White Rose Research Online

eprints@whiterose.ac.uk
https://eprints.whiterose.ac.uk
Universities of Leeds, Sheffield and York

Deposited via The University of Sheffield.

White Rose Research Online URL for this paper:
https://eprints.whiterose.ac.uk/id/eprint/183856/

Version: Accepted Version

Article:
Barkoukis, V., Harris, P., Rowe, R. et al. (2022) Self-affirmation and image/performance enhancing drug use in recreational exercise. Research Quarterly for Exercise and Sport, 94 (3). pp. 698-706. ISSN: 0270-1367

https://doi.org/10.1080/02701367.2022.2046253

This is an Accepted Manuscript of an article published by Taylor & Francis in Research Quarterly for Exercise and Sport on 22 Apr 2022, available online: http://www.tandfonline.com/10.1080/02701367.2022.2046253.

Reuse
Items deposited in White Rose Research Online are protected by copyright, with all rights reserved unless indicated otherwise. They may be downloaded and/or printed for private study, or other acts as permitted by national copyright laws. The publisher or other rights holders may allow further reproduction and re-use of the full text version. This is indicated by the licence information on the White Rose Research Online record for the item.

Takedown
If you consider content in White Rose Research Online to be in breach of UK law, please notify us by emailing eprints@whiterose.ac.uk including the URL of the record and the reason for the withdrawal request.

UNIVERSITY OF LEEDS
University of Sheffield
UNIVERSITY of York

Self-affirmation and Image/Performance Enhancing Drug Use in Recreational Exercise

Vassilis Barkoukis
Aristotle University of Thessaloniki

Peter R. Harris
University of Sussex

Richard Rowe
University of Sheffield

Lambros Lazuras
Sheffield Hallam University

Address for correspondence:
Vassilis Barkoukis
Department of Physical Education and Sport Science
Aristotle University of Thessaloniki
54124,Thessaloniki
Greece
e-mail: bark@phed.auth.gr

Abstract

The use of image and performance enhancement drugs (IPEDs) in recreational sport represents an emerging public health and societal problem. The present study investigated whether self-affirmation changed exercisers' intentions to use IPEDs, via the effects of mental construal and message acceptance. Sixty-eight exercisers who self-reported IPEDs use participated in the study and were randomly assigned to either a self-affirmation or a control group. All participants read a health-related message about the consequences of IPEDs and subsequently completed a survey measuring message acceptance, mental construal, doping intentions and IPEDs-related social cognitive variables. There were no significant differences between the self-affirmed and the control groups. Hierarchical linear regression analysis further showed that message acceptance, subjective norms, and situational temptation were significantly associated with intentions to use IPEDs. Our findings raise the possibility that for recreational exercisers IPED's use is seen mostly as a health-related matter than a socio-moral transgression.

Keywords: IPEDs; exercise; recreational sport; self-affirmation; mental construal; message acceptance.

Self-affirmation and Image/Performance Enhancing Drug Use in Recreational Exercise

The use of image and performance enhancement drugs (IPEDs) in recreational sport and exercise settings represents an emerging societal and public health challenge. According to the 2020 UK Anti-Doping report on IPEDs (UKAD, 2020), over a million people in the UK currently use IPEDs, such as anabolic steroids, with young people being more likely to use IPEDs. The use of IPEDs is associated with a wide range of physical and mental health problems (Birzniece, 2015; Nieschlag & Vorona, 2015), with younger users being at greater risk for such problems. Research on IPEDs revealed that users have little awareness of the health risks involved in IPEDs use and that some users may self-experiment with IPEDs to explore their side-effects (Lazuras et al., 2017a; Morente-Sánchez, & Zabala, 2013). At least 20% of gym users and amateur athletes self-reported doping use (Lazuras et al., 2017a). IPEDs use can be initiated as early as 12 years of age (Nicholls et al., 2017). Although past research provides evidence about the psychological constructs that are associated with IPEDs use in both recreational and competitive/elite sport (see Nicholls et al., 2017; Ntoumanis et al., 2014), there is insufficient research to support an evidence-based approach to facilitating behaviour change in this context.

Self-affirmation theory (Steele, 1988) presents a relevant framework for enabling behaviour change, especially in the context of health-related behaviours, including substance use (Epton & Harris, 2008; Harris & Epton, 2010). The theory posits that people are vigilant to information that threatens their sense of self-integrity (i.e, perception of the self as morally and adaptively adequate; Cohen & Sherman, 2014), which may promote defensive processing of risk messages (e.g., smokers may be defensive against messages depicting the health consequences of smoking). Such

defensiveness will reduce the effectiveness of risk communication campaigns and related preventive efforts (Epton et al., 2015; Harris et al., 2007). However, if people are allowed to self-affirm (e.g., by reflecting on their most important values or key strengths), including in a domain unrelated to that targeted by the risk communication, then they may display greater acceptance of the risk message, greater motivation to change their behaviour, and subsequently change their behaviour (Epton et al., 2015; Sweeney & Moyer, 2015). For instance, evidence has shown that self-affirmation is effective in reducing the negative effects of stereotype threat on academic performance (Cohen & Sherman, 2014), improving prospective academic attainment and progression in ethnic minority groups (Goyer et al., 2017), and in enabling health-related behaviour change across different behavioural domains (Epton et al., 2015). Studies have also shown that self-affirmation improves information processing and problem solving capacity under cognitively taxing conditions (Creswell et al., 2007, 2013; Harris et al., 2017), and is associated with increased neural activity in the brain's reward areas, such as the ventral striatum (Dutcher et al., 2016, 2020), and in the ventromedial prefrontal cortex (vMPFC), which is associated with processing self-referential information and positively evaluated self-representations (Falk et al., 2015).

In the context of IPEDs use, however, only two studies have examined the effects of self-affirmation on behaviour change processes and related psychological constructs, after exposing participants to messages about the health consequences of IPEDs. Specifically, Barkoukis, Lazuras, and Harris (2015a) demonstrated that self-affirmed athletes who self-reported IPEDs use in the past displayed lower scores in situational temptation and in doping intentions, as compared to their non-affirmed counterparts. In another study with exercisers who used nutritional supplements, but

did not self-report IPEDs use, self-affirmation changed moral and descriptive norms around IPEDs use, and anticipated regret from using IPEDs, but did not affect intentions to use IPEDs (Barkoukis et al., 2020). Both studies examined the direct effect of self-affirmation on social cognitive variables associated with IPEDs use, but they did not investigate whether the effect of self-affirmation was mediated by other variables, such as message acceptance. Research has shown that one route through which self-affirmation influences intentions and behaviours is by increasing acceptance of the risk message (Armitage et al., 2008; Harris & Epton, 2009; Harris & Napper, 2005; Sherman, & Cohen, 2002; Sherman et al., 2000).

