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Article (Accepted Version)

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Abstract

Objectives: The use of nutritional supplements has been associated with stronger doping intentions and actual use of doping substances, but there is limited research about doping risk communication among nutritional supplement users. The present study examined if using a self-affirmation manipulation a) changes intentions to use doping and b) influences related social cognitions (i.e., attitudes, social and moral norms, self-efficacy and situational temptation, and anticipated regret) among exercisers who use nutritional supplements, following a brief exposure to doping-related health risk messages.

Design: Between subjects experimental design.

Method: Sixty exercisers were randomly assigned to self-affirmation and control groups and completed a structured and anonymous questionnaire about doping intentions and related social cognitive variables.

Results: Self-affirmed participants reported higher scores in descriptive and moral norms and anticipated regret towards using doping substances, than control participants. Doping intentions were predicted by situational temptation and anticipated regret. Anticipated regret mediated the effect of the self-affirmation manipulation on doping intentions.

Conclusions: In the context of doping risk communication, self-affirmation may influence the decision-making process by acting on anticipated regret. Our findings can inform risk communication campaigns targeting exercisers who use nutritional supplements.

Keywords: recreational sports, nutritional supplements, self-affirmation, social cognition

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Nutritional supplements (e.g., protein, vitamins and minerals, amino acids, and creatine) are widely used to enhance athletic performance and physique in competitive, elite, and non-competitive, amateur sports and fitness settings (Bailey et al., 2011). At the same time, evidence suggests that using nutritional supplements represents one of the most important risk factors for using other performance enhancement substances that are banned in competitive sports, such as anabolic steroids, stimulants, growth hormone, and other performance enhancers described in the list of prohibited substances issued annually by the World Anti-doping Agency (WADA). A meta-analysis of 45 studies found a strong average association between nutritional supplement (NS) use and doping intentions (η^2 =0.36, 95% CI = 0.20 – 0.52) and self-reported doping use (η^2 = 8.24, 95% CI = 5.07 – 13.39; Ntoumanis et al., 2014).

Some researchers have argued that the observed association between NS use and doping behaviour constitutes evidence for a "gateway", such that athletes who more frequently use NS become more familiarized with chemically-assisted performance enhancement and, therefore, progressively move in to the "dark side" of performance enhancement (Backhouse et al., 2013). Other studies in sport and exercise settings have shown that NS users tend to develop more positive beliefs about, and attitudes towards, doping use, and also hold stronger intentions to use doping substances (Barkoukis, Lazuras, Lucidi, & Tsorbatzoudis, 2015). Taken together, these findings suggest that NS users represent a potentially high-risk group for doping use. Unlike professional and competitive sports, however, there has been a

lack of systematic, theory-driven and evidence-based interventions to communicate the risks of doping that aim to change doping-related beliefs (e.g., attitudes), intentions, and behaviour among non-competitive amateur athletes and exercisers who use nutritional supplements (Barkoukis, 2015). Recently, doping researchers have argued that doping among exercisers and non-competitive amateur athletes represents an emerging public health challenge and have called for more concerted preventive efforts (Christiansen & Bojsen-Møller, 2012; Henning & Dimeo, 2017; van de Ven, 2016). Indeed, the non-medical and uncontrolled use of doping substances has been associated with an early onset of preventable mental and physical morbidity (e.g., depression, anxiety, mood and body image disturbances, suicidal thoughts and attempts, kidney and liver damage, elevated blood pressure) and mortality (Hartgens & Kuipers, 2004; Darke et al., 2014; Frati et al., 2015; Lindqvist et al., 2013), especially among younger people (Quaglio et al., 2009).

Self-affirmation & Risk Communication

Risk communication represents an important public health tool to prevent lifestyle-related diseases and change unhealthy behaviours (Glik, 2007; Witte, Allen, & Witte, 2000). Nevertheless, risk communications can fail for various reasons, leaving unhealthy behaviours, cognitions and intentions unchanged. Some of these reasons reflect defensive processing among the target groups involved. To illustrate, smokers presented with information about the health risks of smoking may take a defensive stance to their behaviour, derogating the health message by downplaying the health consequences of smoking or denigrating the message source (Harris, Mayle, Mabbott, & Napper, 2007; Weinstein, 1984; Weinstein, Marcus, & Moser, 2005).

