

# Attitudes towards doping in Spanish competitive female Cyclists vs. Triathletes

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## Abstract

The aim of the present study was to know and compare the attitudes towards doping in Spanish competitive female cyclists and triathletes. All the female cyclists and triathletes who competed (U23 and elite) under license in Spain in 2012 ( $n = 206$ ;  $29.62 \pm 8.70$  years) in the highest national competitions level comprised the sample. The total sample was divided into two: cyclists ( $n = 80$ ;  $28.86 \pm 9.64$  years), and triathletes ( $n = 126$ ;  $30.10 \pm 8.06$  years). Descriptive design was carried out using a validated questionnaire (Performance Enhancement Attitude Scale: PEAS). Complementary, four top-level athletes of each group were interviewed. Regarding results from PEAS, for the whole sample, overall score (17-102) was  $34.02 \pm 12.74$ . Regarding different groups, data were: cyclists:  $36.63 \pm 14.27$ ; and triathletes:  $32.37 \pm 11.41$  ( $p=0.032$ ). Regarding semi-structured interviews ( $n = 8$ ). The most mentioned word associated with doping was “cheating” (%  $n$ : 62.5). As responsible agents of doping was the word “coach/manager” (%  $n$ : 75.0) and the main reason for the initiation in doping was “sport achievement” and “Contract/Money” (%  $n$ : 75.0). This study shows that Spanish competitive female cyclists and triathletes, in general, are not tolerant in relation to doping. Nevertheless, competitive female cyclists are significantly more permissive towards the use of banned substances than female triathletes. Results from semi-structured interviews have shown interesting data in specific open-ended questions. The current findings may contribute to the development of anti-doping prevention programmes and interventions in an appropriate and effective manner, which could be the key to better fight the battle against doping in sport.

**Keywords:** doping prevention, female, competitive athletes, cycling, triathlon.

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## Introduction

The use of banned substances in sport is a well-known phenomenon that has been studied mainly from a biomedical point of view. Even though psychosocial approaches are also considered key factors in the fight against doping. The Tour de France of 1998 provided evidence of a systemic doping problem in sport (Bloodworth and McNamee 2010; Lentillon-Kaestner et al. 2012). Later, the World Anti-Doping Agency (WADA) was established in 1999, providing a centralized body that aimed to harmonize anti-doping strategies across elite sports (Catlin et al. 2008). In this sense, since 2004, the WADA has produced an annually updated code and related documents that outline official international anti-doping standards. Estimating the prevalence of doping is a major objective of many international and national sport governing bodies (Petróczi and Aidman 2009) in order to get a reliable view of how widespread doping is in

sport. However, the number of athletes reported as testing positive by anti-doping bodies is often smaller than what scientific literature shows. The statistics of adverse analytical findings of WADA (i.e. positive doping tests) suggest that, in an average year, 2% of elite athletes use doping substances and this number has been quite stable over the past 10 years (WADA) (Uvacsek et al. 2011). On the contrary, prevalence rates obtained by means of self-report usually vary between a range of 1.2% and 26% (Backhouse et al. 2007; Ohaeri et al. 2004; Özdemir et al. 2005; Papadopoulos et al. 2006; Petróczi 2007; Pitsch et al. 2005; Tahtamouni et al. 2008). Furthermore, according to Lentillon-Kaestner and Ohl (2011), it is important to emphasize that drug testing and questionnaires do not provide the true prevalence of doping substances users. These authors, in a study with 1810 amateur athletes, observed that depending on the definition of doping and the type of question used, the prevalence of doping obtained could differ enormously, between 1.3 and 39.2% of athletes.

In the absence of more objective information on performance enhancing drugs (PED) use, attitudes are often used as an alternative for doping behaviour, assuming that doping users are more permissive towards doping than non-users (Petróczi and Aidman 2009). Attitudes were also in the foci of doping behavioural models (Dodge and Jaccard 2008; Donovan et al. 2002; Lucidi et al. 2008; Strelan and



Boeckmann 2003) aiming to identify risk factors that lead to doping. The “theory of planned behaviour” (Ajzen 1991) suggests that behaviour depends on people’s plans of actions towards that behaviour (intentions), which are regulated by people’s perceived behavioural control, their subjective norms, and attitudes (Lucidi et al. 2008).