In the case of doping, increasing acceptance of health risk messages is highly relevant. According to the 2021 World Anti-doping Code, the health of the athlete represents one of the cornerstones of doping prevention and control efforts. Also, athletes convicted with doping use face sport participation bans and, sometimes followed by severe social and career consequences (Kirby et al., 2011). This has resulted in a stigmatization of doping use that can make athletes and coaches defensive about receiving anti-doping messages (Allen et al., 2017; Backhouse et al., 2016; Barkoukis et al., 2019). Therefore, it is important to investigate whether self-affirmation increases the acceptance of doping-related message, and whether, in turn, message acceptance facilitates the decision to compete clean.

In addition, mental construal may also help to explain the effects of self-affirmation on processes related to behaviour change, including changes in attitudes, self-efficacy, beliefs, and intentions. According to Construal Level Theory (CLT; Liberman & Trope, 1998) mental construal reflects a psychological process through which people mentally represent and interpret their environment, either in concrete or abstract terms. Higher-level construals are abstract, and reflect the core, abstract, and

commonly shared features of an event, object, or situation, whereas lower-lever construals reflect more short distant, concrete, specific, and unique features of events, situations, or objects (Trope & Liberman, 2003, 2010). In short, higher-level construal thinking implies a "big picture" and more distant perspective, whereas lower level, subordinate construal implies a more narrowly focused, short-distance perspective. Given that self-affirmation enhances cognitive processing and executive functions, such as response inhibition and working memory capacity under pressure (e.g., Creswell et al., 2013), it is possible that self-affirmation activates higher-level, superordinate (vs. lower-level, subordinate) construals. Indeed, Wakslak and Trope (2009) showed that self-affirmed participants displayed a higher level construal of the self (Study 1) and engaged in more abstract thinking and interpretation of different actions unrelated to the self (Studies 2 and 3). Similarly, Schmeichel and Vohs (2009; Studies 3 and 4) demonstrated that self-affirmation led to higher mental construal, which was in turn associated with greater self-regulation.

The study of mental construal is relevant to IPEDs use research for the following reasons. IPEDs users tend to display more favourable beliefs towards doping use in the form of more supportive/conducive social norms (Barkoukis et al., 2015b; Dunn et al., 2012; Lentillon-Kaestner & Carstairs, 2010) and more favourable attitudes and outcome expectancies (Barkoukis et al., 2013; Hildebrandt et al., 2012). A possible reason is that perceiving IPEDs use as more normative, popular, and beneficial reflects a self-serving mechanism that can protect and preserve self-integrity and moral adequacy while engaging in a risky behaviour (i.e., IPEDs use). It may also facilitate IPEDs use by reducing any negative psychological aftereffects (e.g., pre- and post-decisional regret). Indeed, low levels of anticipated regret have

been associated with IPEDs use in both elite athletes and recreational users, in both adolescent and adult populations (e.g., Barkoukis et al., 2020; Lazuras et al., 2017b).

In this respect, it could be argued that IPEDs users engage in motivated reasoning (i.e., are motivated to perceive, mentally represent, and report IPEDs use positively), as a way of reducing cognitive and emotional discomfort that may precede and/or potentially result from their behaviour (Epley & Gilovich, 2016; Kunda, 1990). Different construal levels can have differential outcomes in the processing of self-referential information and may lead to either self-serving tendencies, or to preparation for adaptive change. Supporting this argument, Belding et al. (2015) demonstrated that the activation of lower-level, concrete construals through priming led to more self-protection motivation and dismissal of negative information about the self, whereas activating higher-level, abstract construals led to a greater acceptance of negative self-referential information. It is possible, therefore, that the self-affirmation effects on IPEDs-related decision-making variables (e.g., anticipated regret, social and moral norms, intentions) that were observed elsewhere (i.e., Barkoukis et al., 2015a; Barkoukis et al., 2020) resulted from the activation of higher-order mental construals that facilitate adaptive processing of health-risk information and motivate adaptive change (i.e., consideration of stopping using or avoiding IPEDs use). No study has empirically examined this assumption as yet.

The Present Study

The present study set out to investigate whether self-affirmation changes social cognitive beliefs and intentions to use IPEDs, and whether mental construal and message acceptance mediate this effect. The social cognitive variables that were focal in the present study derived from previous research and theory in the context of doping use in sport and included attitudes, social norms, self-efficacy, situational

temptation, and anticipated regret towards IPEDs use. The integrated model of doping use (Barkoukis et al., 2013; Lazuras et al., 2015) posits that those beliefs can shape intentions to use IPEDs, and accordingly lead to actual doping behaviour. Several studies have provided empirical support for this model by showing that doping intentions and self-reported doping use are associated with stronger doping attitudes, more supportive social norms towards doping, and reduced efficacy to resist doping, and greater temptation to succumb to social pressures to dope (Lazuras et al., 2010; Lazuras et al., 2017). Research evidence also supports a significant association between self-reported doping intentions and use of doping substances (Lucidi et al., 2008; Ntoumanis et al., 2014).

Furthermore, previous research on IPEDs use and self-affirmation (Barkoukis et al., 2015a; Barkoukis et al., 2020) has investigated the effect of self-affirmation on self-reporting doping use intentions in competitive athletes and nutritional supplement use intentions in recreational athletes. However, to date there is no evidence concerning the effect of self-affirmation on self-reported IPEDs use and intentions in recreational exercisers. Also, past research on self-affirmation and IPEDs behaviour did not incorporate message acceptance and mental construal as potential explanatory variables for self-affirmation effects on intentions and other decision-making variables. Therefore, in the present study it was hypothesized that self-affirmed participants would report significantly less favourable beliefs (i.e., attitudes, social norms, anticipated regret, situational temptation, and self-efficacy) and intentions to use IPEDs, relative to non-affirmed ones. Furthermore, based on past research on self-affirmation and message acceptance (e.g., Harris & Epton, 2009; Harris & Napper, 2005) and mental construal (Sodenberg et al., 2015; Trope & Liberman, 2010; Trope et al., 2007) it was hypothesised that the effects of self-affirmation on intentions to

use IPEDs would be mediated by message acceptance, mental construal, and other doping-related social cognitions.

