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ABSTRACT
Research has shown that athletes’ attitudes towards the use of banned performance-enhancing substances are reliable predictors of their intentions to use these substances, which in turn can be relevant predictors of their actual doping behaviours. Despite the important role played by attitudes and intentions in doping, research analysing how to change those attitudes and intentions is relatively scarce. The present study examined how individual differences in need for cognition (NC, Cacioppo & Petty, 1982) influenced doping-related attitude change and subsequent behavioural intentions. Participants were randomly assigned to read a persuasive message either against or in favour of legalising the use of several banned substances, including anabolic androgenic steroids (AAS) and Erythropoietin (EPO). In addition, participants completed the NC scale, and finally reported their attitudes and behavioural intentions regarding the legalisation proposal. As hypothesised, results showed that participants who received an anti-legalisation message had significantly more unfavourable attitudes towards the proposal than participants who received a pro-legalisation message, regardless of NC. However, as predicted, NC moderated the relationship between individuals’ attitudes and their intentions. That is, high-NC participants showed greater attitude-intention correspondence than low-NC participants.

Introduction

A wealth of research has shown that athletes’ attitudes towards the use of banned performance-enhancing substances are reliable predictors of their intentions to use these substances (e.g., Barkoukis, Lazuras, Tzorbatzoudis, & Rodafinos, 2013; Lazuras, Barkoukis, Rodafinos, & Tzorbatzoudis, 2010; Lucidi, Grano, Leone, Lombardo, & Pesce, 2004; Lucidi et al., 2008). Furthermore, prior research has indicated that attitudes and intentions are among the most relevant psychological determinants of doping behaviours (e.g., see Backhouse, Whitaker, Patterson, Erickson, & McKenna, 2016; Morente-Sánchez & Zabala, 2013; Ntoumanis, Ng, Barkoukis, & Backhouse, 2014; for reviews).

Among those studies that have experimentally investigated doping-related attitude change, James, Naughton, and Petróczi (2010) demonstrated that exposing male recreational gym users to a persuasive message that promoted alternatives to doping changed their beliefs and automatic associations regarding permitted functional foods (e.g., nitrate-rich food such as beetroot). Similarly, Barkoukis, Lazuras, and Harris (2015) demonstrated that attitudes and intentions towards doping among elite athletes (users of doping substances) were influenced by a manipulation of self-affirmation (vs. control), such that a persuasive message discussing the health side effects and moral aspects of doping generated significantly lower intentions to use AAS for self-affirmed (vs. control) participants.

Although prior theory and research have noted that targeting a recipient’s attitudes and intentions can be an effective strategy for inducing changes in actual doping-related behaviours, relatively little effort has been made to integrate prior doping-related attitudes research within a contemporary attitudes and persuasion framework (e.g., see Horcajo & De la Vega, 2014). Furthermore, what remains unknown is which variables and psychological processes influence the attitude-intention relationship regarding doping behaviour. Thus, the goal of the present study was to apply one of the most prominent theoretical frameworks used in contemporary persuasion research to investigate the relationship between attitudes and intentions related to doping among a sample of young adults. Specifically, we based our predictions on the Elaboration Likelihood Model (ELM, Petty & Cacioppo, 1986; see also Petty & Briñol, 2012; Petty & Wegener, 1999), which holds that attitude change can occur through relatively thoughtful (i.e., “high elaboration”) or relatively non-thoughtful (i.e., “low elaboration”) processes depending on the extent to which people are motivated and able to carefully consider the merits of persuasive communications.

Most important for the present study, the ELM provides a theoretical framework that explains how dispositional and situational variables can influence attitude change under a diverse set of conditions, including within the context of sports (Petty, Briñol, Teeny, & Horcajo, 2018). Thus, the value of the ELM is its ability to make very specific predictions about how any
variable can influence attitudes under different levels of thought and elaboration, as well as specifying the downstream consequences on intentions and behaviours. In fact, the ELM holds that the process by which an attitude is formed or changed is consequential for the strength of the resulting attitude. That is, attitudes formed or changed as a result of careful thought are more likely to yield changes in behavioural intentions and actual behaviours than attitudes changed as a result of less careful thought (e.g., see Petty, Haugtvedt, & Smith, 1995; Petty & Wegener, 1998).

