The role of the *Self* in assessing doping cognition: Implicit and explicit measures of athletes' doping-related prototype perceptions

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Abstract

Objectives: To examine athletes' implicit and explicit prototype perceptions of performance enhancing substance (PES) users and non-users.

Design: A cross-sectional mixed-method study.

Methods: Competitive athletes from 39 sports (N=226; mean age= 27.66±9.74 years; 59% male) completed four self-report questions and two Brief Implicit Association Tests online, assessing prototype favourability and similarity of PES users and non-users.

Results: Athletes explicitly associated themselves with a non-user (M= 3.13±0.92) more than a PES user (M= 0.56±0.88) and perceived a non-user (M= 89.92±14.98) more favourably than a PES user (M= 13.18±21.38). Indexing behaviour on self-reports, doping contemplators did not differ from 'clean' athletes in their perceptions of PES user prototypes while dopers perceived PES users favourably and similar to themselves. In comparison, doping contemplators paired the concept of 'dopers' easier with themselves than with others, while clean athletes and dopers had no preference for either pairing (D = -0.33, -0.08 and 0.01, respectively). All groups demonstrated some degree of preference for 'good and doper', moving from slight to moderate to strong preference in the groups of clean athletes, dopers and contemplators, respectively (D = -0.20, -0.37 and -0.80, respectively).

Conclusions: Results suggest that doping contemplators may have a positive bias towards doping which is not endorsed in self-reports. Implicit preferences, along with the disparity between the implicit and explicit measures of athletes' doping-related prototype perceptions advance understanding of doping behaviour and make a unique contribution to research methodology. Factors influencing the interplay between explicit and implicit endorsements of PES user prototypes warrant further research.

Key words: Mental representation; stimulus-response compatibility; sport; performance enhancement

Introduction

Since the introduction of the World Anti-Doping Agency's (WADA) social science research programme in 2005, the number of individuals conducting research in the area of anti-doping has grown. Building on an initial focus on athletes' attitudes towards doping, there has been a switch in focus to other doping risk and protective factors. Yet one factor that has received little attention thus far - but may help to increase understanding and the prevention of doping behaviour - is an individual's prototype perceptions.

Drawing upon the tenets of the Prototype Willingness Model (PWM; Gibbons, Gerrard, & Lane, 2003), prototype perceptions represent the images of the type of person an individual thinks engages in a particular behaviour (e.g., the 'typical' doper). These prototypes form when people make comparisons with others to evaluate opinions and behaviour (Scott, Mason, & Mason, 2015). Prototypes for any given behaviour are distinct and are made up of both positive and negative attributes (Ouellette, Hessling, Gibbons, Reis-Bergan, & Gerrard, 2005). According to the PWM, there are two aspects of prototype perceptions that influence an individual's willingness to engage in risky behaviour: prototype favourability (how favourable/unfavourable the overall evaluation of the image is) and prototype similarity (how similar an individual feels they are to the image). When considering whether to engage in a behaviour, people compare themselves to their images of the prototype and the positive and negative attributes that are associated with it. The more favourable and similar to themselves a prototype is perceived to be, the more likely an individual will engage in the behaviour (Zimmermann & Sieverding, 2010). Accordingly, if an athlete perceives the image of a performance enhancing substance (PES) user (an individual who uses prohibited substances) favourably and/or believes they themselves are similar to a PES user, theoretically they will be more willing to dope themselves.

Athletes' perceptions of the type of person who engages in doping are important because they may help to identify those who are vulnerable to doping. For example, if an athlete perceives a PES user to consist of many positive characteristics, they may aspire to become like them, which could lead to doping (Whitaker, Long, Petróczi, & Backhouse, 2012).

As individuals, we develop self-schemas from our past experiences that we use to process self-related information (Cross & Markus, 1994). The schemas that we develop influence our sensitivity to information and our ability to predict our future selves within a specific domain (Cross & Markus, 1994). Our possible selves provide an important link between motivation and our self-concept and represent how we see ourselves in the future including our *ideal self*, along with our hopes and fears (Markus & Nurius, 1986). Possible selves also represent what an individual perceives to be attainable and therefore act as a goal to strive towards (Stevenson & Clegg, 2011). If an athlete's *hoped for self* reflects the prototype of a PES user, an individual may be motivated to strive to become like a PES user. Alternatively, an athlete may fear becoming like a PES user and as a result be less willing to dope.

Typically, prototype perceptions have been investigated solely with the use of self-report measures (e.g., Blanton et al., 2001; Spijkerman, van den Eijnden, Vitale, & Engels, 2004; Thornton, Gibbons, & Gerrard, 2002). Not only have studies identified that individuals hold distinct prototypes of the type of person they think engages in a particular behaviour (e.g., condom users/non-users; Blanton et al., 2001), they also indicate that prototype perceptions predict willingness to engage in risky behaviours (e.g., smoking, alcohol use, unsafe sex). For example, positive associations have also been made between prototype perceptions and adolescents' intentions to smoke and drink in the future (Spijkerman et al., 2004). Similarly, perceived social images were significantly related to young adults' willingness to engage in unprotected sex, which later predicted contraceptive use six months on (Thornton et al., 2002). However, the inherent limitation in self-report methodology lies with the assumption that respondents are willing and able to report what they think and how they feel. Proponents of implicit assessments argue that despite the deceptively reassuring feeling of cognitive certainty most people experience, what is available to conscious self-examination is only a small fraction of what is in the mind (Nosek, Hawkins, & Frazier, 2011). For example, social projection, attribute substitution and heuristical decision making happens outside conscious awareness (Kahneman, 2003; Robbins & Krueger, 2005), meaning self-reported and automatic motivations or preferences can differ widely (McClelland, Koestner, & Weinberger, 1989; Nosek, 2007). This intriguing characteristic calls for alternative measurement processes in order to capture the mental processes that happen outside conscious control.

Because implicit measurements do not require respondents to make explicit connections or evaluations about the target construct (e.g., doping attitude or PES user prototypes), they are assumed to be able to tap into people's subconscious and uncontrolled thought processes. Response time-based implicit tests, such as the Implicit Association Test (IAT) variants (Greenwald, McGhee, & Schwartz, 1998) utilise the stimulus-response compatibility (SRC) concept whereby the speed by which one is able to perform the task is influenced by compatibility between (a) the stimuli and the required response (S-R) and/or (b) features of the stimuli (S-S) (de Houwer, 2001; Kornblum, Hasbroucq, & Osman, 1990). Inferences are made from the response times of each S-R pair to determine which pairing represents the compatible S-R pair and which is the incompatible S-R pair (e.g., 'doping and cheating' vs. 'doping and fair', or vice versa). The easier pairing, which is performed quicker, is presumed to be subconsciously preferred by the respondent.