Method

Participants

Snowball sampling (chain referral) was used to identify recreational exercisers in Greece who admitted past or current IPEDs use. Five fitness instructors were initially asked to assist data collection. All fitness instructors agreed to approach exercisers who they knew from private discussions they were doping and give them the survey. Eligibility criteria included systematic participation in training for the past five years and use of doping substances. Overall, 68 exercisers (53 males) who self-reported IPEDs use participated in the study. An a priori power analysis to define the appropriate sample size of the study was conducted with GPower3.10. Taking into consideration previous research on self affirmation on sport and doping (Barkoukis et al., 2015a, 2020) the effect size was set at f = 0.40 using one-way ANOVA with fixed effects, the probability level at a = 0.05, and the power at 0.85. A sample size of 60 participants (30 in each group) emerged as a sufficient sample providing adequate power.

Measures

Mental construal: The psychological distance measure developed by Allard and Griffin (2017) was used to measure the extent to which individuals' mindsets are characterized by psychologically distant or close perspectives. The measure consists of 12 item-pairs. Each pair contains one psychologically close and one psychologically distant item (example pairs are 'Near – Far', 'Friend – Enemy', 'Self – Others' and 'Specific – General'). In each pair, participants select 'the word that

best fits my frame of mind right now'. The psychologically close items were scored 0 and the psychologically distant items scored 1. A composite score was produced with higher scores indicating a more psychologically distant mindset at the time of completing this measure.

Message acceptance: Acceptance of the health message was measured with eight items based on those used in past research by Harris and Napper (2005). These items measured participants' understanding of the existence of negative side effects of doping use (e.g., 'There is an association between doping use and negative health side effects') and their severity (e.g., How threatening did you find the message about the negative health side effects of doping?). Responses were given on a 7-point bi-polar scale ranging from 1 (*negative pole*) to 7 (*positive pole*). A composite score was produced with higher scores indicating greater message acceptance.

The social cognitive measures (i.e., attitudes, norms, self-efficacy, situational temptation, anticipated regret and intentions) were derived from previous studies with Greek athletes (Barkoukis et al., 2015a, 2015b, 2020; Lazuras et al., 2015).

Attitudes: The stem proposition 'The use of prohibited substances is…' followed by four semantic differential evaluative adjectives (*bad/good; useless/useful; right/wrong; detrimental/beneficial*) was used to measure attitudes towards doping use. Responses were given on a seven-point bi-polar scale ranging from 1 (*negative*) to 7 (*positive*).

Subjective norms: A composite score of three items (e.g., 'most people who are important to me would want me to use prohibited substances to enhance my performance during this season') was used to assess participants' subjective norms. Responses were given on a seven-point scale (1 = *strongly disagree*, 7 = *strongly*

agree) with higher scores showing more positive normative beliefs towards doping use.

*Descriptive norms***.** Two open-ended questions estimated participants' descriptive norms. These questions assessed beliefs about the perceived prevalence of doping use in elite and fellow athletes (e.g., 'Out of 100%, how many athletes at the same competitive level to you in Greece do you think engage in doping to enhance their performance?').

Self-efficacy. Self-efficacy was measured with three items (e.g., 'I feel in complete control over whether I will use prohibited substances to enhance my performance during this season'), with responses given on a seven-point scale (1 = *strongly disagree*, 7 = *strongly agree*) and higher scores indicating higher efficacy.

Situational temptation. Situational temptation was measured with five items following the stem proposition ('How much would you be tempted to use prohibited doping substances to enhance your performance this season' (e.g., when your coach suggests so). Responses were given on a five-point Likert scale (1 = *not at all tempted*, 5 = *very much tempted*) with higher scores indicating more temptation.

Doping use intentions. A composite score of three items (e.g., 'I intend to use prohibited substances to enhance my performance during this season') was used to measure participants' intentions to use doping substances. Participants responded on a seven-point scale (1 = *definitely not*, 7 = *definitely yes*) with higher scores reflecting higher doping use intentions.

Anticipated regret. Anticipated regret was assessed with four items following the stem proposition ("If I use prohibited substances to enhance my performance during this season, I will…"). An example item is 'be disappointed with myself'. Responses were

recorded on a 7-point Likert scale (1 = *definitely not*, 7 = *definitely yes*) with higher scores reflecting higher regret.

Affirmation manipulation. The aim of the manipulation was to induce self-affirmation in participants in the intervention group. Participants randomized to the experimental group read the self-affirmation manipulation procedure developed by Reed and Aspinwall (1998). The manipulation consists of 10 questions designed to encourage participants to recall and give examples on past acts of other-directed kindness, such as "Have you ever forgiven another person when they have hurt you? and "Have you ever been considerate of another person's feelings?" Participants responded using a Yes–No format. Those who responded positively were asked to elaborate further on their experiences by providing more details. Writing about such acts of kindness has been shown to be more effective in increasing message acceptance when compared to control tasks, such as writing about irrelevant issues or not writing at all (e.g., Crocker et al., 2008). Participants randomized to the control condition were given a similar self-reported task and asked to state their opinions on a range of unrelated issues, such as "I think that chocolate is the best flavor ice cream". Participants responded using a Yes – No format and those responding Yes were asked to elaborate more by providing further details.

Health message. Following the self-affirmation manipulation participants in both conditions read a health message about IPEDs use. This message was adopted from Barkoukis et al. (2015a). It included a general statement about the side effects of doping use and the relationship between doping use and premature mortality. Subsequently the specific side effects on psychological variables, different bodily systems (e.g., cardiovascular, reproductive, endocrine systems, etc), and the overall longer term health side effects were presented. The description of side effects was

based on side-effects identified in the medical literature and was accompanied by relevant research citations to strengthen the message by indicating the scientific basis. The message was approx. 600 words.