Importantly, recent research investigating the relationship between cognitive processing and doping-related attitude change has shown that attitudes changed as a result of high-elaboration processes were more stable and persistent (Horcajo & De la Vega, 2014), more resistant to further change, and more predictive of behavioural intentions (Horcajo & Luttrell, 2016) than attitudes changed through low-elaboration processes. Moreover, conviction (i.e., certainty) in one’s attitude was also higher when individuals changed their attitudes through high-elaboration (vs. low-elaboration) processes (Horcajo & De la Vega, 2016). Although this research highlighted a number of important downstream consequences of cognitive processing on attitude change, one notable limitation of these studies is that in each case, elaboration (high vs. low thinking) was manipulated by using an induction that only temporarily affected thinking by either increasing or decreasing the extent to which participants felt personally responsible for their answers and/or perceived the topic as personally relevant. Of course, showing that changes in doping-related attitudes and intentions can be produced even by inductions that stimulate relatively temporary changes in thinking is important. However, if similar changes in doping-related attitudes and intentions could also be produced as a result of more stable factors such as dispositional attributes linked to preferences for careful thinking (i.e., the need for cognition), this could have important real-world implications for the design of doping-intervention programmes because individual-difference variables are a significant source of variance in doping behaviour (e.g., see Chan et al., 2015; Gucciardi, Jalleh, & Donovan, 2011; Jalleh, Donovan, & Jobling, 2014; Madigan, Stoebber, & Passfield, 2016). Thus, in an attempt to address this potential methodological issue while also enhancing ecological validity, we sought to conceptually replicate and extend prior research by using a stable, well-validated individual-difference variable to assess participants’ amount of elaboration. Specifically, we tested whether individual differences in need for cognition (NC, Cacioppo & Petty, 1982) moderated the relationship between attitudes and intentions related to doping. That is, by identifying individuals’ relative level of NC, researchers can better predict for whom attitudes changed as a result of doping interventions will show greater correspondence with intentions and subsequent behaviours, among other important downstream consequences.

NC is an individual-difference variable often linked to different processes and outcomes related to attitude formation and change. Specifically, NC is represented by a continuum that reflects stable, individual differences in the tendency to engage in and enjoy effortful cognitive activities (see Cacioppo, Petty, Feinstein, & Jarvis, 1996; Petty, Briñol, Loersch, & McCaslin, 2009; for reviews). Individuals who fall at the upper end of the continuum (high in NC) tend to engage in and enjoy cognitively challenging activities, whereas individuals who fall at the lower end of the continuum (low in NC) tend to exhibit relatively less engagement and less enjoyment of cognitively challenging tasks.

In accord with the ELM (Petty & Cacioppo, 1986), early research on NC demonstrated that political attitudes of high-NC (vs. low-NC) individuals were more predictive of their intentions and subsequent voting behaviours because of the greater chronic tendency in high-NC individuals to carefully process and integrate issue-relevant information into an overall evaluative position (e.g., Cacioppo, Petty, Kao, & Rodriguez, 1986). In contrast, attitude change in low-NC individuals is usually based more on a simple cue that provides some evaluative association or allows some relatively simple inference (e.g., heuristic rule) regarding the validity of the advocacy. In sum, individuals high (vs. low) in NC may exhibit greater attitude-behaviour correspondence because their attitudes are based more on a careful consideration of issue-relevant information.

Interestingly, although a large body of literature has examined the effects of NC on attitudes and persuasion (see Cacioppo et al., 1996; Petty et al., 2009; for reviews), few studies have examined the relationship between NC and either behavioural intentions or actual behaviours. Furthermore, as far as we are aware, of those studies that have examined these relationships, nearly all have used topics regarding desirable behaviours, such as exercise behaviour (Conner, Rhodes, Morris, McEachan, & Lawton, 2011), fruit and vegetable consumption (Williams-Piehota, Pizarro, Navarro Silvera, Mowad, & Salovey, 2006), mammography utilisation (Williams-Piehota, Schneider, Pizarro, Mowad, & Salovey, 2003), breast self-examination (Ruiter, Verplanken, De Cremer, & Kok, 2004), [cancer patients] talking to their physicians about clinical trials (Latimer et al., 2008), pro-environmental behaviour (Barbaro, Pickett, & Parkhill, 2015), or voting behaviour (Cacioppo et al., 1986). One exception that focused on an undesirable behaviour examined excessive alcohol consumption (Hittner, 2004), but this study did not analyse attitudes or attitude-intention correspondence. In addition, even fewer studies have included both attitudes and intentions as separate dependent variables within the same study. Thus, very little is known about how individual differences in NC might influence the relationship between attitudes and behavioural intentions regarding behaviours considered as undesirable (e.g., doping in sports). In fact, existing data is somewhat unclear and inconclusive regarding the moderating role of NC on the relationship between attitudes and behavioural intentions – and/or actual behaviours. For example, whereas some research has found evidence in favour of the moderating role of NC (e.g., Cacioppo et al., 1986), other research either did not find evidence.
or did not report it (e.g., Conner et al., 2011; Ruiter et al., 2004). As a consequence, the gaps and inconsistencies in the existing literature provide an important opportunity to clarify the role of NC in the attitude-intention relationship.