Recent research into the phenomenology of implicit measures and implicit attitudes suggests that a measurement being *implicit* does not equate to being automatic or outside conscious awareness (De Houwer & Moors, 2007; Fazio & Olson, 2003). Under the right conditions, people can have accurate introspection into their implicit attitudes (Cooley, Payne, Loersch, & Lei, 2015). Yet, implicit measures can be constructed in multiple ways, with the retrieval process being influenced by both external and internal factors as well as the interaction between them. In turn, this makes them quite malleable (Payne & Cameron, 2013; Payne & Gawronski, 2010; Petróczi, 2013). Recognising the importance of capturing both implicit and explicit thought processes when dealing with socially sensitive issues such as doping in sport, there is an increasing trend of employing both indirect measures and direct assessments, such as self-report questionnaires, whilst also accounting for socially desirable responding (Gucciardi, Jalleh, & Donovan, 2010). With regards to researching doping behaviour, a handful of IAT test variants have been developed and tested, focusing on attitudes and automatic associations (for a review, see Brand, Wolff, & Baumgarten, 2015; Petróczi, 2013).

The most popular implicit measurement tool utilised by researchers is the IAT (Greenwald et al., 1998). IATs involve a double-category lexical or pictorial sorting task where two concepts (the target category and the attribute) are represented by the same response key. The time taken to accurately select the correct response key is recorded and a latency score is then calculated to determine which categories are easier to pair together. The sorting task is perceived to be easier when there is a strong association between two concepts sharing the same response key, resulting in a faster response time and fewer errors than when two concepts assigned the same key are not associated (Nosek, Greenwald, & Banaji, 2007). Recognising a need to employ indirect methods to assess socially undesirable behaviours such as doping, research teams are beginning to use IAT's to investigate doping-related attitudes (e.g., Brand, Heck, & Ziegler, 2014a; Brand, Wolff, & Thieme, 2014b; Petróczi, Aidman, & Nepusz, 2008). In addition, Petróczi and colleagues (2011) used a Brief IAT (B-

IAT) combined with self-report measures and hair analysis to investigate doping behaviour/attitudes.

To our knowledge, there have been no studies that have assessed athletes' prototype perceptions using direct and indirect measures. An individual's self-concept can influence the association between two concepts measured using an IAT (Greenwald et al., 2002). However, Ratliff and Howell (2015) examined the role of implicit and explicit prototypes on engagement in risky sun-related behaviour (e.g., using sunbeds, use of high SPF sun cream) and demonstrated that implicit prototypes were more predictive of white American women's risky sun-related behaviour than explicit prototypes. Thus it is assumed that the speed at which the IAT task can be performed is influenced by whether the relevant descriptor (e.g., PES user) is readily accessible in the working self-concept (Cross & Markus, 1994). If the descriptor is readily available in the working self-concept, response latencies on the IAT will be faster (Fazio, 1990).

It is important to identify both implicit and explicit prototype perceptions because self-reported and automatic preferences can differ widely (Nosek, 2007). Prototype perceptions may help to identify athletes who are more willing to dope, which is important for targeting prevention and education. Prototype perceptions also offer an alternative approach to investigating doping vulnerability (Whitaker, Long, Petróczi, & Backhouse, 2014; Whitaker et al., 2012), rather than focusing on attitudes (which dominate the literature). Although attitudes influence doping, literature shows that athletes in general - even doping users - display unfavourable attitudes towards doping (e.g., Petróczi & Aidman, 2009). Equally, attitudes toward an object/behaviour (e.g., doping), constitute a more abstract evaluation than those directly linked to the *Self* (e.g., prototype similarities). Therefore, in this paper we combine implicit and explicit measures to examine athletes' prototype perceptions of PES users and non-users and how these differ according to doping experience and future intentions/willingness to dope. We hypothesise that individuals reporting use of PES and/or contemplating future use will directly (explicit measures) and indirectly (implicit measures) perceive PES users as more favourable and similar to themselves than individuals who have not used PES and have no intentions/willingness to use PES in the future. With this approach, we aim to make a unique contribution to doping research methodology and advance anti-doping by expanding the pool of known cognitive antecedents of the doping decision via explicit and implicit prototype perceptions. The rationale is that goals related to one's Self (prototypes perceptions leading to possible selves) may play an important role in initiating goals and formulating goal-pursuing strategies (Read & Miller, 1989). Acknowledging the limitations associated with self-awareness and self-reports, this study utilises both explicit and implicit assessments of athletes' perceptions about PES user vs. non-user prototypes. Such combination also offers the opportunity to investigate the similarities and discrepancies between the explicit and implicit manifestations of these prototypes; and the interplay between the method (explicit and implicit retrieval) and the effect of the Self through abstract evaluations and Self-related similarity assessments.

Method

Participants

The study involved 226 competitive athletes with a mean age of 27.66 ± 9.74 years. At the time of the study, participants were competing at a range of performance levels from club/university level to elite level. Specifically, 31% were club/university, 18% county, 20% national and 29% international level. In addition, participants represented 39 sports with the highest proportions of participants being from cycling, athletics and hockey. Prior to recruitment, ethical approval was gained from the University research ethics committee. Participants were then recruited via a number of gatekeepers including national governing bodies, local sports clubs, coaches and known athletes. Social networking sites were also utilised to increase the reach of the study. When participants opened the survey link provided by gatekeepers, they were provided with an online information sheet that informed them of the purpose of the study, the voluntary and anonymous nature of the study and that consent was implied once the questionnaire had been submitted.

Procedure

Data for this study were collected as part of a larger project investigating the suitability of the prototype-willingness model to predict athletes' willingness to dope (Anonymous, 2014). First, participants completed the explicit measures via an online survey using a closed survey platform (Survey Monkey). A web-link at the end of the survey then directed participants to the implicit measures where the IAT tests were conducted using a bespoke Java application developed by [redacted]. This ordering was adopted because researchers advocate that IAT's are beyond deliberate conscious control (Gawronski, LeBel, & Peters, 2007) and assess associations which are developed over a long period of time (e.g., Boldero, Rawlings, & Haslam, 2007), suggesting that priming of IAT responses would not occur.