From the perspective of self-affirmation theory (Steele, 1988), people engage in defensive processing when risk information reminds them of the inadequacy of their choices, which may trigger negative self-evaluations. Defensive processing enables them to modulate the cognitive and affective repercussions of risk messages and thereby maintain a sense of being morally worthy, competent and able to control important outcomes ('adaptively adequate', Steele, 1988; Sherman & Cohen, 2006). Self-affirmation theory proposes that people are strongly motivated to maintain such a global perception of themselves (as being morally and adaptively adequate). However, the theory also proposes that individuals can maintain this perception by engaging in self-affirmations, which are acts that bolster the sense of having moral or adaptive adequacy. Consequently, when people are allowed to affirm themselves in one behavioural domain (e.g., being a good parent; being a kind person), this frees them to process a personally relevant risk message more open-mindedly and without feeling so threatened (Cohen & Sherman, 2014; Sherman & Cohen, 2002). Interventions based on self-affirmation theory have demonstrated the effectiveness of this approach to improving message acceptance and changing intentions and behavior, in a wide range of health-related (e.g., Epton et al., 2015; Sweeney & Moyer, 2015) and non-health behaviors (Cohen & Sherman, 2014). Based on this literature, it is expected that self-affirmation may assist in improving message acceptance with respect to doping related information (i.e., health effects of doping, moral and social consequences of doping, alternative approaches to enhance performance) by reducing the defensive processes associated with threat of being involved in a stigmatized behavior, such as doping (Barkoukis, Brooke, Ntoumanis, Smith, & Gucciardi, 2019).

One way in which self-affirmation may promote behaviour change is by influencing social cognitive variables that are pertinent to intention formation and

action initiation, such as attitudes towards the behaviour in question, social norms, and self-efficacy (Epton & Harris, 2008), and anticipated regret (van Koningsbruggen et al., 2016). For instance, van Koningsbruggen et al. (2016) showed that, relative to control participants, self-affirmed participants had higher feelings of anticipated regret following a health message, suggesting that self-affirmation may encourage people to more openly report the regret they would experience in performing an inappropriate behavior, such as doping. Other research has shown that self-affirmation interventions can improve goal attainment (Harris, Harris, & Miles, 2017; Logel & Cohen, 2012), problem solving under pressure (Creswell, Dutcher, Klein, Harris, & Levine, 2013), and activate neural reward pathways and brain regions associated with positive autobiographical memories, such as the ventral striatum (Dutcher et al., 2016). Thus, it is theoretically plausible that self-affirmation can influence self-awareness and related processes with respect to doping use, such as making personal values and norms around doping more salient.

To date, there is only one study examining self-affirmation with respect to doping behaviour. Barkoukis, Lazuras and Harris (2015) investigated the effect of a self-affirmation manipulation on the decision to dope among competitive athletes who self-reported using doping substances. The results showed that self-affirmed athletes reported significantly lower doping intentions and lower scores reflecting situational temptation to use doping substances - both known to be significant factors in predicting doping behaviour (Ntoumanis et al., 2014).

The present study

Although sport involvement is meant to promote healthier lifestyles and disease prevention, an increasing volume of evidence suggests exercisers and amateur athletes use or consider using doping substances for performance and appearance

enhancement reasons. Anti-doping scholars have emphasized the negative public health implications of this trend (e.g., Christiansen & Bojsen-Møller, 2012; Henning & Dimeo, 2017; van de Ven, 2016). Although previous research has demonstrated the promising effects of self-affirmation in changing situational temptation and intentions to dope in competitive athletes (Barkoukis, et al., 2015), no studies have established whether similar effects of self-affirmation can be found in non-elite and non-competitive athletes. Meta-analysis and review papers have shown that non-elite athletes and exercisers who consume nutritional supplements are at higher risk for doping (Nicholls et al., 2017; Ntoumanis et al., 2014). Other research has shown that nutritional supplement users hold more favourable beliefs about doping use, and such beliefs may facilitate the transition to doping (Barkoukis et al., 2015). Therefore, it is important to investigate whether a self-affirmation manipulation can alter exercisers' beliefs towards doping use. From a theoretical point of view, this will advance our understanding of self-affirmation effects in groups that are not currently engaged in a health-risk (and socially undesirable) behaviour, but are high at-risk for doing so. From a practitioners' point of view, if self-affirmation is effective in altering exercisers' beliefs about doping use, then this can inform subsequent initiatives to reduce the risk for doping in this population. Therefore, the present study was designed to investigate if self-affirmation influences doping intentions and related social cognitive variables among exercisers who use nutritional supplements but not doping substances, following exposure to messages about the health risks associated with doping use.