In the present study, attitude change was induced using a manipulation of the direction of the message with two experimental conditions. Specifically, participants were randomly assigned to read one of two different versions of a persuasive message composed of information either against (i.e., the anti-legalisation message) or in favour of (i.e., the pro-legalisation message) legalising several doping behaviours (e.g., the use of AAS and EPO). This manipulation was used to influence the favourability of participants’ attitudes. That is, the message against legalisation was expected to produce significantly more unfavourable attitudes towards the legalisation proposal than the message in favour of legalisation. In addition, participants completed the NC scale, after which they reported their attitudes and behavioural intentions regarding the legalisation proposal.

In accord with the ELM and prior research, we made three main predictions:

Hypothesis 1: We expected that the anti-legalisation message would generate more unfavourable attitudes than the pro-legalisation message, regardless of participants’ level of NC. That is, we hypothesised a main effect of the direction of the message on attitudes towards the legalisation proposal.

Hypothesis 2: We expected that attitudes towards the legalisation proposal (when included as a predictor variable) would predict behavioural intentions. Specifically, more unfavourable attitudes would predict lower intentions to support legalisation and less willingness to engage in those banned behaviours if legalised, compared with more favourable attitudes. That is, we hypothesised a main effect of attitudes towards the legalisation proposal on behavioural intentions.

Hypothesis 3: We expected that NC would moderate the relationship between individuals’ attitudes (when included as a predictor variable) and their intentions, such that greater correspondence between attitudes towards the legalisation proposal and intentions to support and engage in those banned behaviours if legalised should emerge for high (vs. low) NC individuals. That is, we hypothesised an interaction between attitudes and NC on behavioural intentions.

Method

Participants and design

One hundred thirty-six university students (109 females, 25 males, 2 unidentified; $M_{age} = 19.39, SD = 1.60$) were randomly assigned to a 2 (Message Direction: Against vs. In Favour of Legalisation) between-participants factorial design, with Need for Cognition as an additional predictor variable. An *a priori* power analysis was conducted using G*Power (Faul, Erdfelder, Buchner, & Lang, 2009) based on similar prior research analysing the effects of elaboration on attitude strength regarding doping-related attitudes (averaging $f = .24$; see Horcajo & De la Vega, 2014; Horcajo & Luttrell, 2016). Results of the G*Power analysis indicated that the desired sample size for our study with an effect size of $f = .24$ and a power of .80 is $N = 139$. Our final sample size was determined by the number of participants that we were able to collect during the academic semester, resulting in a number that was nearly identical (136 participants) to the estimated one. Importantly, our goal was to examine attitudes and behavioural intentions related to doping in recreational sports because recent research indicates this is an emerging issue among young adults (e.g., see Lazuras et al., 2017).