Measures

A combination of implicit and explicit measures were utilised to investigate athletes' doping-related prototype perceptions. The implicit and explicit measures were both designed to tap into prototype similarity (athletes' self-identification with a PES user) and prototype favourability (an individual's attitudes towards a PES user and non-user).

Implicit measures

The implicit measure chosen for this study was a Brief Implicit Association Test (B-IAT). B-IATs have been used in a number of different contexts including one developed by Petróczi and colleagues to investigate athletes' underlying attitudes towards doping (Petróczi et al., 2010). In comparison to standard IATs, B-IATs contain fewer sorting trials, which not only reduces the time necessary to conduct the test but also limits the boredom factor that may come into play when conducting a repetitious task. The B-IAT uses simplified instructions, which require the participant to focus on two out of four categories during each combined task (Sriram & Greenwald, 2009).

Before a combined trial, participants were shown two category labels along with their examples, whilst being instructed to respond to the items from the focal categories with one key (E) and to respond to any other stimuli with an alternative key (I). Prior to the test beginning, participants placed their fingers on the relevant keys and used the space bar to start the test. Once the test had started, a red cross appeared in the centre of the screen when a word had been incorrectly categorised and the participant would have to re-categorise the word. All participants took part in a practice B-IAT first, so that they could get used to the protocol before completing the task. This was to ensure that errors were limited, as a high error rate would result in the data being excluded from the study. In addition, instructions informing participants to sort the words into the correct category as fast as possible without making a mistake preceded the test.

In the present study, two B-IATs were used. The first B-IAT was used to ascertain whether athletes would associate PES users with themselves or others (self-identification with a PES user). The target categories in this B-IAT were ‘doper’ (cheat, artificial, doped, risky) and ‘non-doper’ (clean, safe, natural, honest) where ‘non-doper’ was non-focal. Doper vs. non-doper stimuli sets were constructed based on previous research (Anonymous, 2013) and were selected to avoid ambiguity by creating a very clear differentiation. Note that in IAT/B-IAT, participants are not asked to explicitly endorse one set over the other or record any kind of agreement. They are instructed to simply sort the stimuli words with their respective, pre-set category labels (dopers vs. non-dopers) as fast and as accurately as they can. To clarify this, participants are typically shown the labels and related stimuli sets at the start of the test and practice the lexical sorting task in single block settings before the actual test. For a more detailed description on the methodology, see the review by Petróczi (2013). The attributes included in the B-IAT were ‘me’ (I, me, myself, mine) and ‘others’ (them, they, others, their). In the second B-IAT, the target categories and focal points remained the same (‘doper’ and ‘non-doper’). However, the attributes included were ‘good’ (love, pleasant, happy, enjoyable) and ‘bad’ (failure, horrible, harmful, terrible). This B-IAT aimed to determine athletes’ prototype favourability of PES users and whether athletes would associate dopers as being good or bad. Response times below 300 and above 3000 milliseconds were capped in line with IAT convention (Greenwald et al., 1998). Mean latency scores and differences along with D-scores were calculated in line with the scoring algorithm recommendations made by Greenwald et al. (2003). D-scores < 0 indicate stronger associations between ‘me’ and ‘doper’/‘good’ and ‘doper’ while D-scores > 0 indicate stronger associations between ‘others’ and ‘doper’/‘bad’ and ‘doper’. Absolute scores between -0.15 and 0.15 are considered to represent no preference to either association, 0.16 to 0.35 represent a slight preference, 0.36 to 0.65 represent a moderate preference and values > 0.65 represent a strong preference for ‘me’ and ‘doper’ (Sriram & Greenwald, 2009).

Explicit measures

Based on previous research (e.g., Zimmermann & Sieverding, 2010), four self-report questions were used to assess participants’ prototype favourability and similarity (two for each). To assess favourability, respondents were asked to indicate their overall evaluation of an athlete who uses/does not use banned substances from 0 to 100 (0= highly unfavourable, 100= highly favourable). In comparison, similarity was assessed on a five-point scale where respondents were asked: “do the characteristics that describe an athlete who uses banned substances describe you (0= definitely not, 4= definitely yes)?”

Auxiliary measures used in this paper to establish the doping cluster groups and validity (i.e., explicit doping attitude, perceived willingness to dope of other athletes, PES subjective

Norms, PES use and social desirability) are described in detail in (Anonymous, 2014).

Data analysis

SPSS 22.0 for Windows was used to conduct data analysis. Dependent t-tests were used to assess the differences in latency times between the separate blocks within each B-IAT (‘me’ and ‘doper’/‘good’ and ‘doper’ versus ‘others’ and ‘doper’/‘bad’ and ‘doper’) while correlations between implicit and explicit prototype perceptions and social desirability hits were conducted using Spearman’s Rank. Similarly, differences in implicit and explicit prototype perceptions between cluster groups were analysed using Kruskal-Wallis χ^2 whereas pairwise comparisons were conducted using Mann Whitney U with Bonferroni correction due to violation of assumptions. However, due to the lack of a non-parametric equivalent, interaction effects were calculated using mixed model ANOVA with syntax modified for calculating single main effects. The level of significance was set at p = 0.05 while effect sizes reported represent eta squared and partial eta squared. Effect sizes for Kruskal-Wallis χ^2 were calculated by dividing the chi square value by n-1 (Lenhard & Lenhard, 2015). Two-step cluster analysis was conducted using log-likelihood as the distance measure and Akaike’s information criterion as the clustering criterion in order to determine the doping groups.

Results

Before presenting the implicit and explicit prototype perceptions findings, it is necessary to provide some insight into how the doping cluster groups were determined to enable comparisons to be made between PES users, contemplators and clean athletes.

Doping cluster groups

Differences in prototype perceptions were assessed according to four doping behaviour-related variables: 1) previous PES use, 2) current PES use, 3) intentions to use PES in the next 12 months and 4) willingness to use PES in the next 12 months.