Based on previous research about the effects of self-affirmation on doping intentions (Barkoukis et al., 2015) and on physical activity (Cooke et al., 2014) the current study focused on social cognitive variables derived from the Theory of

Planned Behavior and the Reasoned Action Perspective (Ajzen, 1991; Fishbein & Ajzen, 2011) because these variables have been associated with doping use and intentions in previous research (Barkoukis & Lazuras, in press; Lazuras et al., 2015; Ntoumanis et al., 2014). The following hypotheses were tested: a) self-affirmed exercisers will report lower doping intentions and scores on related social cognitive variables that predict intentions and/or behaviour change (i.e., attitudes, social and moral norms, self-efficacy, situational temptation, and anticipated regret) following exposure to health messages against doping, and b) the effects of self-affirmation on doping intentions would be mediated by doping-related social cognitive variables.

Method

Participants

A snowball sampling (chain referral) strategy was used to recruit participants. Assistance in data collection was initially requested from three fitness instructors, who served as co-researchers. They all agreed to promote the study in their fitness centers. Eligibility criteria included systematic participation in training for the past five years and use of nutritional supplements. Overall, we recruited sixty exercisers (43 males) who were currently using nutritional supplements. With GPower 3.10 we calculated a priori power analysis for our study. Based on previous research (Barkoukis et al., 2015) which demonstrated medium to large effect sizes ($\eta^2 \sim .09$ - .19) when comparing self-affirmed and non-self-affirmed groups in doping related cognition, we set the effect size f = .40 using one-way ANOVA with fixed effects, with a probability level a= 0.05, and power set at 0.85. The analysis showed that a total sample size of 60 participants (30 in each group) was required. The study was granted ethics approval by the respective committee (UREC) of the [redacted], and participants were informed about their participation rights, data

anonymity and confidentiality. Due to the sensitive nature of the behavior involved, participants were asked to provide consent for participation in the study. Only their gender was recorded as a demographic variable, as the recording of other demographic characteristics (e.g., age) was perceived by participants as a potential threat to their anonymity.

Measures

A brief structured survey was used to assess social cognitions related to doping use. These measures were based on past research on doping (e.g., Barkoukis, et al., 2013; Barkoukis et al., 2015; Lazuras et al., 2010) and assessed attitudes towards doping use, social norms (descriptive and injunctive norms) and moral norms, perceived behavioral control, situational temptation, and anticipated regret. The studies by Barkoukis and colleagues have attested to the face, content, concurrent, and predictive validity of the measures described below.

Attitudes. Attitudes to doping were measured with the stem 'the use of prohibited substances to enhance my performance this season is…' followed by four semantic differential evaluative adjectives (*bad/good; useless/useful; right/wrong; detrimental/beneficial*) scored on a seven-point scale (Barkoukis, et al., 2013; Lazuras et al., 2010; Lazuras et al., 2015).

Injunctive norms. Injunctive norms were assessed with the mean 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'), scored on a seven-point scale (1 = *strongly disagree*, 7 = *strongly agree*). A composite score was computed with higher scores showing stronger norms about doping use (Barkoukis, et al., 2013; Lazuras et al., 2010; Lazuras et al., 2015).

Descriptive norms. Descriptive norms were assessed with five items. Two open-ended questions addressed the perceived prevalence of doping use among elite athletes in Greece (i.e., 'Out of 100%, how many elite athletes in Greece do you think engage in doping to enhance their performance?) and exercisers at the same to the participant's level (i.e., 'Out of 100%, how many exercisers at the same to you level in Greece do you think engage in doping to enhance their performance?'). Participants were further asked to indicate how many other exercisers they knew who used doping substances (scored on a 5-point scale, 1 = nobody, 5 = a lot of them); if they believed that most professional athletes use doping substances (scored on a 7-point scale, 1 = definitely not, 5 = definitely yes); and how many of their fellow exercisers would use doping substances if they wanted to improve their athletic performance (scored on a 7-point scale, 1 = none of them, 7 = most of them). This method for assessing descriptive norms has been used effectively in previous studies on doping (e.g., Barkoukis et al., 2013; Lazuras et al., 2010; Lazuras et al., 2015; Wiefferink et al., 2008).