Procedure

Permission to conduct the study was provided by the university institutional ethics committee before the study began. Using a procedure adapted from prior research (see Horcajo & De la Vega, 2014, 2016; Horcajo & Luttrell, 2016), participants were told that they would be taking part in a study regarding the legalisation of several doping behaviours (e.g., the use of anabolic androgenic steroids; AAS, and Erythropoietin; EPO). We chose a legalisation proposal as our target attitude object (instead of towards doping itself) in order to reduce bias induced by socially desirable responding (e.g., Gucciardi, Jalleh, & Donovan, 2010; Petrózzi & Nepusz, 2011). Next, participants were randomly assigned to receive a persuasive message that presented either negative (i.e., risks) or positive (i.e., benefits) information about the legalisation of those banned behaviours. Both messages contained a mix of strong arguments (which can lead to attitude change when people think carefully about the message), and potential peripheral cues such as a credible source (which can lead to attitude change when people do not think carefully about a message). Thus, participants were likely to be persuaded regardless of whether they were thinking carefully (high-NC individuals) or not thinking carefully (low-NC individuals) about the message (see Haugtvedt & Petty, 1992, for a similar approach). In addition, participants completed the NC scale. Finally, participants reported their attitudes and behavioural intentions towards the legalisation proposal, then filled out several socio-demographic questions. After all measures were completed, each participant was debriefed and received information clarifying the purpose of the study.

Independent variables

Message direction

Messages were taken from prior research (e.g., see Horcajo & Luttrell, 2016). In the anti-legalisation condition, the message contained a mix of strong arguments (which can lead to attitude change when people think carefully about the message), and potential peripheral cues such as a credible source (which can lead to attitude change when people do not think carefully about a message). Thus, participants were likely to be persuaded regardless of whether they were thinking carefully (high-NC individuals) or not thinking carefully (low-NC individuals) about the message (see Haugtvedt & Petty, 1992, for a similar approach). In addition, participants completed the NC scale. Finally, participants reported their attitudes and behavioural intentions towards the legalisation proposal, then filled out several socio-demographic questions. After all measures were completed, each participant was debriefed and received information clarifying the purpose of the study.

3Participants were required to meet the following inclusion criteria: a) fall between 18 and 26 years of age; b) engage in sports or physical exercise at least 3 hours per week; and c) not be enrolled as last-year university students because these students could have already taken upper-year attitudes and persuasion courses and thus be aware of our hypotheses, which could potentially bias their responses.

2Participants were told that messages did not include rigorous and accurate scientific information (most importantly, about the certain benefits of those substances and behaviours). Furthermore, a message in favour of legalisation was included to have more equivalent tasks across experimental conditions and to permit a better comparison with a message against legalisation (Horcajo & De la Vega, 2014). Applications of this research (e.g., doping prevention programmes) should include the implementation of effective programmes to change doping-related attitudes in only one direction (i.e., against doping).
emphasised various risks of legalisation. For example, “it is not appropriate to permit the use of substances such as EPO and AAS because these substances can produce severe harm to athletes’ health,” and “one of the most obvious consequences of legalising these doping substances is that their consumption would skyrocket and occur at increasingly early ages by athletes,” and “the level of physical and psychological dependence could increase the consumption of certain harmful substances.”

By contrast, in the pro-legalisation condition, the message emphasised various benefits of legalisation under medical guidance. For example, “substances such as EPO and AAS could help athletes cope with stress,” and “the legalisation of some practices and substances that are currently prohibited would lead to more investment in research and development in order to improve sports performance, which would create new job opportunities and with it new jobs,” and “legalisation would be beneficial because some athletes acquire these substances on the ‘black market’ without any medical control or a medical prescription regarding safe dosages.”

In addition, both messages contained several variables potentially serving as peripheral cues, including: a credible source (e.g., the World Anti-Doping Agency; WADA), the blatant direction of the proposal (highlighting the terms risks or benefits of legalisation by underlining them and making them bold), and a relatively extensive number of arguments (i.e., five arguments per message). Therefore, consistent with prior research (e.g., Horcajo & De la Vega, 2014), we anticipated that attitudes were likely to change for both high-NC individuals (via more reliance on argument quality) and low-NC individuals (via more reliance on peripheral cues).

**Need for cognition**

All participants completed the Spanish version of the 18-item NC scale (Falces, Briñol, Sierra, Becerra, & Alier, 2001). This scale is a well-validated, single-factor measure assessing individual differences in the tendency to engage in and enjoy effortful cognitive activities (see Cacioppo, Petty, & Kao, 1984). It includes items such as “I would prefer complex to simple problems” and “I find satisfaction in deliberating hard and for long hours.” Each item is answered on a 5-point Likert-type scale ranging from 1 (extremely uncharacteristic of me) to 5 (extremely characteristic of me). Items showed high internal consistency ($\alpha = .87$); therefore, the final score for each participant was the mean of all 18 items. NC scores did not differ as a function of Message Direction ($p = .526$), Attitude ($p = .627$), Behavioural Intentions ($p = .189$), or the interactions between these variables ($ps > .215$).