Procedure

The fitness instructors were asked to administer a survey on exercisers using doping substances. The surveys were in envelopes and the fitness instructors were blind to the manipulation; they were assigned numbers and were randomly assigned to control and intervention groups. The fitness instructors were asked to give the envelopes to the exercisers and continuously recruit exercisers until they were informed by the researchers that they collectively reached the critical number of 60 participants with complete data. Data collection lasted approximately one year. Exercisers provided consent for participation. The first page of the survey included the informed consent provided by the Research Ethics Committee of the University of Sheffield giving participants information regarding the study's aim, asking them whether they had read and understood the information, informing them that their participation was voluntary and they could withdraw from the study at any time they wished, and that their responses were confidential and would be treated solely for research purposes. In order to proceed with the questionnaire the participants had to sign the consent form. Only gender was recorded as a demographic variable to further ensure the anonymity. The variables were presented to the participants in the following order: self affirmation/control manipulation, mental construal, health message, message acceptance, social cognitive variables.

Data analysis

SPSS version 25 (IBM Corporation, Armonk, NY) was used to analyse the data.

Descriptive statistics (means and standard deviations) were calculated for all variables in the experimental and control groups. The correlations among the variables in the full sample were calculated using Pearson's *r*. To test for differences between the self-affirmed and non self-affirmed groups a Students' T-test was performed. The effects of self-affirmation on intentions to use IPEDs and the potential mediating role of message acceptance, mental construal, and other doping-related social cognitions was tested via a hierarchical regression analysis. The analysis included four steps; self-affirmation manipulation at Step 1, mental construal at Step 2, message acceptance at Step 3, and social cognitions at Step 4. Statistical significance was set at $p < .05$. Missing values were very few, representing 0.01% of the entire dataset across all measures. Therefore, no further action was taken with respect to replacing missing values using imputation techniques or performing analyses regarding the randomness of missing data.

Results

Preliminary analyses

Means and standard deviations of the study's variables are presented in Table 1. The analysis of correlation revealed moderate correlations among the study variables (Table 2). The estimation of variance inflation factor (VIF < 3.04, tolerance < 1.0) supported that multicolinearity did not affect the analyses (Akinwande et al., 2015). Cronbach alpha exceeded .70 for all subscales (see Table 2) with the exception of mental construal where alpha was lower. Skewness and kurtosis statistics were at acceptable levels for all variables (< 3).

Effect of self-affirmation on IPEDs use intentions and related social cognitive variables

The means and standard deviations of the study variables are presented in Table 1. Independent samples t-tests were used to test for differences between the two groups in the studied variables. Levene's test of equality of variances supported the homogeneity of variances in almost all variables, but message acceptance and subjective norms; for these two variables we report the findings based on the unequal variance assumption. The results indicated no significant differences between the experimental and control groups in any of the tested variables (mental construal, message acceptance, attitudes, subjective and descriptive norms, self-efficacy, situational temptation, anticipated regret or intentions), albeit mental construal (t (65) = -1.91, p = .059) was marginally non-significant. In both cases, participants in the intervention group had higher scores as compared to those in the control condition (Table 1).

The correlation analysis indicated moderate-to-high effect sizes in the observed associations among most of the study variables (Table 2), with the exception of mental construal that was not correlated with the study variables. Multiple linear regression analysis was used to assess the predictive effects of self-affirmation manipulation, mental construal, message acceptance and social cognitions (attitudes towards doping, subjective and descriptive norms, self-efficacy, situational temptation, and anticipated regret) on doping intentions. The analysis was completed in four steps in order to assess the unique effects of the self-affirmation manipulation (coded as a dummy 'intervention' variable at Step 1, 0 = control group, 1 = experimental group) in Step 1, mental construal (Step 2), message acceptance (Step 3), and social cognitions (Step 4). A significant overall model emerged (F (9, 55) =

10.71, $p < .001$) predicting 57.7% (AdjR^2) of the variance in doping intentions. At Step 1, the effect of the manipulation was not statistically significant. At Step 2, the addition of mental construal did not significantly improve the predicted variance ($R^2change = .10$, $p = .422$). The addition of message acceptance at Step 3 improved the overall predicted variance by 21.7% with message acceptance emerging as a significant predictor of doping intentions. The addition of social cognitive variables at Step 4 significantly improved the overall predicted variance ($R^2change = .39$). At this step, the effect of message acceptance became non-significant. Significant predictors of doping intentions at this step included subjective norms, and situational temptation. The findings from the regression analysis are summarized in Table 3. Although we hypothesized that the effect of self-affirmation manipulation on intentions to use IPEDs would be indirect, via the effects of message acceptance, mental construal, and IPED-related social cognitive variables, this hypothesis could not be examined because self-affirmation did not have a significant effect on intentions.

Discussion

The present study examined the effects of self-affirmation on intentions to use IPEDs and related social cognitive beliefs, such as attitudes, social norms, anticipated regret, and self-efficacy. Intentions represent a proximal antecedent of volitional behaviour, such as IPEDs use, and the social cognitive beliefs that were focal in the present study have been associated with doping use in previous research (Ajzen, 2020; Barkoukis et al., 2013; Lazuras et al., 2017; Ntoumanis et al., 2014). To better understand doping decision-making processes it is important to understand the correlates of doping behaviour and intentions, and how these can be altered by psychological interventions, such as self-affirmation. Previous research has shown that self-affirmation interventions can lead to significant changes in message

389 acceptance, intentions, and actual behaviour change (Epton et al., 2015), and self-
390 affirmation induced differences in doping-related social cognitions have also been
391 reported (Barkoukis et al., 2015; Barkoukis et al., 2020).
392 However, contrary to the hypotheses, the self-affirmation manipulation in the
393 present study did not have a significant effect on intentions to use IPEDs and related
394 social cognitive beliefs in exercisers with IPEDs use history. Mental construal was
395 also unrelated to intentions to use IPEDs. Furthermore, in examining the multivariate
396 associations between the self-affirmation manipulation, mental construal and message
397 acceptance, and the social cognitive beliefs related to IPEDs use, only subjective
398 norms, and situational temptation were significantly associated with intentions to use
399 IPEDs, over and above the effects of other correlates.
400 The present findings are similar to previous research showing no effect of self-
401 affirmation manipulation on intentions to use nutritional supplements among
402 exercisers (Barkoukis et al., 2020). However, they are inconsistent with evidence
403 suggesting a significant effect on intentions towards IPEDs in athletes who had
404 admitted doping use (Barkoukis et al., 2015a). Also, the present findings contrast with
405 previous evidence showing significant effect of self-affirmation in improving message
406 acceptance and enabling health-related behaviour change (Cohen & Sherman, 2014;
407 Cornil, & Chandon, 2013; Epton et al., 2015; Sweeney & Moyer, 2015).
408 A possible explanation for the present study findings may lie in the conditions
409 under which the self-affirmation manipulation was implemented. For self-affirmation
410 to be effective, Ferrer and Cohen (2019) have argued three conditions should be met,
411 namely presence of a psychological threat, opportunities to change behaviour and
412 timeliness of the self-affirmation with the threat and opportunities. Our study did not
413 meet all these conditions. In particular, it may be that the intervention was not always