Moral norms. Moral norms were assessed with three items (e.g. 'Doping use is against my moral principles'). Exercisers responded on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). One item was reverse scored so that a composite mean score was computed with higher scores reflecting stronger moral norms against doping use (Barkoukis et al., 2015).

Self-efficacy. Self-efficacy about using doping substances was assessed using three items (e.g., 'I feel in complete control over whether I will use prohibited substances to enhance my performance during this season'), measured on a seven-point scale (1 = *strongly disagree*, 7 = *strongly agree*) with higher scores indicating higher self-efficacy (Barkoukis, et al., 2013; Lazuras et al., 2010; Lazuras et al., 2015).

Situational temptation. A measure of situational temptation developed by Lazuras et al. (2010) was used to assess perceived efficacy to resist situational pressures to dope (i.e., situational temptation). The measure includes a stem proposition ('How much would you be tempted to use prohibited doping substances to enhance your performance this season'), followed by five items ('when your coach suggests so,' 'when you believe that most colleagues of yours use prohibited substances,' 'when you were told to enhance your performance,' 'when you were feeling disadvantaged', and 'when you prepare for an important game/competition'). Responses were given on a five-point Likert scale (1 = *not at all tempted*, 5 = *very much tempted*) with higher scores showing greater situational temptation (i.e., less self-efficacy about resisting temptation) (Barkoukis, et al., 2013; Lazuras et al., 2015).

Doping intentions. Intentions to dope during the season were assessed with the mean of three items (e.g., 'I intend to use prohibited substances to enhance my performance during this season'), scored on a seven-point scale (1 = *definitely not*, 7 = *definitely yes*). Higher scores reflected higher doping use intentions (Barkoukis, et al., 2013; Lazuras et al., 2010; Lazuras et al., 2015).

Anticipated regret. Anticipated regret was assessed with the stem "If I use prohibited substances to enhance my performance during this season, I will…", followed by four items (regret it; be disappointed with myself; feel bad with myself; feel shame), scored on a 7-point Likert scale (1 = *definitely not*, 7 = *definitely yes*) with higher scores indicating greater regret (Lazuras et al., 2015).

Design

A between-group experimental design was used. Participants were randomly allocated to either the self-affirmation or the control group.

Affirmation manipulation. Participants in the intervention group were exposed to the self-affirmation manipulation developed by Reed and Aspinwall (1998). This consists of 10 questions designed to encourage participants to elaborate on their past acts of other-directed kindness, namely to recall and give examples of past acts of 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 about their acts of kindness. Writing about such acts 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 (Crocker, Niiya, & Mischkowski, 2008).

An active control group (e.g., Reed & Aspinwall, 1998) was used. Participants randomized to the control condition were given a similar self-reported task but, instead of reporting acts of kindness, they were asked to state their opinions on a range of unrelated issues, such as "I think that chocolate is the best flavor ice cream," and "I think the beach is the best place to go on holidays", and to elaborate on those beliefs by providing further details.

Intervention message. A health-related message was developed based on the WADA's anti-doping campaigns and information leaflets about the health consequences of doping use. This included a general statement on the side effects of doping use on the body and the relationship between doping use and mortality. Subsequently the specific side effects on cardiovascular function, on hepatic function and on the reproductive and endocrine systems, the psychological, dermatological and musculo-skeletal side effects, and other health symptoms and long term health effects of doping were described. The display of the side effects of doping on health was

accompanied by related research citations in order to more explicitly demonstrate that the stated effects were supported by scientific evidence and that they did not represent lay beliefs or assumptions about the effects of doping use (Parssinen & Seppala, 2002). Both groups received the same intervention message.

Procedure

The three fitness instructors who served as co-researchers were contacted, and the aim and procedure of the study were explained. In order to facilitate the data collection process and ensure that ethical guidelines were not violated, these co-researchers received brief training about who to approach and how to approach them. Following the training, they were given a weblink (URL) with the study's survey and were asked to provide it to exercisers within their fitness centers who were training and they knew were using nutritional supplements systematically. The co-researchers were continuously recruiting exercisers until reaching the critical number of 30 participants with complete data in each group. They asked participants to log into the system to complete the survey. After logging into the system, participants were randomly assigned to the experimental and control group by random numbers generated by the system and completed a consent form. Following that the typical self-affirmation paradigm was used (Epton & Harris, 2008; Reed & Aspinwall, 1998) in which participants completed the manipulation (self-affirmation or control condition) before reading the health message. After the message they completed the survey measuring doping intentions and social cognition variables. Survey completion lasted 15-20 min and was performed in the gym (e.g., reception or locker rooms). Data collection lasted approximately six months. Overall, 111 exercisers were approached and agreed to enter the weblink. Of those, 60 provided complete data.

