned behaviour. In J. Kuhl, & J. Beckmann (Eds.), *Action control: From cognitions to behaviour* (pp. 11–39). New York: Springer.
- Ajzen, I. (1991). The theory of planned behaviour. *Organisational Behaviour and Human Decision Processes*, 50, 179–211.
- Ajzen, I., & Fishbein, M. (1980). *Understanding attitude and predicting social behaviour*. New Jersey: Prentice-Hall.
- Armitage, C. J., & Conner, M. (2000). Social cognition models and health behaviour: A structured review. *Psychology & Health*, 15, 173.
- Backhouse, S., McKenna, J., & Patterson, L. (2009). *Prevention through education: A review of current international social science literature; A focus on the prevention of bullying, tobacco, alcohol and social drug use in children, adolescents and young adults*.
- Backhouse, S. H., McKenna, J., Robinson, S., & Atkin, A. (2007). Attitudes, behaviours, knowledge and education - drugs in sport: Past, present and future. Retrieved from http://www.wada-ama.org/rtecontent/document/Backhouse_et_al_Full_Report.pdf.
- Blanton, H., Vanden den Eijnden, R. J. J. M., Buunk, B. P., Gibbons, F. X., Gerrard, M., & Bakker, A. (2001). Accentuate the negative: Social images in the prediction and promotion of condom use. *Journal of Applied Social Psychology*, 31, 274–295.
- Bloodworth, A., & McNamee, M. (2010). Clean Olympians? Doping and anti-doping: The views of talented young British athletes. *International Journal of Drug Policy*, 21, 276–282.
- Bloodworth, A., Petróczy, A., Bailey, R., Pearce, G., & McNamee, M. J. (2010). Doping and supplementation: The attitudes of talented young athletes. *Scandinavian Journal of Medicine & Science in Sports*, <http://dx.doi.org/10.1111/j.1600-0838.2010.01239.x>
- Botvin, G. J., Griffin, K. W., Wagner, E. F., & Waldron, H. B. (2001). *Life skills training: Theory, methods, and effectiveness of a drug abuse prevention approach Innovations in adolescent substance abuse interventions*. Amsterdam Netherlands: Pergamon/Elsevier Science Inc., 31–50.
- Burnett, K. F., & Kleiman, M. E. (1994). Psychological characteristics of adolescent steroid users. *Adolescence*, 29, 81–89.
- Chantal, Y., Soubranne, R., & Brunel, P. C. (2009). Exploring the social image of anabolic steroids users through motivation, sportspersonship orientations and aggression. *Scandinavian Journal of Medicine & Science in Sports*, 19, 228–234.
- Denscombe, M. (2008). The length of responses to open-ended questions. *Social Science Computer Review*, 26, 359–368.
- Dodge, T., & Jaccard, J. J. (2008). Is abstinence an alternative? Predicting adolescent athletes' intentions to use performance enhancing substances. *Journal of Health Psychology*, 13, 703–711.
- Fahey, J. (2009). Are we winning the fight? Play True, (1), 1. Retrieved from http://playtrue.wada-ama.org/Global/PDF%20Issues/EN/PlayTrue_2009_1_Engaging_The_Athlete.EN.pdf.
- Fainaru-Wada, M., & Williams, L. (2006). *Game of shadows: Barry Bonds, BALCO, and the steroids scandal that rocked professional sports*. New York: Gotham Books.
- Fishbein, M., & Ajzen, I. (1975). *Belief, attitude, intention and behaviour: An introduction to theory and research*. Reading, MA: Addison-Wesley.
- Gerrard, M., Gibbons, F. X., Houlihan, A. E., Stock, M. L., & Pomery, E. A. (2008). A dual-process approach to health risk decision making: The prototype willingness model. *Developmental Review*, 28, 29–61.
- Gerrard, M., Gibbons, F. X., Reis-Bergan, M., Trudeau, L., Vande Lune, L. S., & Buunk, B. (2002). Inhibitory effects of drinker and nondrinker prototypes on adolescent alcohol consumption. *Health Psychology*, 21, 601–609.
- Gerrard, M., Gibbons, F. X., Stock, M. L., Vande Lune, L. S., & Cleveland, M. J. (2005). Images of smokers and willingness to smoke among African American pre-adolescents: An application of the prototype/willingness model of adolescent health risk behavior to smoking initiation. *Journal of Pediatric Psychology*, 30, 305–318.
- Gerrits, J. H., de Ridder, D. T. D., de Wit, J. B. F., & Kuijter, R. G. (2009). Cool and independent or foolish and undisciplined? Adolescents' prototypes of (un)healthy eaters and their association with eating behaviour. *Appetite*, 53, 407–413.
- Gibbons, F. X., Gerrard, M., Blanton, H., & Russell, D. W. (1998). Reasoned action and social reaction: Willingness and intention as independent predictors of health risk. *Journal of Personality and Social Psychology*, 74, 1164–1180.
- Gibbons, F. X., Gerrard, M., & Lane, D. J. (2003). A social reaction model of adolescent health risk. In J. M. Suls, & K. A. Wallston (Eds.), *Social Psychological Foundations of Health and Illness* (pp. 107–136). Oxford: Blackwell.
- Gould, D., Dieffenbach, K., & Moffatt, A. (2002). Psychological characteristics and their development in Olympic champions. *Journal of Applied Sport Psychology*, 14, 172–204.