414 or even typically timely with the threat. That is, we asked IPEDs-user exercisers to
415 complete a survey about their IPEDs use beliefs, but survey completion and exposure
416 to the self-affirmation manipulation and the IPEDs-related health message were not
417 timely with their use of IPEDs: some exercisers might have completed the
418 manipulation while on an IPEDs cycle, whereas others completed the study before or
419 after their IPEDS use cycle. Thus, the timeliness of the manipulation with respect to
420 the threat (i.e., doping use) may have been low. Accordingly, we did not provide
421 relevant opportunities for behaviour change, which is another condition for self-
422 affirmation success (Ferrer & Cohen, 2019), mainly because the focus of the study
423 was to determine short-term effects of self-affirmation on behavioural intentions and
424 associated social cognitive beliefs, rather than to test for changes in IPEDs use.
425 In line with the above, another explanation for the null effects of self-
426 affirmation on the study's variables might lie in the sample of the study. In this study,
427 recreational athletes self-reporting IPEDs use participated whereas competitive
428 athletes confessing doping took part in the Barkoukis et al. (2015a) study. Past
429 evidence suggested the reasons for using IPEDs in exercise settings (e.g., appearance
430 enhancement, self-experimentation; Lazuras et al., 2017a) may differ from those in
431 competitive sport (e.g., performance enhancement, career transition; Overbye et al.,
432 2013). Also, in recreational sports doping is not as effectively regulated as it is in
433 competitive sports and may not be considered as an unethical behaviour (i.e., no
434 unfair advantage in competition is gained). Thus, recreational athletes may not feel
435 sufficiently ethically threatened by the IPEDs use to be influenced by the self-
436 affirmation manipulation.
437 Likewise, mental construal was not influenced by the self-affirmation
438 manipulation and was not associated with social cognition about IPEDs use. The

effects of doping use on health are evident in the long term and it is possible that the athletes had developed an optimistically-biased belief about the effect of doping use on their health. In this case, a concrete construal focusing on the near future that was employed in the present study asking participants to declare their intentions to use doping substances in the upcoming season may not be appropriate to describe the decision-making process. A long-term perspective of health and developing a higher-level construal might be more effective in predicting cognition and behaviour. This is consistent with the findings of Eyal et al. (2004, 2009) and Sagristano et al. (2002) showing that higher-level construals may more accurately predict intentions for behaviours in the distant future. Nevertheless, more evidence is needed to identify the role of mental construal in understanding doping behaviours and its potential to assist in anti-doping education.

Furthermore, intentions to use IPEDs in the present study were predicted by normative factors, such as the perceived social approval of IPEDs use by referent others and the temptation to succumb to normative pressures to use IPEDs. This highlights the role of social norms and normative pressures in IPEDs use in recreational exercise settings. Past research has also shown that social norms may determine the ways exercisers draw information about substance and usage safety (e.g., reusing needles for injectable steroids; Kimergård, 2015; Santos & Coomber, 2017). Taking these factors into consideration, our findings suggest that efforts to prevent IPEDs use in recreational sport settings may benefit from targeting social norms in referent groups. Recent research has shown that a combination of normative information and self-affirmation can lead to stronger behaviour change intentions and actual behaviour change two weeks post-intervention (Rosas et al., 2017).

The limitations of our study should be considered. Firstly, selection bias is a potential limitation as our participants may represent a group of steroid users who are willing to admit their doping use to others. In this case participants may not have been defensive talking about doping, and thus, even if the manipulation induced self-affirmation, it did not exert any influence on the dependent variables. Although selection bias is not uncommon in behaviour change intervention studies (Freijy & Kothe, 2013; Tarquinio et al., 2015), this is something to be addressed in future research examining the effects of self-affirmation effects on IPEDs use. In addition, our sample consisted of a population difficult to reach, i.e., doping users. Therefore, due to the sensitive nature of the survey we avoided asking demographic questions (e.g., age, gender, type and amount of physical activity, type and amount of substances used) that could potentially make them believe that their identity could be disclosed. This was a necessary step in recruiting a very hard to reach sample and making it as representative of users as possible. However, it prevented us from obtaining information about participants' demographics, as well as the frequency and "heaviness" of doping use. Although all participants had a lifetime experience with doping use, their current doping behaviour was not measured, either in terms of engagement in the behaviour or level of involvement (i.e., systematic vs occasional; heavy vs light use). It is therefore possible that the current doping behaviour may have distorted the data with respect to mental construal and message acceptance. In addition, the periodization of the training and frequency of doping cycles were not taken into account during the study. That is, it cannot be estimated whether an athlete completed the manipulation while being in a doping cycle, before that cycle or after. Also, although the sample size was adequate in terms of power and the participants represented a population that is difficult to reach, the study sample was rather small

and this might have influenced the results of the analysis. Therefore, future studies would benefit from larger samples, and given that this may be difficult, a greater control of potential sources of error variance such as the frequency and 'heaviness' of doping use and attention to the timeliness of the self-affirmation with respect to the doping cycles. Lastly, the mental construal measure demonstrated relative low internal consistency and findings pertaining to mental construal should be interpreted with caution.