Results

Descriptive statistics and randomization check

The means and standard deviations of the study variables in the experimental and control groups are presented in Table 1. Correlation analyses revealed moderate to strong relationships among the study's variables (Table 2). As a test for participant randomization to each condition we compared gender distribution between the intervention and the control groups, using Pearson's chi-square test (χ^2). The results indicated no significant differences in the distribution of males and females (21 males in the control group; 23 males in the intervention group) between conditions, $\chi^2(1, N = 60) = 0.34$, $p > .05$.

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

A multivariate analysis of variance (MANOVA) was performed to assess differences between self-affirmed and control groups in doping intentions and related social cognitive variables towards doping, namely, attitudes towards doping use, descriptive and injunctive norms, moral norms, self-efficacy, situational temptation, and, anticipated regret; Hypothesis 1). The results showed that self-affirmed participants reported higher scores (*Wilks' Lamda* = .572, $F = 2.64$, $p = .008$) on two items reflecting descriptive social norms, namely, knowing more exercisers who have used prohibited substances ($F = 8.08$, $p = .006$, $\eta_p^2 = .12$) and perceiving greater prevalence of doping use among elite athletes ($F = 5.53$, $p = .022$, $\eta_p^2 = .08$); stronger moral norms ($F = 5.81$, $p = .019$, $\eta_p^2 = .09$), and more anticipated regret ($F = 9.04$, $p = .004$, $\eta_p^2 = .13$). The observed effect sizes ranged from moderate to strong according to Cohen (1988). No other significant differences were observed.

Multiple linear regression analysis was used to test if the effects of self-affirmation on doping intentions are mediated by doping-related social cognitive variables (Hypothesis 2). The analysis was completed in two steps (see Table 3). First, to enable the assessment of the unique effects of the self-affirmation manipulation (coded as a dummy variable, 0 = control group, 1 = self-affirmation), it was entered at Step 1 to predict doping intentions. The social cognition variables (i.e., attitudes towards doping, descriptive and injunctive social norms, moral norms, self-efficacy beliefs, situational temptation and anticipated regret) were added at Step 2 to examine potential mediation effects, that is, whether doping-related social cognitive variables may account for the effect of the self-affirmation manipulation.). The overall model was statistically significant and predicted 24.5% (Adjusted R^2) of the variance in doping intentions. The analysis showed that the effect of the intervention was not statistically significant in the first step of the analysis, but the addition of social cognitive variables in Step 2 significantly increased predicted variance explained in intentions ($F_{\text{change}} = 2.83$; $p = .006$). Significant predictors of doping intentions in the second step of the analysis included situational temptation and anticipated regret (see Table 3). Because self-affirmation did not have a significant effect on doping intentions we did not proceed with assessing the mediation effects of social cognitive variables.

Discussion

The present study examined the effects of a self-affirmation manipulation on doping intentions and related social cognitive variables among exercisers who used nutritional supplements - a population that is at high risk for doping use according to previous research (e.g., Hoffman et al., 2008; Nicholls et al., 2017; Ntoumanis et al., 2014). Self-affirmed participants reported higher scores on descriptive and moral

norms, as compared to participants in the control condition. Specifically, self-affirmed participants reported that doping use would be more against their own moral principles, that they knew more exercisers who used doping substances, and believed that more professional athletes engage in doping to improve their performance. This possibly indicates that self-affirmed participants more readily accessed normative information about doping use as well as their own moral principles and standards towards the behaviour. Previous research has indicated that self-affirmation activates brain areas associated with the processing of self-referential information (Dutcher et al., 2016). Other studies have further shown that self-affirmation influences thought accessibility, specifically by attenuating the accessibility of thoughts that are threatening to the self (e.g., mortality; Schmeichel & Martens, 2005; Vail, Morgan, & Kahle, 2018). One possibility is that self-affirmation might increase private self-awareness (e.g., Reid, Field, Jones, DiLemma, & Robinson, 2019), as well as the accessibility of self-referential cognitions that may serve to protect self-integrity (e.g., personal moral standards/moral norms; see Dutcher et al., 2016). Hence, normative information (e.g., perceived prevalence) about doping use may have become more salient in the self-affirmed participants serving as a mechanism helping them be more alert about "exposure" to or involvement with doping in the future. Another explanation for the higher descriptive norm scores in the self-affirmed group may relate to the tendency to more openly disclose information that would otherwise be unreported. In support of this argument, a recent study showed that self-affirmed participants were more likely to disclose undesirable behaviours and related information, compared to non-affirmed participants (Davis, Soref, Villalobos, & Mikulincer, 2016). Although these explanations are theoretically plausible, they require empirical investigation.