- Hyde, M. K., & White, K. M. (2009). Similarity not favourability: the role of donor prototypes in predicting willingness to donate organs while living. *Journal of Health Psychology*, 14, 888–898.
- Hyde, M. K., & White, K. M. (2010). Are organ donation communication decisions reasoned or reactive? A test of the utility of an augmented theory of planned behaviour with the prototype/willingness model. *British Journal of Health Psychology*, 15, 435–452.

- Kayser, B., Mauron, A., & Miah, A. (2007). Current anti-doping policy: A critical appraisal. *BMC Medical Ethics*, 8, 2.
- Kayser, B., & Smith, A. C. T. (2008). Globalisation of anti-doping: the reverse side of the medal. *British Medical Journal*, 337, 85–87.
- Keresztes, N., Piko, B. F., Gibbons, F. X., & Spielberger, C. D. (2009). Do high- and low-active adolescents have different prototypes of physically active peers? *Psychological Record*, 59, 39–52.
- Lucidi, F., Zelli, A., Mallia, L., Grano, C., Russo, P. M., & Violani, C. (2008). The social-cognitive mechanisms regulating adolescents' use of doping substances. *Journal of Sports Sciences*, 26, 447–456.
- MacNamara, A., Button, A., & Collins, D. (2010). The role of psychological characteristics in facilitating the pathway to elite performance part 1: Identifying mental skills and behaviors. *Sport Psychologist*, 24, 52–73.
- Monin, B. T., & Norton, M. I. (2003). Perceptions of a fluid consensus: Uniqueness bias, false consensus, false polarization, and pluralistic ignorance in a water conservation crisis. *Personality and Social Psychology Bulletin*, 29, 559–567.
- Norman, C. C., & Aron, A. (2003). Aspects of possible self that predict motivation to achieve or avoid it. *Journal of Experimental Social Psychology*, 39, 500–507.
- Ouellette, J. A., Hessling, R., Gibbons, F. X., Reis-Bergan, M., & Gerrard, M. (2005). Using images to increase exercise behavior: Prototypes versus possible selves. *Personality and Social Psychology Bulletin*, 31, 610–620.
- Petróczi, A. (2007). Attitudes and doping: A structural equation analysis of the relationship between athletes' attitudes, sport orientation and doping behaviour. *Substance Abuse Treatment, Prevention and Policy*, 2, 34.
- Petróczi, A., & Aidman, E. (2008). Psychological drivers in doping: The life-cycle model of performance enhancement. *Substance Abuse Treatment, Prevention & Policy*, 3, 7.
- Piko, B. F., Bak, J., & Gibbons, F. X. (2007). Prototype perception and smoking: Are negative or positive social images more important in adolescence? *Addictive Behaviors*, 32, 1728–1732.
- Probert, A., & Leberman, S. (2009). The value of the dark side: An insight into the risks and benefits of engaging in health-compromising practices from the perspective of competitive bodybuilders. *European Sport Management Quarterly*, 9, 353–373.
- Quinlan, S. L., Jaccard, J., & Blanton, H. (2006). A decision theoretic and prototype conceptualisation of possible selves: Implications for prediction of risk behaviour. *Journal of Personality*, 74, 599–630.
- Rivis, A., & Sheeran, P. (2003). Social influences and the theory of planned behaviour: Evidence for a direct relationship between prototypes and young people's exercise behaviour. *Psychology & Health*, 18, 567–583.
- Rivis, A., Sheeran, P., & Armitage, C. J. (2006). Augmenting the theory of planned behaviour with the prototype/willingness model: Predictive validity of actor versus abstainer prototypes for adolescents' health-protective and health-risk intentions. *British Journal of Health Psychology*, 11, 483–500.
- Sottas, P. E., Robinson, N., Fischetto, G., Dollé, G., Alonso, J. M., & Saugy, M. (2011). Prevalence of blood doping in samples collected from elite track and field athletes. *Clinical Chemistry*, 57, 762–769.
- Thornton, B., Gibbons, F. X., & Gerrard, M. (2002). Risk perception and prototype perception: Independent processes predicting risk behavior. *Personality and Social Psychology Bulletin*, 28, 986–999.
- WADA (2009a). Adverse analytical findings and atypical findings reported by accredited laboratories Retrieved 25th July, 2011. from: http://www.wada-ama.org/Documents/Science_Medicine/Anti-Doping_Laboratories/Lab_Statistics/WADA_2009_LaboratoryStatisticsReport_Final.pdf.
- WADA (2009b). World Anti-Doping Code. Retrieved from http://www.wada-ama.org/Documents/World_Anti-Doping_Program/WADP-The_Code/WADA_Anti-Doping.CODE.2009.EN.pdf.
- Wichstrom, L., & Pedersen, W. (2001). Use of anabolic-androgenic steroids in adolescence: Winning, looking good or being bad? *Journal of Studies on Alcohol*, 62, 5–13.
- Wiefferink, C. H., Detmar, S. B., Coumans, B., Vogels, T., & Paulussen, T. G. (2008). Social psychological determinants of the use of performance-enhancing drugs by gym users. *Health Education Research*, 23, 70–80.
- Zimmermann, F., & Sieverding, M. (2010). Young adults' social drinking as explained by an augmented theory of planned behaviour: The roles of prototypes, willingness, and gender. *British Journal of Health Psychology*, 15, 561–581.