Using these variables, athletes were clustered into three distinct groups: 1) clean athletes (self-reported having never used PES and displayed no intention or willingness to dope; n= 179), 2) dopers (self-reported PES use; n= 12) and 3) contemplators (self-reported having never used PES but displayed intentions or willingness to dope; n= 35). The cluster quality was very good (average silhouette= 0.9/1.0) but owing to the nature and prevalence of the target behaviour, cluster sizes differ greatly with the ratio of 14.92 between the smallest and largest cluster. Of the four indicators (when determining the cluster groups), PES use intention was the factor that differentiated between the groups the most (predictor importance index= 1.0/1.0); followed by past use (0.44/1.0), future willingness to use (0.23/1.0) and current use (0.22/1.0) of PES. In order to check the validity of the clusters, we compared the groups according to doping attitude, PES subjective norms and perceptions of other athletes' willingness to use PES using a condition resembling the so-called "Goldman dilemma" (Goldman, Bush, & Klatz, 1984) where athletes are asked if they would use a drug that guaranteed sporting success but would result in their death in 5 years' time.

In line with previous literature, explicitly expressed attitudes toward doping were most lenient in the group of athletes who admitted doping use ($M= 3.08 \pm 0.28$), compared to the clean athletes and doping contemplators ($M= 1.40 \pm 0.85$ and $M= 1.29 \pm 0.86$, respectively; $F(2,223)= 18.14$, $p< .001$, $\eta^2= .14$). Equally, the Goldman dilemma-inspired hypothetical scenarios showed a similar pattern. Under the assumption that the hypothetical performance enhancing drug is undetectable but guaranteed to win, dopers predicted that the vast majority of the athletes would use the drug ($M= 79.83 \pm 23.69\%$), followed by contemplators ($M= 42.46 \pm 27.37\%$) and then clean athletes ($M= 32.89 \pm 27.36\%$). The difference was statistically significant between ($F(2,221)= 17.62$, $p< .001$, $\eta^2 = 0.14$) users and the other two groups but there was no difference between contemplators and clean athletes. The most notable difference between the athlete groups was detected in PES subjective norms (perceptions of whether significant others would approve of them doping). Self-reported dopers scored much higher ($M= 6.58 \pm 4.83$) compared to clean athletes and contemplators ($M= 0.89 \pm 1.79$ and $M= 0.66 \pm 1.63$, respectively; $F(2,223)= 45.52$, $p< .001$, $\eta^2= 0.29$), whereas no difference was detected in subjective norms relating to nutritional supplements ($M= 13.29 \pm 4.39$, $M= 13.34 \pm 4.15$ and $M= 15.08 \pm 4.40$ for dopers, clean and contemplators, respectively; $F(2,223)= 0.96$, $p= .384$, $\eta^2= 0.01$). All pairwise differences between dopers and the other two groups were significant at $p< .001$ level and there was no statistically significant difference between clean athletes and contemplators in any of the outcome measures used for validation of the clusters. There was no age difference between the three groups ($F(2,223)= 0.321$, $p= .726$; $\eta^2=0.01$); or the proportion of individual vs. team sports ($\chi^2= 2.839$, $p=.235$). All together, these results offer reassurance that the clusters are indeed, qualitatively different in their approach to doping. Thus it is reasonable to assume that if perceptions of PES user prototypes are linked to doping-related behaviour (past, current or intended) differences, they would manifest and be detected in the related measures between the doping cluster groups.

Explicit measures

Prototype similarity

On average, athletes perceived themselves as more similar to a non-user ($M= 3.13 \pm 0.92$) than a PES user ($M= 0.56 \pm 0.88$). Differences emerged in athletes' perceptions of their similarity to PES users ($\chi^2= 21.73$, $p< .001$, $\eta^2= .10$) and non-users ($\chi^2= 10.72$, $p=.005$, $\eta^2= .05$) between the clean athletes, contemplators and dopers (Figure 1). Pairwise comparisons showed that dopers perceived PES users as significantly more similar to themselves than the clean athletes ($p< .001$) and the contemplators ($p< .001$). However, the contemplators' perceptions of PES user similarity did not significantly differ from the clean athletes ($p= 1.00$). Equally, dopers perceived non-users as significantly less similar to themselves than the clean athletes ($p= .003$) and the contemplators ($p= .017$) but there was no significant difference in non-user similarity between the clean athletes and the contemplators ($p= 1.00$).

-Insert figure 1 here-

Prototype favourability

Similarly, athletes perceived non-users ($M= 89.92 \pm 14.98$) as more favourable than PES users ($M= 13.18 \pm 21.38$). Group differences also emerged in perceived PES user favourability ($\chi^2= 14.97$, $p= .001$, $\eta^2= .07$) and non-user favourability ($\chi^2= 7.17$, $p= .028$, $\eta^2= .03$) between the clean athletes, contemplators and dopers (Figure 1). Post-hoc tests revealed that dopers perceived PES users as significantly more favourable than contemplators ($p= .002$) and clean athletes ($p< .001$). However, perceptions of PES user favourability did not significantly differ between clean athletes and contemplators ($p= 1.00$). In comparison, clean athletes perceived non-users as significantly more favourable than self-reported dopers ($p= .022$), yet contemplators did not significantly differ in their favourability perceptions of non-users from self-reported dopers ($p= .072$) or clean athletes ($p= 1.00$).

Implicit measures

Prototype similarity

Implicit association of PES user similarity was based on response latency measures where ‘doper’ was paired with ‘me’ and ‘others’. Figure 2 shows the average latency scores for ‘me and doper’ and ‘others and doper’. A significant difference was observed between the mean latency scores for ‘me and doper’ and ‘others and doper’ ($t(225)= -3.04$, 95% CI: -108.96 to -23.23; $p= .003$, $d= .215$). Mean latency scores were faster when ‘me and doper’ ($M= 960.09 \pm 287.95$ ms) were paired together compared to ‘others and doper’ ($M= 1035.18 \pm 324.64$ ms). This suggests that on average, athletes find it easier to pair words associated with ‘me’ and ‘doper’ together than they do words associated with ‘others’ and ‘doper’.

The mean D-score demonstrated that participants had no preference for either association ($D= -0.12$). Significant differences did emerge in the D-scores relating to the PES user similarity B-IAT between self-reported dopers, contemplators and clean athletes (χ^2= 6.05, p= .049, η^2= .03). However, post-hoc tests showed that the groups did not significantly differ. Nevertheless, although the mean D-scores for clean athletes (M= -0.08 ± 0.61) and dopers (M= 0.01 ± 0.51) were close to zero (indicating no preference), the contemplators mean D-score (M= -0.33 ± 0.52) suggests they have a slight preference for ‘me’ and ‘doper’ (Figure 3). These findings contradict expected findings where dopers were anticipated to demonstrate greater identification with a PES user compared to clean athletes.