Importantly, self-affirmed exercisers in the present study reported significantly higher anticipated regret scores than control participants. Recent studies have shown that self-affirmation may influence behaviour change processes by acting on anticipated regret which, in turn, may predict intentions and actual behaviour change (van Koningsbruggen et al., 2016). Therefore, the non-significant effect we observed on doping intentions does not mean that self-affirmation is unimportant in doping-related cognitions in exercisers who use nutritional supplements, but rather suggests that this effect may occur through changes in proximal predictors of health-related intentions and behaviour, such as anticipated regret. Previous research has demonstrated the importance of anticipated regret in health-related behaviours (Brewer, DeFrank, & Gikey, 2016), and anticipated regret has also been found to be one of the most important predictors of doping intentions in sport populations (Lazuras, Barkoukis, Mallia, Lucidi, & Brand, 2017; Lazuras et al., 2015; Ntoumanis et al., 2014), and predicted doping intentions in the present study.

There were no significant differences between the self-affirmed and control participants in intentions to use doping substances in the present study. This may be attributed to the overall lower scores in doping intentions (i.e., a floor effect) in both groups: typically participants were not intending to use doping substances and, therefore, self-affirmation could not produce changes in this variable. This may also explain why the present findings with exercisers who used NS differ from the results reported by Barkoukis et al. (2015), who showed that self-affirmation significantly reduced doping intentions among competitive athletes who had used doping substances in the past. Possibly, exercisers using nutritional supplements may not perceive doping use as something relevant to them, although self-affirmation helps them to readily recognize it as a problem in given referent groups. Self-affirmation in

the doping prevention context may be more relevant to exercisers already engaging in the target behaviour (i.e., who use/have used or intent to use doping substances), than to exercisers without such experiences and intentions.

Finally, regarding the predictors of doping intentions in the present study, situational temptation and anticipated regret were the only significant predictors of doping intentions in the full model. Situational temptation has been found to be the most influential social cognitive construct on doping use intentions (Barkoukis et al., 2013a; Lazuras et al., 2010). Thus, the current findings corroborate past evidence and support situational temptation as an important construct influencing intentions. Anticipated regret significantly predicted doping intentions, thus showing that it is relevant to the intention-formation process in the context of doping use, both among athletes and leisure time exercisers. These findings suggest that situational temptation and anticipated regret can serve as protective factors and should be addressed in educational campaigns targeting clean exercisers.

A limitation of the present study is the lack of measures assessing whether participants understood the content of the message and whether they were self-affirmed. In future studies, the use of manipulation checks would confirm the efficacy of the manipulation in self-affirming participants and increase confidence that the observed results are due to changes in participants' sense of self-integrity. In addition, the use of measures of message acceptance in the future would allow estimating the effect of the self-affirmation on the acceptance of the content of the message. Furthermore, the study sample was rather small, resulting from the difficulty reaching this population. Therefore, some of the non-significant effects reported here might have been significant with a larger sample of participants with more statistical power. In addition, the sustainability of the effects was not tested in the present study. Future

research should more thoroughly investigate the longer term effects of self-affirmation, which may provide valuable information for anti-doping prevention campaigns and education. Finally, the measure of intentions used provided low scores on exercisers' beliefs about doping in the future. Using alternative proxy measures of doping behaviour, such as doping susceptibility, doping likelihood or implementation intentions (Barkoukis, Lazuras & Tsorbatzoudis, 2014; Blank, Kopp, Niedermeier, Schnitzer, & Schobersberger, 2016), might result in increased response variability and, hence, more proportion of variance explained. Nevertheless, the present study is among the first studies to investigate how self-affirmation works on people being at risk for manifesting an inappropriate behavior and provides valuable information that could inform anti-doping awareness raising and educational campaigns in leisure-time exercisers who use nutritional supplements and constitute the large majority of recreational sport exercisers.