Notwithstanding those limitations, the present study is among the first to investigate the role of self-affirmation on intentions to use IPEDs among recreational exercisers who admitted past or current IPEDs use, and advances previous research in this area (Barkoukis et al., 2015a; Barkoukis et al., 2020). In particular, it tests a sample of doping users, a population difficult to reach, for self-affirmation effects and examines both direct and indirect effects, via mental construal, of self-affirmation on behaviour change factors, such as message acceptance and intentions (Epton et al., 2015). This study focused on recreational sport, which is a rather underrepresented context in the study of IPED's use. However, IPED's use is evident across all levels and types of sport (Nicholls et al., 2017). So far, research has largely focused on competitive sport but clearly IPED's use exist in recreational sport too (Lazuras et al., 2017) and more research in this context is warranted. Our study indicated that IPED's use intentions were influenced by the acceptance of a health message but not in this study by self-affirmation. This finding raises the possibility that for recreational exercisers IPED's use is not considered as a moral/ethical issue but as a health one. If so, preventive interventions should place emphasis on the health hazards of IPED's use, rather than the values of sport participation. This possibility warrants further research.

References

Ajzen, I. (2020). The theory of planned behavior: Frequently asked questions. *Human Behavior and Emerging Technologies*, *2*(4), 314-324.

Akinwande, M. O., Dikko, H. G., & Samson, A. (2015). Variance inflation factor: as a condition for the inclusion of suppressor variable (s) in regression analysis. *Open Journal of Statistics*, *5*(07), 754.

Allard, T., & Griffin, D. (2017). Comparative price and the design of effective product communications. *Journal of Marketing*, *81*(5), 16-29.

Allen, J. B., Morris, R., Dimeo, P., & Robinson, L. (2017). Precipitating or prohibiting factor: Coaches' perceptions of their role and actions in anti-doping. *International Journal of Sports Science & Coaching*, *12*(5), 577-587.

Armitage, C. J., Harris, P. R., Hepton, G., & Napper, L. (2008). Self-affirmation increases acceptance of health-risk information among UK adult smokers with low socioeconomic status. *Psychology of Addictive Behaviors*, *22*(1), 88.

Backhouse, S. H., Whitaker, L., Patterson, L., Erickson, K., & McKenna, J. (2016). *Social psychology of doping in sport: A mixed studies narrative synthesis*. Project Report. World Anti-Doping Agency, Montreal Canada.

Barkoukis, V., Brooke, L., Ntoumanis, N., Smith, B., & Gucciardi, D. F. (2019). The role of the athletes' entourage on attitudes to doping. *Journal of Sports Sciences*, *37*(21), 2483-2491.

Barkoukis, V., Lazuras, L., & Harris, P. R. (2015a). The effects of self-affirmation manipulation on decision making about doping use in elite athletes. *Psychology of Sport and Exercise*, *16*, 175-181.

Barkoukis, V., Lazuras, L., Lucidi, F., & Tsorbatzoudis, H. (2015b). Nutritional supplement and doping use in sport: possible underlying social cognitive

processes. *Scandinavian Journal of Medicine & Science in Sports*, *25*(6), e582-e588.

Barkoukis, V., Lazuras, L., Tsorbatzoudis, H., & Rodafinos, A. (2013). Motivational and social cognitive predictors of doping intentions in elite sports: An integrated approach. *Scandinavian Journal of Medicine & Science in Sports*, *23*(5), e330-e340.

Barkoukis, V., Rowe, R., Harris, P. R., & Lazuras, L. (2020). Self-affirmation effects on doping related cognition among exercisers who use nutritional supplements. *Psychology of Sport and Exercise*, *46*, 101609.

Belding, J. N., Naufel, K. Z., & Fujita, K. (2015). Using high-level construal and perceptions of changeability to promote self-change over self-protection motives in response to negative feedback. *Personality and Social Psychology Bulletin*, *41*(6), 822-838.

Birzniece, V. (2015). Doping in sport: effects, harm and misconceptions. *Internal Medicine Journal*, *45*(3), 239-248.

Cohen, G. L., & Sherman, D. K. (2014). The psychology of change: Self-affirmation and social psychological intervention. *Annual Review of Psychology*, *65,* 333-371.

Cornil, Y., & Chandon, P. (2013). From fan to fat? Vicarious losing increases unhealthy eating, but self-affirmation is an effective remedy. *Psychological Sience*, *24*(10), 1936-1946.

Creswell, J. D., Dutcher, J. M., Klein, W. M., Harris, P. R., & Levine, J. M. (2013). Self-affirmation improves problem-solving under stress. *PloS One*, *8*(5), e62593.

Creswell, J. D., Lam, S., Stanton, A. L., Taylor, S. E., Bower, J. E., & Sherman, D. K. (2007). Does self-affirmation, cognitive processing, or discovery of meaning

564 explain cancer-related health benefits of expressive writing? *Personality and*
565 *Social Psychology Bulletin*, *33*(2), 238-250.
566 Crocker, J., Niiya, Y., & Mischkowski, D. (2008). Why does writing about important
567 values reduce defensiveness? Self-affirmation and the role of positive other-
568 directed feelings. *Psychological Science*, *19*(7), 740-747.
569 Dunn, M., Thomas, J. O., Swift, W., & Burns, L. (2012). Elite athletes' estimates of
570 the prevalence of illicit drug use: evidence for the false consensus effect. *Drug*
571 *and Alcohol Review*, *31*(1), 27-32.
572 Dutcher, J. M., Creswell, J. D., Pacilio, L. E., Harris, P. R., Klein, W. M., Levine, J.
573 M., ... & Eisenberger, N. I. (2016). Self-affirmation activates the ventral striatum:
574 a possible reward-related mechanism for self-affirmation. *Psychological*
575 *Science*, *27*(4), 455-466.
576 Dutcher, J. M., Eisenberger, N. I., Woo, H., Klein, W. M., Harris, P. R., Levine, J. M.,
577 & Creswell, J. D. (2020). Neural mechanisms of self-affirmation's stress
578 buffering effects. *Social Cognitive and Affective Neuroscience,1086-1096*.
579 Epley, N., & Gilovich, T. (2016). The mechanics of motivated reasoning. *Journal of*
580 *Economic Perspectives*, *30*(3), 133-40.
581 Epton, T., & Harris, P. R. (2008). Self-affirmation promotes health behavior
582 change. *Health Psychology*, *27*(6), 746-752.
583 Epton, T., Harris, P. R., Kane, R., van Koningsbruggen, G. M., & Sheeran, P. (2015).
584 The impact of self-affirmation on health-behavior change: A meta-
585 analysis. *Health Psychology*, *34*(3), 187.
586 Eyal, T., Liberman, N., Trope, Y., & Walther, E. (2004). The pros and cons of
587 temporally near and distant action. *Journal of Personality and Social*
588 *Psychology*, *86*(6), 781.