-Insert figure 2 here-

Prototype favourability

Implicit association of attitudes towards PES users was based on response latency measures where ‘doper’ was paired with ‘good’ and ‘bad’. Figure 2 shows the average latency scores for ‘good and doper’ and ‘bad and doper’. A significant difference was observed between the mean latency scores for ‘good and doper’ and ‘bad and doper’ (t(225)= -5.36, 95% CI: -244.65 to -113.05; p< .001, d= .463). Mean latency scores were faster when ‘good and doper’ (M= 970.10 ± 343.21 ms) were paired together compared to ‘bad and doper’ (M= 1148.95 ± 423.70 ms). These findings suggest that on average, athletes found the association between ‘good’ and ‘doper’ easier than ‘bad’ and ‘doper’.

-Insert figure 3 here-

The patterns in the D-scores replicated the mean latency scores and indicated that participants portrayed a slight preference (D= -0.30) for ‘good’ and ‘doper’. Figure 3 shows the D-scores according to cluster groups. Dopers (D= -0.37) portrayed moderate preferences for ‘good’ and ‘doper’ while contemplators (D= -0.80) portrayed strong preferences for ‘good’ and ‘doper’. Like the B-IAT representing PES user similarity, there were significant differences in D-scores relating to athletes’ prototype favourability of PES users between dopers, contemplators and clean athletes (χ^2= 14.06, p= .001, η^2= .06). Post-hoc tests revealed that contemplators had a significantly greater preference for 'good' and 'doper' compared to clean athletes ($p= .001$). However, dopers did not significantly differ from clean athletes ($p= 1.00$) or contemplators ($p= .522$).

Comparing response times by test blocks and athlete groups (Figure 4) showed no interaction effect between reaction times in test blocks and athlete groups when 'doper' was combined with self-reference (me vs. others, $F(2,223)= 1.32$, $p= .270$, $\eta^2= 0.01$) but revealed a statistically significant interaction when the 'doper' target concept was paired with 'good'/'bad' affective attributes ($F(2,223)= 5.37$, $p= .005$, $\eta^2= 0.05$). Single main effect test showed no statistically significant differences between the groups in either blocks; but there was a significant difference between test block 1 and 2 in the clean ($p= .001$) and contemplator group ($p< .001$), with significantly slower response times in block 2 (doper + bad). The observed difference in the doper group was not significant ($p= .175$).

-Insert figure 4 here-

Explicit - implicit relations

A significant but weak relationship was found between PES user similarity and the self-identification with a PES user B-IAT D-score ($r= .142$, $p= .033$). In contrast, there was no relationship between non-user similarity and the B-IAT D-score ($r= -.042$, $p= .533$). Similarly, there were no significant relationships between the implicit and explicit prototype favourability measures, between PES user favourability and the attitudes towards a PES user B-IAT D-score ($r= -.049$, $p= .464$), or between non-user favourability and the B-IAT D-score ($r= .011$, $p= .867$).

In addition, the relationships between the explicit prototype perceptions measures and total number of hits scored on the social desirability scale were practically non-existing (PES user favourability $r= -.050$, $p= .459$; PES user similarity $r= -.068$, $p= .310$; non-user favourability $r= .145$, $p= .029$; non-user similarity $r= .018$, $p= .793$). Similarly, there were no relationships between the implicit prototype perceptions measures (D-scores) and total number of hits scored on the social desirability scale (PES user similarity B-IAT r= .014, p= .834; PES user favourability B-IAT r= .037, p= .585).

Overall results

In summary, explicit measures revealed that on average, athletes associated themselves with a non-user more than a PES user and perceived a non-user more favourably than a PES user. In addition, dopers perceived a PES user more favourably than contemplators or clean athletes. They also perceived themselves as more similar to a PES user than contemplators or clean athletes. In comparison, the implicit measures indicated that on average, athletes had no subconscious preference for ‘me’ and ‘doper’ or ‘others’ and ‘doper’, but contrary to expectations, did have a slight preference for ‘good’ and ‘doper’ over ‘bad’ and ‘doper’. Generally, these findings indicate that athletes did not associate PES users with themselves or others but they did associate PES users more with ‘good’ than ‘bad’. Behavioural choice/intention influenced the explicit endorsements of PES user/non-user prototypes and the affective implicit association, but not the self-referenced combinations.

Discussion

This paper aimed to examine athletes’ prototype perceptions of PES users and non-users using, for the first time, a combination of implicit and explicit measures. The contrasting outcomes between explicit and implicit measures of PES user prototypes, along with the lack of correlation between the explicit and implicit measures, were in line with previous research combining implicit and explicit measures of the same construct (Nosek, 2007). Yet an interesting pattern within the implicit measures emerged, which could be explained by the behavioural choices participants explicitly endorsed. We discuss this explanation first. The alternative, or complementary explanation lies with the implicit test construction and procedure. Following a detailed account by cluster groups based on the PES status, we highlight the key methodological issues that could have had an effect on participants' performance in the B-IATs independent of their PES-related behaviour or intention. It is important to note that we have chosen to focus more heavily on the B-IAT findings, not because we think that they are less valid or reliable than the self-report findings but because if we can understand them correctly, they offer an alternative insight into doping prevention.

The influence of behavioural choices on prototype perceptions

Out of the three cluster groups, the results of this study were most revealing about the contemplators. Unexpectedly, findings indicated that contemplators did not differ from the clean athletes in their self-reported perceptions of PES users and non-users. However, the B-IAT results revealed that contemplators had a slight preference for 'me' and 'doper' and a strong preference for 'good' and 'doper'. These findings are comparable to previous research involving doping deniers (athletes who self-reported as clean but hair analysis indicated PES use) where deniers scored similar to clean athletes on explicit measures regarding attitudes towards doping but performed the IAT easier than clean athletes when presented with doping words (Petróczi et al., 2010; Petróczi et al., 2011).