**Dependent variables**

**Attitudes**

Attitudes towards the legalisation proposal were assessed using the same eight 9-point semantic differential scales from prior research (Horcajo & Luttrell, 2016): against vs. in favour, less vs. more stress after legalisation, unhealthy vs. healthy, inappropriate vs. appropriate, negative vs. positive, undesirable vs. desirable, non-recommendable vs. recommendable, and bad vs. good. Item-ratings were highly correlated ($\alpha = .91$), thus averaged to create a composite attitude index. Responses to these attitude scales were scored so that higher values represented more favourable attitudes towards legalisation.

**Behavioural intentions**

Participants’ behavioural intentions were assessed using three 9-point items adapted from Horcajo and Luttrell (2016) for this specific sample of participants: (1) “Hypothetically, to what extent would you be willing to deliver flyers supporting the legalisation proposal?”, (2) “Hypothetically, to what extent would you be willing to participate in a debate supporting the legalisation proposal?”, and (3) “Hypothetically, to what extent do you have the intention to use the substances and do the behaviours if they were legalised?” We chose these items because they are specifically tailored to the legalisation proposal of several doping substances (i.e., AAS and EPO) rather than to doping itself. Additionally, these items better fit the specific type of population (i.e., university students) in the present study because two of the three items assess relatively familiar activities for university students (i.e., delivering flyers and participating in a debate). The third item is exactly the same as that used in Horcajo and Luttrell (2016). Item-ratings were moderately correlated ($\alpha = .67$), thus averaged to create a composite index of behavioural intentions. Higher values represent greater intentions to support the legalisation proposal and to engage in those banned behaviours if legalised.

**Results**

**Attitudes**

The attitudes measure was submitted to a hierarchical multiple regression analysis conducted via PROCESS (Hayes, 2013; Model 3). Message Direction (dummy coded; anti-legalisation = 0; pro-legalisation = 1), NC (continuous variable), Behavioural Intentions (continuous variable), and the interaction terms were entered as predictors. NC scores and Behavioural Intentions were mean centred in the analyses to address collinearity issues when computing interaction terms. Following the suggestion of Cohen and Cohen (1983), all main effects and interactions were interpreted in the first block in which they appeared in the regression analysis.

As hypothesised and shown in Figure 1, a significant main effect of Message Direction emerged, $B = 1.133$ (95%CI: .776, 1.490), $t(132) = 6.275$, $p < .001$, Cohen’s $f = 0.546$. That is, participants who received the anti-legalisation message elicited more unfavourable attitudes towards the proposal ($M = 2.16$, $SD = .95$) than

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4 These variables are expected to serve as simple cues when recipients are under low-elaboration conditions (such as low-NC individuals). However, these same variables can also affect attitudes through different processes under other circumstances (e.g., see Petty & Briñol, 2012; Petty & Cacioppo, 1986; Petty & Wegener, 1998).

5 To control for the potential effect of behavioural intentions on attitudes, participants’ intentions were included in the analysis as a covariate.
participants who received the pro-legalisation message (M = 3.82, SD = 1.44), independent of NC levels (i.e., high or low NC).\(^6\) Moreover, as expected, a significant positive relationship emerged between Behavioural Intentions and attitudes, B = .547 (95%CI: .413, .680), t(132) = 8.102, p < .001, Cohen's \(f = 0.705\), such that greater intentions to support the legalisation proposal were tied to more favourable attitudes towards legalisation. No further effects reached significance (ps > .1).

### Behavioural Intentions

Similar analyses using PROCESS were conducted to investigate the relationship between Message Direction, NC, Attitudes, and the interaction terms as predictors, with behavioural intentions as our dependent variable (see Horcajo & Luttrell, 2016, for a similar approach). In this case, NC scores and Attitudes were mean centred. As hypothesised, results indicated a significant main effect of Attitudes, B = .608 (95%CI: .459, .756), t(132) = 8.014, p < .001, Cohen's \(f = 0.695\), indicating that attitudes were more unfavourable for the anti- than pro-legalisation message. No other main effect emerged (ps > .19).\(^7\) Of critical importance, the expected interaction between Attitudes and NC on behavioural intentions was found, B = .215 (95%CI: .018, .412), t(132) = 2.163, \(p = .032\), Cohen's \(f = 0.188\). As hypothesised and illustrated in Figure 2, this pattern revealed that attitudes were a better predictor of intentions for high-NC (B = .704 [95%CI: .549, .859], t(132) = 8.990, p < .001, Cohen's \(f = 0.782\)) than for low-NC (B = .447 [95%CI: .265, .629], t(132) = 4.867, p < .001, Cohen's \(f = 0.424\)) individuals.\(^8\)