589 Eyal, T., Sagristano, M. D., Trope, Y., Liberman, N., & Chaiken, S. (2009). When
590 values matter: Expressing values in behavioral intentions for the near vs. distant
591 future. *Journal of Experimental Social Psychology*, *45*(1), 35-43.
592 Falk, E. B., O'Donnell, M. B., Cascio, C. N., Tinney, F., Kang, Y., Lieberman, M. D.,
593 ... & Strecher, V. J. (2015). Self-affirmation alters the brain's response to health
594 messages and subsequent behavior change. *Proceedings of the National Academy*
595 *of Sciences*, *112*(7), 1977-1982.
596 Ferrer, R. A., & Cohen, G. L. (2019). Reconceptualizing self-affirmation with the
597 trigger and channel framework: Lessons from the health domain. *Personality and*
598 *Social Psychology Review*, *23*(3), 285-304.
599 Freijy, T., & Kothe, E. J. (2013). Dissonance-based interventions for health behaviour
600 change: A systematic review. *British Journal of Health Psychology*, *18*(2), 310-
601 337.
602 Goyer, J. P., Garcia, J., Purdie-Vaughns, V., Binning, K. R., Cook, J. E., Reeves, S.
603 L., ... & Cohen, G. L. (2017). Self-affirmation facilitates minority middle
604 schoolers' progress along college trajectories. *Proceedings of the National*
605 *Academy of Sciences*, *114*(29), 7594-7599.
606 Harris, P. R., & Epton, T. (2009). The impact of self-affirmation on health cognition,
607 health behaviour and other health-related responses: A narrative review. *Social*
608 *and Personality Psychology Compass*, *3*(6), 962-978.
609 Harris, P. R., & Epton, T. (2010). The impact of self-affirmation on health-related
610 cognition and health behaviour: Issues and prospects. *Social and Personality*
611 *Psychology Compass, 4*, 439 – 454.

612 Harris, P. R., & Napper, L. (2005). Self-affirmation and the biased processing of
613 threatening health-risk information. *Personality and Social Psychology*
614 *Bulletin*, *31*(9), 1250-1263.
615 Harris, P. R., Mayle, K., Mabbott, L., & Napper, L. (2007). Self-affirmation reduces
616 smokers' defensiveness to graphic on-pack cigarette warning labels. *Health*
617 *Psychology*, *26*(4), 437-446.
618 Harris, P. S., Harris, P. R., & Miles, E. (2017). Self-affirmation improves
619 performance on tasks related to executive functioning. *Journal of Experimental*
620 *Social Psychology*, *70*, 281-285.
621 Hildebrandt, T., Harty, S., & Langenbucher, J. W. (2012). Fitness supplements as a
622 gateway substance for anabolic-androgenic steroid use. *Psychology of Addictive*
623 *Behaviors*, *26*(4), 955-962.
624 Kimergård. A. (2015). A qualitative study of anabolic steroid use amongst gym users
625 in the United Kingdom: motives, beliefs and experiences, *Journal of Substance*
626 *Use, 20*(4), 288-294.
627 Kirby, K., Moran, A., & Guerin, S. (2011). A qualitative analysis of the experiences
628 of elite athletes who have admitted to doping for performance
629 enhancement. *International Journal of Sport Policy and Politics*, *3*(2), 205-224.
630 Kunda, Z. (1990). The case for motivated reasoning. *Psychological Bulletin 108*(3),
631 480–498.
632 Lazuras, L., Barkoukis, V., Loukovitis, A., Brand, R., Hudson, A., Mallia, L., ... &
633 Zelli, A. (2017a). “I want it all, and I want it now”: Lifetime prevalence and
634 reasons for using and abstaining from controlled Performance and Appearance
635 Enhancing Substances (PAES) among young exercisers and amateur athletes in
636 five European Countries. *Frontiers in Psychology*, *8*, 1-9.

637 Lazuras, L., Barkoukis, V., & Tsorbatzoudis, H. (2015). Toward an integrative model
638 of doping use: an empirical study with adolescent athletes. *Journal of Sport and*
639 *Exercise Psychology*, *37*(1), 37-50.
640 Lazuras, L., Barkoukis, V., Mallia, L., Lucidi, F., & Brand, R. (2017b). More than a
641 feeling: The role of anticipated regret in predicting doping intentions in
642 adolescent athletes. *Psychology of Sport and Exercise*, *30*, 196-204.
643 Lentillon-Kaestner, V., & Carstairs, C. (2010). Doping use among young elite
644 cyclists: a qualitative psychosociological approach. *Scandinavian Journal of*
645 *Medicine & Science in Sports*, *20*(2), 336-345.
646 Liberman, N., & Trope, Y. (1998). The role of feasibility and desirability
647 considerations in near and distant future decisions: A test of temporal construal
648 theory. *Journal of Personality and Social Psychology*, *75*(1), 5-18.
649 Morente-Sánchez, J., & Zabala, M. (2013). Doping in sport: a review of elite athletes'
650 attitudes, beliefs, and knowledge. *Sports Medicine*, *43*(6), 395-411.
651 Nicholls, A. R., Cope, E., Bailey, R., Koenen, K., Dumon, D., Theodorou, N. C., ... &
652 Kristensen, A. H. (2017). Children's first experience of taking anabolic-
653 androgenic steroids can occur before their 10th birthday: a systematic review
654 identifying 9 factors that predicted doping among young people. *Frontiers in*
655 *Psychology*, *8*, 1-22.
656 Nieschlag, E., & Vorona, E. (2015). Doping with anabolic androgenic steroids (AAS):
657 Adverse effects on non-reproductive organs and functions. *Reviews in Endocrine*
658 *and Metabolic Disorders*, *16*(3), 199-211.
659 Ntoumanis, N., Ng, J. Y., Barkoukis, V., & Backhouse, S. (2014). Personal and
660 psychosocial predictors of doping use in physical activity settings: a meta-
661 analysis. *Sports Medicine*, *44*(11), 1603-1624.