The B-IATs imply that contemplators identify themselves with a doper and perceive PES users more favourably than the explicit measures suggest. One explanation is that the contemplators were not honest in their self-reporting of PES use or prototype perceptions and instead tried to portray themselves as clean (although they did admit to having intentions or being willing to dope in the future). Alternatively, because contemplators had yet to engage in PES use themselves, they portrayed similar explicit prototype perceptions to the clean athletes. However, the contemplators may possess an unconscious bias towards dopers due to their future possible selves reflecting a doper, explaining their intention/willingness to dope in the future. As a result, the contemplators demonstrated greater preferences for 'me' and ‘doper’ and ‘good’ and ‘doper’ compared to the clean athletes and dopers (particularly on the attitude towards dopers B-IAT).

The explicit findings relating to dopers and clean athletes were in the expected direction. Self-reported dopers perceived PES users favourably and similar to themselves whereas the clean athletes perceived non-users as more favourable and similar to themselves. However, the implicit findings produced mixed results. Despite the D-score for the prototype favourability B-IAT being in the expected direction (greater association when ‘doper’ and ‘good’ were paired together), self-reported dopers demonstrated a weaker preference for ‘good’ and ‘doper’ than the contemplators. Equally, clean athletes demonstrated a slight preference for ‘good’ and ‘doper’ over ‘bad’ and ‘doper’, which was not expected. The PES user similarity B-IAT produced even more unexpected results. Like previous research (Petróczi et al., 2010; Petróczi et al., 2011), the D-scores did not differentiate between self-reported dopers and clean athletes with both groups demonstrating no preference for ‘me’ and ‘doper’ or ‘others’ and ‘doper’. In addition, the contemplators demonstrated only a slight preference for ‘me’ and ‘doper’. Nevertheless, mean latency response times for all three groups were quicker when ‘me’ and ‘doper’ were paired together. This may have resulted from the inclusion of the self in the category labels and self-related information tending to have a dominant position in the memory (Popa-Roch & Delmas, 2010), making it easier for the athletes to complete the B-IAT when ‘me’ and ‘doper’ were paired together.

Looking into the reaction times per test blocks, there was an observed selective effect of PES-related behaviour/intention on the average speed which participant groups were able to perform the B-IAT categorisation tasks. Behavioural position regarding doping exerted influence over the affective categorisation task in the clean and contemplator group, but not in the doping user group; nor in the self-referenced B-IAT tasks. Theoretically, performance on a self-referenced task can be affected by a combination of (1) whether the respondents have self-relevant active and endorsed schema (Cooley et al., 2015) - in this case, for PES users; and (2) how closely the stimuli used in the implicit test matches to the labels by which the construct is stored in people's minds (Petróczi, 2013). The observed pattern, showing that behavioural position had an effect on the B-IAT with affective valence (good vs. bad) but not on the self-referenced pairing, suggests that either participants did not have active, available self-schema for doping use or - which is more likely - users and contemplators had such schema but they did not conform to the more socially determined labelling. In both cases, the implicitly retrieved prototype identification was most likely created on demand rather than representing individuals' automatic preferences retrieved from their memory.

Test construct and procedure effects on the implicit measures

Due to the inconsistent implicit findings, it is important to consider whether athletes' underlying prototype perceptions influenced performance on the B-IATs or whether other factors could have played a role. One possibility is that the order of tasks could have influenced performance on the B-IATs. Although the two B-IATs were randomised, athletes were presented with 'good and doper' or 'me and doper' stimuli before they were presented with 'bad and doper' or 'others and doper'. Performance on the second combined task ('bad and doper' or 'others and doper') may have been compromised because the first task ('good and doper' or 'me and doper') preceded it. IAT effects can be biased towards the first association (Nosek et al., 2007) because participants may find it hard to switch focus from the first task to the second. One way of combatting this would have been to randomise the order in which the paired tasks were presented to participants so that some participants received 'others and doper'/'bad and doper' first rather than all participants being presented with 'me and doper'/'good and doper' first.

The IAT effects may have also occurred due to the focal categories adopted for each B-IAT. Previous research indicates that when 'good' or 'self' categories are used as focal categories, they produce better results than when ‘bad’ or ‘others’ are used (Sriram & Greenwald, 2009). Self-related information usually has a dominant position in the memory (Popa-Roch & Delmas, 2010), making it is easier to categorise stimuli that relate to the self than others. Equally, people tend to be more drawn towards positive valence rather than negative (Nosek, Bar-Anan, Sriram, & Greenwald, 2013; Sriram & Greenwald, 2009). Therefore, in the absence of stored evaluations to be retrieved, this may explain why reaction times were faster when ‘me and doper’ or ‘good and doper’ were paired together rather than ‘others and doper’ or ‘bad and doper’.

Another possible explanation is that the IAT effects were influenced by the strategies individuals adopted to complete the tasks. If an individual does not have relevant self-schemas in their memory to draw upon, the strategy used to complete the task is created on the spot (Cross & Markus, 1994). For example, IAT effects can occur as a result of differences in salience between categories rather than associations between categories (Rothermund & Wentura, 2004). When the target and attribute categories are associated with a figure/ground asymmetry (Rothermund & Wentura, 2004), the compatible block of the IAT will consist of two salient categories assigned to the same response key (Rothermund & Wentura, 2010). In this study, it may have been that because ‘doper’ rather than ‘non-doper’ was the focal category, it became more salient. Alternatively, there may have been an environmental effect due to media representations of athletes. When an athlete is caught doping, they are highlighted in the media as ‘bad’ whereas non-dopers are not made visible for being clean. Salience is closely linked to familiarity and valence of categories (Rothermund & Wentura, 2004) and with the majority of athletes representing non-users, the unfamiliar characteristics of a doper may have stood out, making the doper category more salient. Therefore, when combined with the ‘good’ or ‘me’ categories (rather than ‘bad’ or ‘others’), which appear to be more salient, compatible blocks are formed, making it easier to focus attention on the salient category. However, when the incompatible block occurs, one salient and one non-salient category will be assigned to the same key, meaning the recoding strategy cannot be utilised. Attention then has to be diverted away from the salient category (‘me’ or ‘good’) to the non-salient category (‘others’ or ‘bad’) thus, increasing response times. Overall the results highlight the importance of understanding how responses on the timed response-stimulus compatibility tasks are influenced by the Self; and as Cooley and colleagues (Cooley et al., 2015) suggested, evaluation of the Self influences the explicit endorsement of the implicit thoughts.