### Discussion

This study showed that individual differences in need for cognition are an important determinant of the relationship between attitudes and intentions related to doping. Specifically, we hypothesised and found that attitudes were more predictive of intentions for high-NC than for low-NC individuals, even though no difference in attitude favourability emerged across levels of NC. This finding is consistent with the idea that for high-NC individuals, attitude change typically occurs via processes that involve more issue-relevant thinking, whereas for low-NC individuals, attitude change is often elicited by peripheral cues (see Cacioppo et al., 1996; Petty et al., 2009; for a review). In line with multi-process models of persuasion such as the ELM (Petty & Cacioppo, 1986) or the HSM (Heuristic-Systematic Model, Chaiken, Liberman, & Eagly, 1989), we suggest that those different processes leading to attitude change for high-NC (vs. low-NC) individuals were responsible for the differences found in our study regarding attitude-intention correspondence.\(^9\) Therefore, the present research meaningfully advances the doping-related attitudes literature by proposing the ELM as a relatively new (and complementary) conceptual framework in doping research, as well as by proposing a very specific moderator of the relationship between attitudes and behavioural intentions that has not been

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\(^6\)When Message Direction and NC were the only predictors included in the model, the main effect of Message Direction remained significant, B = 1.650 (95%CI: 1.242, 2.057), t(133) = 8.014, p < .001, Cohen's \(f = 0.695\), indicating that attitudes were more unfavourable for the anti- than pro-legalisation message. No other effects were significant (ps > .12).

\(^7\)When Message Direction and NC were the only predictors included in the model, a main effect of Message Direction emerged, B = .946 (95%CI: .517, 1.375), t (133) = 4.358, p < .001, Cohen's \(f = 0.378\), indicating lower behavioural intentions for the anti-legalisation than pro-legalisation message. Also, a main effect of NC emerged, B = .361 (95%CI: .001, .721), t(132) = 1.985, \(p = .049\), Cohen's \(f = 0.172\), indicating greater behavioural intentions as NC increased.

\(^8\)A marginally significant three-way interaction (Message Direction × NC × Attitudes) emerged, B = .515 (95%CI: -.029, 1.078), t(132) = 1.877, \(p = .063\), Cohen's \(f = 0.166\), indicating that the expected pattern of results was more pronounced for the pro-legalisation (vs. anti-legalisation) message. In addition, there was a marginal effect of Message Direction × NC interaction, B = .639 (95%CI: -.081, 1.359), t(132) = 1.756, \(p = .081\), Cohen's \(f = 0.153\). In line with prior research (Horcajo & Luttrell, 2016), for the high-NC participants, those who received the anti-legalisation message reported significantly lower intentions to support legalisation and to engage in doping behaviours if legalised than those who received the pro-legalisation message, B = 1.326 (95%CI: .722, 1.929), t(132) = 4.344, \(p < .001\), Cohen's \(f = 0.379\). For the low-NC participants, there was only a marginal difference between those who received the message against and those who received the message in favour of legalisation, B = .563 (95%CI: -.044, 1.169), t(132) = 1.836, \(p = .069\), Cohen's \(f = 0.160\). Finally, there was no Message Direction × Attitudes interaction, B = .056 (95%CI: -.256, .369), t(132) = 0.356, \(p = .722\), Cohen's \(f = 0.031\).

\(^9\)According to the ELM (e.g., see Petty & Briñol, 2012), when either motivation or ability to think is low, variables typically serve as simple peripheral cues, producing an effect that is consistent with their valence (i.e., variables evaluated positively lead to more persuasion). When motivation and ability to think are high, variables can produce persuasion via other processes, such as serving as arguments (pieces of evidence), biasing thoughts, or influencing the degree to which a person has confidence in their thoughts (i.e., self-validation) and thus relies on them when making judgements. When thinking is not constrained to be high or low by other factors, then variables determine how much thinking is done.
examined in prior doping literature: The need for cognition. This moderator is important because it provides critical information that helps understand when and why attitudes predict intentions and behaviours and when they do not.