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Table 1

Descriptive Statistics of the Study's Variables for Both Groups

	Experimental group		Control group	
	M	SD	M	SD
Attitudes	2.06	1.25	2.17	1.12
Self-efficacy	5.75	1.40	6.18	.92
Injunctive norms	1.41	.75	1.68	.73
Moral norms*	5.40	1.80	4.23	1.93
Descriptive norms[a]	35.17	21.95	45.93	25.43
Descriptive norms[b]	75.40	22.83	76.97	21.92
Descriptive norms [c]*	3.00	0.94	3.73	1.04
Descriptive norms[d]	5.37	1.32	6.13	1.19
Descriptive norms[e]	3.90	1.78	4.40	1.40
Situational temptation	1.96	.97	2.26	.84
Anticipated regret**	5.10	2.02	3.62	1.78
Intentions	1.63	1.44	1.62	1.02

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; Descriptive norms[a] = perceived prevalence of doping use in elite athletes; Descriptive norms[b] = perceived prevalence of doping use in exercisers; Descriptive norms[c] = knowing doped exercisers; Descriptive norms[d] = believing that most professional athletes use doping*; Descriptive norms[e] = Believing that most exercise would use doping to enhance performance ; * $p < .05$, ** $p < .005$, *** $p < .001$.

Table 2

Correlation Coefficients among the Study Variables

	1	2	3	4	5	6	7	8	9	10	11	12
1. Intentions	-	.26*	.01	.09	.13	.23	.12	.25*	-.20	.10	.54***	-.36**
2. Attitudes		-	.05	.06	.14	.08	.06	.06	-.38**	.11	.31*	-.41***
3. Injunctive norms			-	.06	-.07	.18	.15	.05	-.44***	-.06	.05	-.44***
4. Descriptive norms[a]				-	.28*	.37**	.34*	.38**	-.03	.14	.24	.00
5. Descriptive norms[b]					-	.37**	.64***	.33*	-.04	-.05	.20	.00
6. Descriptive norms[c]						-	.53***	.61***	-.15	.13	.23	-.16
7. Descriptive norms[d]							-	.45***	-.18	-.01	.24	-.18
8. Descriptive norms[e]								-	-.15	.03	.42***	-.12
9. Moral norms									-	-.14	-.28*	.67***
10. Self-efficacy										-	.19	-.12
11. Situational temptation											-	-.33**

12. Anticipated regret	-

Note. Descriptive norms[a] = perceived prevalence of doping use in elite athletes; Descriptive norms[b] = perceived prevalence of doping use in exercisers; Descriptive norms[c] = knowing doped exercisers; Descriptive norms[d] = believing that most professional athletes use doping*; Descriptive norms[e] = Believing that most exercise would use doping to enhance performance ; * $p < .05$, ** $p < .005$, *** $p < .001$.

Table 3

Effect of self affirmation on the decision-making process

Step 1	*Predictors*	B	*β*	95% CI for B	*Adjusted R^2*
	Self-affirmation	.011	.005	-.637- .659	-.01%
Step 2	Self-affirmation	.549	.223	-.126 - 1.225	24.5%
	Attitudes to doping	.001	.001	-.283 - .285	
	Injunctive norms	-.215	-.130	-.676 - .247	
	Descriptive norms[a]	-.001	-.011	-.014 - .013	
	Descriptive norms[b]	.001	.010	-.018 - .019	
	Descriptive norms[c]	.283	.241	-.109, .674	
	Descriptive norms[d]	-.058	-.062	-.393 - .276	
	Descriptive norms[e]	-.038	-.049	-.289 - .214	
	Moral norms	.038	.059	-.172 - .247	
	Self-efficacy	-.016	-.015	-.269 - .237	
	Situational temptation	.623	.459**	.241 - 1.005	
	Anticipated regret	-.218	-.357*	-.434 - -.002	

Note. Descriptive norms[a] = perceived prevalence of doping use in elite athletes; Descriptive norms[b] = perceived prevalence of doping use in exercisers; Descriptive norms[c] = knowing doped exercisers; Descriptive norms[d] = believing that most professional athletes use doping*; Descriptive norms[e] = Believing that most exercise would use doping to enhance performance ; * $p < .05$, ** $p < .005$, *** $p < .001$.

Note. *$p < .05$; **$p \leq .001$.