Limitations and future research

As with any research, this study is not without its limitations. First, the online nature of the study means that the survey was not conducted in a controlled environment and this could be a confounding factor. Having said this, research suggests the accuracy and reporting of sensitive information can be increased via online surveys so this may also serve to enhance the accuracy of the information obtained (Kreuter, Presser, & Tourangeau, 2008). Second, the sampling method and recruitment strategies utilised prevent us from identifying the response rate and may have resulted in some bias within the sample. Specifically, those athletes who chose to respond to the survey may be different from athletes who chose not to respond (Nulty, 2008). Nevertheless, participants represented a variety of competition levels and sports, suggesting that a suitable range of perceptions were captured. In addition, the sample represents the largest sample included in a doping-related IAT study, highlighting another strength of the research.

When planning future research, it is important for researchers to consider the implications of the methodologies they adopt. The limitations of self-report surveys are acknowledged (Petróczi & Haugen, 2012; Pitsch & Emrich, 2011) and it is important to emphasise here that we are not suggesting that self-report responses are more valid/reliable than B-IATs. However, less is known about B-IATs, therefore, we have chosen to focus our methodological discussion on this element of our study design. B-IATs are still in their infancy particularly within the doping domain and concerns exist around what they actually measure (Greenwald & Nosek, 2008; Payne & Gawronski, 2010; Petróczi, 2013). IAT effects may be influenced by the order in which the paired tasks are presented (Nosek et al., 2007). Equally, it is suggested that B-IATs could still be susceptible to recoding processes meaning IAT effects do not represent associations between categories but instead may be produced according to salience, familiarity or valence of categories (Rothermund & Wentura, 2010). As a result, caution needs to be taken when interpreting the findings from this study.

Without further investigation, it is impossible to be certain what the B-IATs used in this study actually measure. Failure to acknowledge this uncertainty is equivalent to failing to accept that self-report findings are based on what individuals are consciously able and willing to disclose). The difference in the response times between the two conditions is compelling evidence that the observed latency is due to the experimental manipulation of the tasks (pairings as shown in Figure 2). According to the conventional interpretation, the measured latency indicates subconscious or automatic preferences and interpreted as implicit prototype favourability and prototype identification. However, this interpretation is based on the fact that the implicit measures were modelled to mirror the explicit measures. In order to avoid naming fallacy, one must prove that the observed significant latency between the pairings are, in fact, influenced by favourability and self-identification with the doper prototype and not an artefact caused by some temporary cognitive processing during task performance. This is especially the case if it is reasonable to assume that the target concept may not be stored and readily available in memory thus created on demand and potentially influenced by some other cognitive mechanism (i.e., not favourability or identification). A similar phenomenon was observed in a study where drug naïve participants produced implicit test results indicative of cocaine use (Vargo & Petróczi, 2013; Vargo, Petróczi, Shah, & Naughton, 2014).

The observed pattern draws attention to some potentially essential aspects in future research. Most importantly, careful examination of the test performance and factors that might have determining influence on the test outcomes is warranted before results are interpreted as evidence or predisposition for a certain behaviour (Petróczi et al., 2015). A sensitive area like doping, where a potentially strong influence from the environment (i.e., prevailing social norms), the Self and evaluation of the Self and contradicting evaluation of the target concept (i.e., doping is effective thus good for performance but it is against the rule thus cheating) are likely present, offers an excellent testing field for researching the phenomenology of implicit social cognitive measures. Therefore, with continuous advancement of IAT methodology, consideration should be given to the increased incorporation of implicit measures within anti-doping research (Brand et al., 2014a).

Researchers embarking on using implicit measurements should approach the task with open minds and embrace the notion that explicit and implicit co-exist with their own validity. That is, implicitly retrieved thoughts are not more valid, or more true, than the explicitly expressed and reported thoughts or introspectively assessed feelings. Tempting as it may be to see them in such way, implicit doping attitudes are not "true reflections" devoid of socially desirable responding. Equally, explicitly reported perception evaluations cannot be treated as solid baseline measures against which outcomes from other assessments are validated. Rather, explicit and implicit measures are based on and influenced by the construction and retrieval process and therefore they represent different manifestations (Petróczi, 2013).

Before designing IATs for future investigations, researchers are encouraged to take steps to minimise any extraneous influences that could impact on the meaning of the IAT effect. First, the order in which paired categories are presented to participants should be randomised. This might minimise the IAT effect being biased towards the first pairing presented. Second, the impact of salience, familiarity and valence of categories on the IAT effect should be acknowledged. Finally, the order in which direct and indirect measures are presented should be counterbalanced to prevent the possibility of one measure affecting performance on the other (Nosek et al., 2007).

Conclusion

Inconsistencies exist in athletes' implicit and explicit doping-related perceptions despite the measures being designed to tap into the same constructs. Doping contemplators may have an unconscious bias towards doping which is not captured via self-report. Alternatively, performance on the B-IATs may not have resulted from athletes' underlying prototype perceptions. At present, it is still debated what the IAT actually measures. However, in an area which is dominated by research derived from self-report measures, the use of IATs in combination with self-report measures is undoubtedly valuable for future doping research whilst contribute to a better understanding of the underlying mechanisms of the implicit measurements. Further research is warranted to determine whether implicit measures can help identify vulnerable athletes who may be contemplating using PES in the future; and under what circumstances can it be used for such purpose. The methodological lessons learned in this study will be informative to other researchers in the field. Researchers wishing to utilise IATs need to ensure that their IAT is carefully designed to reduce possible extraneous influences that could affect the interpretation of the IAT effect. Future research into the functionality of the implicit tests and factors that influence the disparity between explicit and implicit endorsements of PES user prototypes are warranted to determine how they can contribute to understanding doping behaviour.