Our findings highlight the important role of attitude strength as it relates to attitude-intention correspondence. As shown in the present study, variations in the amount of elaboration (i.e., high vs. low NC) are consequential. In fact, when people are relatively unmotivated (e.g., low-NC individuals) or unable to think, they are more likely to form or change their attitude by relying on the valence of immediately accessible information that originates either internally (e.g., one’s prior attitude) or externally (e.g., the credibility of the source). In contrast, when people are motivated (e.g., high-NC individuals) and able to think, they are more likely to form or change their attitude by carefully processing issue-relevant information and integrating it into an overall evaluative position which predicts their intentions to a greater extent. Based on prior research (e.g., see Petty et al., 1995), we suggest that doping-related attitude change occurring as a result of high-elaboration processes could enhance the accessibility of the newly formed or changed attitude and/or increase one’s certainty in the attitude (e.g., see Horcajo & De la Vega, 2016). Consequently, this could increase attitude persistence, resistance to counter-attitudinal information, and yield larger attitude-behaviour correspondence compared with doping-related attitude change occurring as a result of low-elaboration processes.

Taken together, the results of our study not only contribute to doping research by specifying when and for whom attitudes predict intentions related to doping, but also to the broader literatures on attitude change and need for cognition, accumulating conclusive evidence that NC is capable of moderating attitude-intention/behaviour correspondence, as proposed by the ELM and other models of attitude change such as the HSM, even in the case of an undesirable behaviour such as doping in sports. In addition, by considering the role of individual differences in the preference for careful thinking, indeed the ELM provides a relevant framework that allows both researchers and practitioners to make useful suggestions to improve the efficacy of interventions designed to change attitudes, intentions, and behaviours related to doping in the context of sports. Consider this in light of the meta-analysis conducted by Ntoumanis et al. (2014), which evaluated the effectiveness of existing randomised controlled trials regarding intervention programmes such as ATLAS (e.g., Goldberg et al., 1996, 2000) and ATHENA (e.g., Elliot et al., 2004, 2008; see also Goldberg & Elliot, 2005). While their meta-analysis revealed a very small, albeit significant, reduction in doping intentions, no changes in doping behaviour were found. Although some explanations were proposed (e.g., the non-significant effects might reflect floor effects because participants’ doping intentions at baseline [pre-intervention] were low, see Ntoumanis et al., 2014), as shown in the present study, the conceptual framework provided by the ELM allows greater insight into these types of questions because it permits researchers and practitioners to make more specific predictions regarding when (not whether) doping-related attitude change will be consequential for intentions and behaviours (e.g., when individuals have high levels of NC).

Nevertheless, it is important to recognise that doping behaviour is a very complex phenomenon that can be studied from multiple levels (e.g., individual, interpersonal, social, cultural, sport-specific) and perspectives (e.g., see Barkoukis et al., 2013; Donovan, 2009; Johnson, 2011, 2012; Petróczi, 2013; Petróczi, Norman, & Brueckner, 2017; Pitsch, Emrich, & Klein, 2007). Thus, although the data supported our hypotheses, it should be noted that our study is not without limitations. For example, like any study involved in “the cognitive research program” (Hauw & McNamee, 2015), our conclusions are based on the hypothesis that attitudes and intentions are causally related to behaviour in accord with most psychological research on doping, which has extensively maintained this “cognitive research program” assumption. However, as noted by Hauw and McNamee (2015), other research programmes can also be used to understand doping behaviour, such as those analysing the drive/motivation leading to doping behaviour (i.e., “the drive research program”) or the influence of the context on doping behaviour (i.e., “the situated dynamic research program”). Of course, the underlying motives for the use of doping substances and methods is a relevant question for research, as is the study of doping behaviour that indeed emerges in specific contexts, and comes from interactions between individuals and situations (Hauw, 2013). Moreover, “drives” and “contexts” can widely differ between recreational sportspeople and elite athletes. This fact notwithstanding, the results of the present study are consistent with prior research analysing the effects of elaboration on attitude change and intentions related to doping (e.g., Horcajo & De la Vega, 2014, 2016; Horcajo & Luttrell, 2016), even though these prior studies examined other different populations (e.g., soccer players and coaches). The consistency in results is not surprising because the cognitive processes tested in the present study are expected to occur irrespective of a person’s specific level or role in sports. Nevertheless, although the same processes operate, future research should analyse these cognitive processes in relation with other contexts, as well as regarding different “drives” which could influence information processing in different ways.