662 Overbye, M., Knudsen, M. L., & Pfister, G. (2013). To dope or not to dope: Elite
663 athletes' perceptions of doping deterrents and incentives. *Performance*
664 *Enhancement & Health*, *2*(3), 119-134.
665 Reed, M. B., & Aspinwall, L. G. (1998). Self-affirmation reduces biased processing
666 of health-risk information. *Motivation and Emotion*, *22*(2), 99-132.
667 Rosas, C. E., Gregorio-Pascual, P., Driver, R., Martinez, A., Price, S. L., Lopez, C., &
668 Mahler, H. I. (2017). Effects of social norms information and self-affirmation on
669 sugar-sweetened beverage consumption intentions and behaviors. *Basic and*
670 *Applied Social Psychology*, *39*(2), 112-126.
671 Santos, G. H., & Coomber, R. (2017). The risk environment of anabolic–androgenic
672 steroid users in the UK: Examining motivations, practices and accounts of use.
673 *International Journal of Drug Policy*, *40*, 35-43.
674 Sagristano, M., Trope, Y., & Liberman, N. (2002). Time-dependent gambling: Odds
675 now, money later. *Journal of Experimental Psychology: General, 131*, 364 –376.
676 Schmeichel, B. J., & Vohs, K. (2009). Self-affirmation and self-control: affirming
677 core values counteracts ego depletion. *Journal of Personality and Social*
678 *Psychology*, *96*(4), 770.
679 Sherman, D. K., & Cohen, G. L. (2002). Accepting threatening information: Self–
680 Affirmation and the reduction of defensive biases. *Current Directions in*
681 *Psychological Science*, *11*(4), 119-123.
682 Sherman, D. A. K., Nelson, L. D., & Steele, C. M. (2000). Do messages about health
683 risks threaten the self? Increasing the acceptance of threatening health messages
684 via self-affirmation. *Personality and Social Psychology Bulletin*, *26*(9), 1046–
685 1058.

686 Soderberg, C.K., Callahan, S.P., Kochersberger, A.O., Amit, E., & Ledgerwood, A.
687 (2015). The effects of psychological distance on abstraction: Two meta-analyses.
688 *Psychological Bulletin, 141*(3), 525-548.
689 Steele, C. M. (1988). The psychology of self-affirmation: Sustaining the integrity of
690 the self. *Advances in Experimental Social Psychology*, *21*(2), 261-302.
691 Sweeney, A. M., & Moyer, A. (2015). Self-affirmation and responses to health
692 messages: A meta-analysis on intentions and behavior. *Health Psychology*, *34*(2),
693 149-159.
694 Tarquinio, C., Kivits, J., Minary, L., Coste, J., & Alla, F. (2015). Evaluating complex
695 interventions: perspectives and issues for health behaviour change
696 interventions. *Psychology & Health*, *30*(1), 35-51.
697 Trope, Y., & Liberman, N. (2003). Temporal construal. *Psychological*
698 *Review*, *110*(3), 403-421.
699 Trope, Y., & Liberman, N. (2010). Construal-level theory of psychological
700 distance. *Psychological Review*, *117*(2), 440-463.
701 Trope, Y., Liberman, N., & Wakslak, C. (2007). Construal levels and psychological
702 distance: Effects on representation, prediction, evaluation, and behavior. *Journal*
703 *of Consumer Psychology*, *17*(2), 83-95.
704 UKAD (2020, January 17). *Image and performance enhancing drugs: UKAD's status*
705 *report on IPEDs in the UK*. https://www.ukad.org.uk/sites/default/files/2020-
706 01/UKAD%20IPED%20Report%20FINAL.pdf
707 Wakslak, C. J., & Trope, Y. (2009). Cognitive consequences of affirming the self:
708 The relationship between self-affirmation and object construal. *Journal of*
709 *Experimental Social Psychology*, *45*(4), 927-932.
710
711

Table 1: *Means and Standard Deviations of the Study's Variables*

	Experimental group (n = 31)		Control group (n = 37)	
	M	SD	M	SD
Distance	4.51	2.04	3.86	2.52
Message acceptance	5.00	1.63	5.47	1.17
Attitudes	4.64	1.70	5.04	1.48
Self-efficacy	5.65	1.35	5.69	1.28
Subjective norms	2.17	1.49	1.67	.86
Descriptive norm	51.76	20.80	47.20	20.41
Situational temptation	2.69	1.17	2.55	1.09
Anticipated regret	3.13	2.07	3.54	2.07
Intentions	3.21	2.41	2.59	2.18

Note: Higher scores in attitudes, situational temptation, norms and intentions reflect more positive beliefs towards doping, whereas higher scores in anticipated regret show more negative affect towards doping use.

720

721

722 Table 2: *Correlation Coefficients Among and Internal Consistency of the Study's*
723 *Variables*

	1	2	3	4	5	6	7	8	9
1. Mental construal		-.18	.04	-.06	.10	.15	-.01	.03	.22
2. Message acceptance			-.58**	-.18	-.77**	-.07	-.47**	.56**	-.52**
3. Attitudes				-.15	-.58**	-.04	-.63**	.38*	-.51**
4. Self-efficacy					.21	.25*	.34**	-.32**	.17
5. Subjective norms						.16	.40**	-.52**	.57**
6. Descriptive norm							.20	-.23	.16
7. Situational temptation								-.48**	.70**
8. Anticipated regret									-.51**
9. Intentions									
Cronbach α	.62	.88	.79	.75	.86	.71	.85	.95	.98

724 *Note*. * = $p < .05$, ** = $p < .01$.

725

726

727

728 Table 3: *Effect of self-affirmation on the decision-making process*

Step	Predictors	β	p	AdjR^2	F
1				.003	1.18
	Intervention	.13	.280		
2				.003	.91
	Intervention	.11	.366		
	Mental construal	.10	.422		
3				.20	6.61*
	Intervention	.03	784		
	Mental construal	.09	.417		
	Message acceptance	-.47*	.000		
4				.57	10.71*
	Intervention	.03	.660		
	Mental construal	.10	.212		
	Message acceptance	.15	.273		
	Attitudes	.09	.470		
	Self-efficacy	-.13	.163		
	Subjective norms	.43*	.004		
	Descriptive norms	-.04	.628		
	Situational temptation	.59*	.000		
	Anticipated regret	-.20	.069		

729 Note: * < .001