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Figures

Figure 1: (A) Mean scores for prototype favourability (0 = highly unfavourable, 100 = highly favourable); (B) mean scores for prototype similarity (0 = definitely no, 4 = definitely yes)

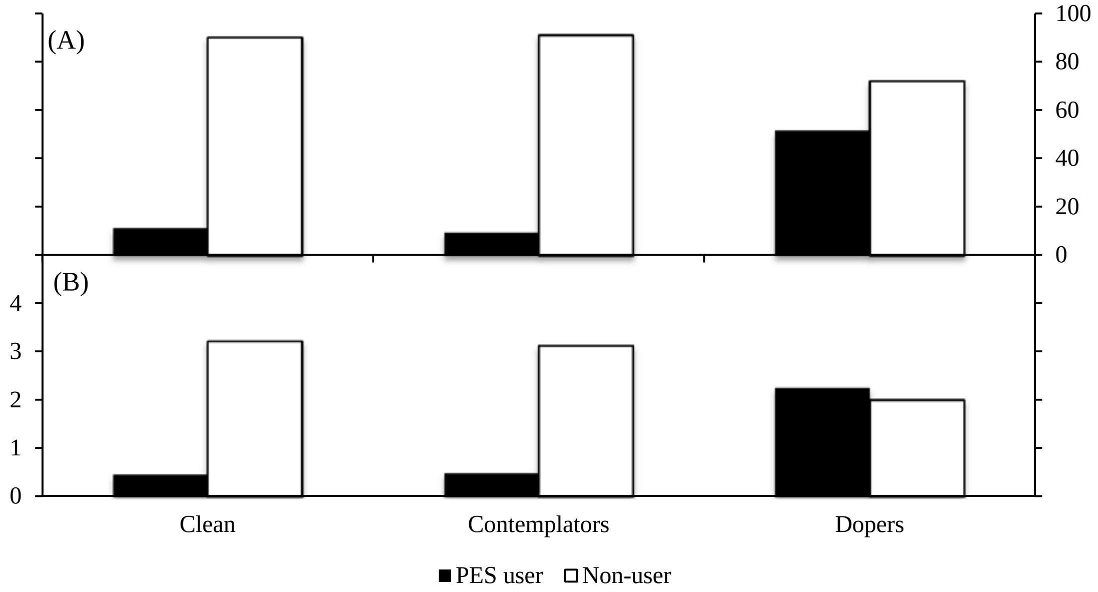

Figure 2: Mean latency scores and standard deviation (in milliseconds) for each B-IAT

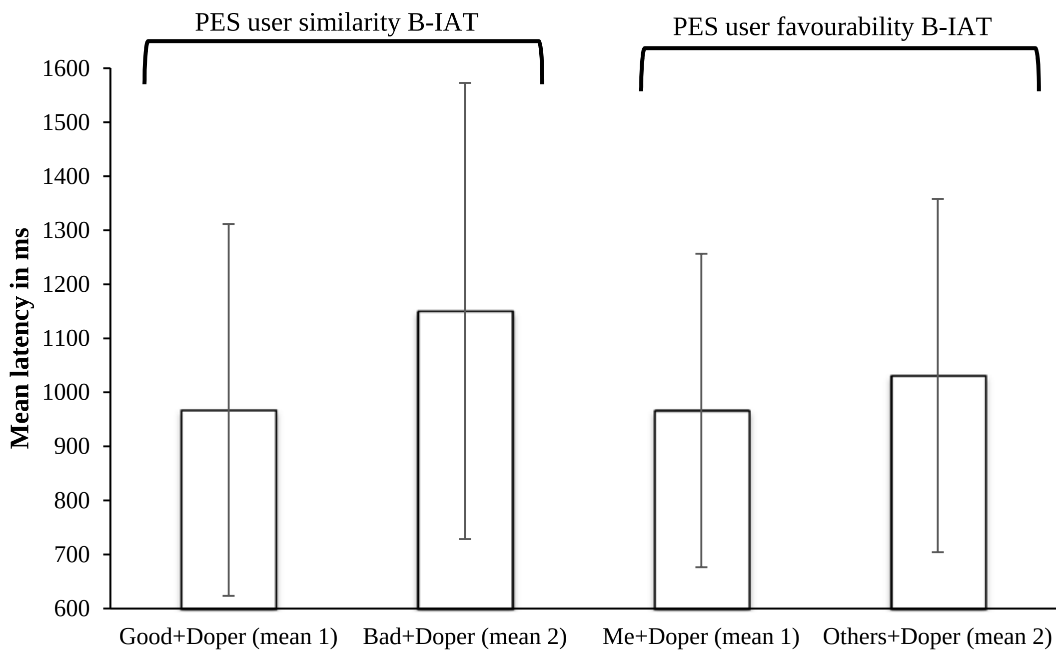

Figure 3: Mean D-Scores for each B-IAT per cluster group

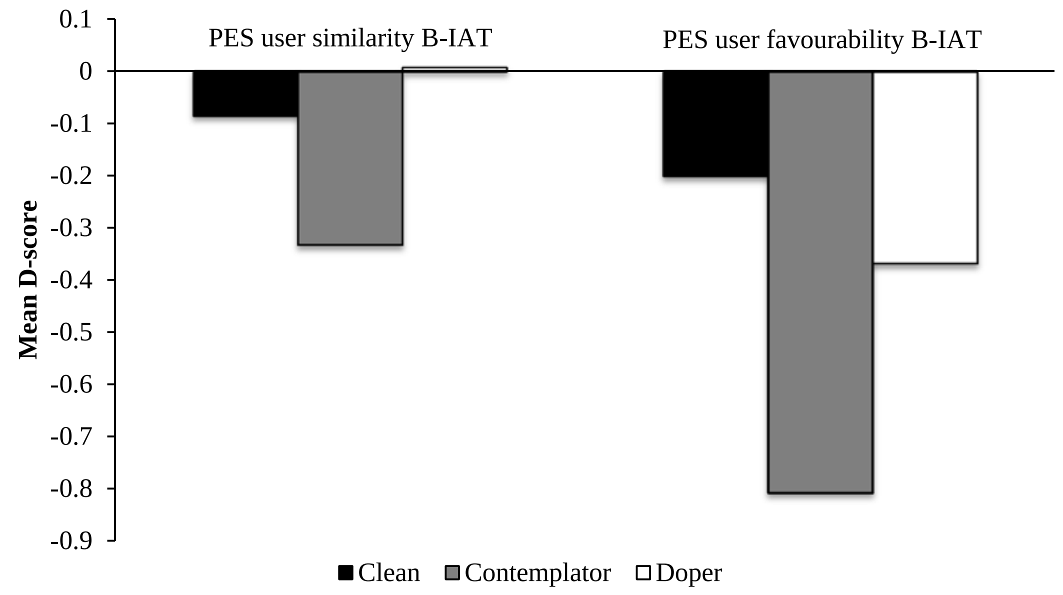

Figure 4: Mean latency scores and standard deviation (in milliseconds) for each B-IAT per cluster group