It is also important to recognise that each approach or “research program” has strengths and weaknesses (Hauw & McNamee, 2015). From a specific cognitive perspective, the present study demonstrates that individual differences in NC can influence the psychological processes leading to attitude change and subsequent intentions related to doping, although other traits and dispositional characteristics can also influence attitudes and attitude-behaviour correspondence regarding doping (e.g., see Chan et al., 2015; Guccardi et al., 2011; Jalleh et al., 2014; Madigan et al., 2016; see Brînol & Petty, 2019, for a recent review on the effects of individual-difference factors on attitude change). Moreover, it should be noted that our goal was not to provide an alternative theory to replace current models and theories in doping research, such as the applications of the Theory of Planned Behaviour (Ajzen, 1991), or similar conceptual models which include different social psychological factors predicting doping behaviour. Rather, we sought to use the ELM to expand our understanding of when and why attitudes formed or changed in
response to persuasive information can predict (or not predict) intentions and behaviours related to doping. Therefore, although we agree with contemporary attitude models related to doping, and their relationships with intentions and behaviours, the novelty/value of our approach is linked to the ELM’s ability to specify the factors and psychological processes responsible for those relationships. In sum, the conceptual framework provided by the ELM (Petty & Cacioppo, 1986) is in fact a relevant and complementary framework to current doping attitude models, thus extending our understanding of attitude change, as well as intentions and behaviours related to doping (e.g., Horcajo & De la Vega, 2014, 2016; Horcajo & Luttrell, 2016; see Petty et al., 2018, for a review).

In light of the present findings, future research can benefit from considering the influential role played by differences in a person’s propensity for careful thought when designing and implementing more effective doping prevention programmes. Similarly, future research could also benefit by examining the role of NC as a relevant variable within other doping-specific models to better understand not only doping-related attitude formation and change, but also the attitude-intention-behaviour correspondence. Finally, by knowing the recipients’ personal characteristics and message characteristics, prevention programmes might more effectively facilitate attitude change under specific circumstances, and thus increase attitude-behaviour correspondence in the desired direction (i.e., against doping in sports).

Although we believe the current study provides some useful insights regarding the moderating role of NC in the relationship between attitudes and intentions related to doping, it should be acknowledged that we assessed attitudes and intentions rather than doping behaviour per se. Thus, our focus was somewhat different than some prior research, which has specifically examined the relationship between intentions and doping behaviour. The results of these studies have largely been inconsistent, with some authors finding a significant relationship (e.g., Backhouse et al., 2016; Ntoumanis et al., 2014), while others did not (e.g., Blank, Kopp, Niedermeier, Schnitzer, & Schobersberger, 2016). While different explanations could be proposed based on different populations (e.g., elite athletes vs. recreational sportspeople), methodological issues, macro-level factors, and so forth (e.g., see Blank et al., 2016; Ntoumanis et al., 2014; for a discussion), we speculate that the inconsistent relationship between intentions and doping behaviour could also be linked to the notion of attitude strength. Indeed, as previously discussed, a large body of work has indicated that attitudes formed via extensive cognitive elaboration of attitude-relevant information are more predictive of behavioural intentions and behaviours than are attitudes formed via relatively less careful thought (e.g., see Petty et al., 1995; Petty & Wegener, 1998). Thus, one potentially fruitful area for future research would be to specifically analyse the consequences of attitude strength on actual doping behaviour (vs. intentions), as well as other potential (situational and individual) moderators of the relationship between attitudes, intentions and doping behaviour.

In conclusion, our findings provide convergent evidence with the ELM and prior doping research showing that both momentary experimental manipulations of elaboration (e.g., Horcajo & De la Vega, 2014, 2016; Horcajo & Luttrell, 2016), and stable dispositional factors that affect elaboration (i.e., NC), can determine the psychological processes leading to changes in doping-related attitudes. Importantly, understanding these processes can help us to describe, explain and better predict the immediate and long-term attitudinal and behavioural consequences regarding doping in sports.

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