We have found that there is an important lack of investigations that have studied attitudes towards doping in female athletes being the most of studies related to attitudes towards doping in sport using samples comprised by a mix of male athletes from different disciplines or analysing big samples of team sports (Morente-Sánchez; and Zabala 2013). Specifically, here is not any study in triathlon, which has more and more followers and practitioners (some of them coming from cycling and few from running or swimming). Some authors stated that in elite cycling the use of performance enhancing drugs (PED) was endemic among the cycling teams to the extent that it became institutionalized (Bassons 2000; Kimmage 1998; Voet 1999) and was quasi-tolerated by the professional cycling community (Schneider 2006) before the “Festina scandal” in 1998, although other authors suggest that use of banned substances is nowadays less widespread (Lentillon-Kaestner et al. 2012; Zabala et al. 2009). In Spain, after so famous and unfortunate doping scandals like “Operación Puerto” in 2006, it has been suggested that this type of studies about doping in individual sports are necessary, and more specifically focused on sports like cycling (Morente-Sánchez; and Zabala 2013).

Considering the international negative view about the phenomenon of doping in Spain, (especially after the shameful resolution of Puerto case) and taking into account the lack of studies focused on female athletes, we have considered developing a qualitative research using as a sample all the Spanish female cyclists and triathletes that compete under licence in 2012 (U23 and elite) in Spanish cup (the highest competing level for both cycling and triathlon). So, the aim of the present study was to know and compare the attitudes towards doping in Spanish female cyclists and triathletes of the highest competitive level in Spain.

## Methods

The current research methodologies used to study athletes’ attitudes towards doping are weak (Backhouse et al. 2007). In addition, scientific literature research typically shows findings obtained by means of ad hoc measurements, while other scales focused on attitudes toward specific substances, mainly steroids (Anshel and Russell 1997; Schwerin and Corcoran 1996a, b; Tricker and Connolly 1997). For the majority of the measurement tools, the scale development process was not reported (or not in sufficient details) and the scales used were not subjected to psychometric testing, which seriously undermines the validity and reliability of any inference made based on the test scores obtained from those bespoke scales (Petróczi and Aidman 2009). On the other hand, a qualitative approach seemed to be the

best way to capture the complexity of doping behaviour (Lentillon-Kaestner et al. 2012). In this sense, after analysing scientific literature about researching methodology in this field, we have considered the combination of two attitudes towards doping assessment tools: a validated questionnaire (PEAS) (Petróczi and Aidman 2009) and semi-structured interviews (Lentillon-Kaestner and Carstairs 2010; Lentillon-Kaestner et al. 2012).

## Sample

All the female cyclists and triathletes who competed (since U23 category) under license in Spain in 2012 ( $n = 206$ ;  $29.62 \pm 8.70$  years) in the highest national competing level comprised the sample. The total sample was divided into two groups from mentioned disciplines: cyclists ( $n = 80$ ;  $28.86 \pm 9.64$  years) and triathletes ( $n = 126$ ;  $30.10 \pm 8.06$  years).

## Measures

A cross-sectional descriptive design was carried out by means of a validated questionnaire: Performance Enhancement Attitude Scale (PEAS) (Petróczi and Aidman 2009). This scale is a 17-question attitude scale with response options ranging from strongly disagree to strongly agree on a six-point Likert-type scale (1= Strongly Disagree; 2=Through disagree; 3= Slightly disagree; 4=Slightly Agree; 5=Agree; 6= Strongly Agree). So, overall score ranges from 17 to 102, so higher scores represent a more lenient attitude toward doping. This tool has been used in previous studies showing good psychometric properties (Petróczi and Aidman 2009; Uvacsek et al. 2011, Morente-Sánchez, Mateo-March and Zabala, 2013). Participation was completely voluntary and to provide the subjects with a sense of security, and thus to obtain reliable data, the principle of anonymity was secured.

Although its satisfactory validation in Spanish is still in publication process (Morente-Sánchez, Femia-Marzo, Petróczi & Zabala, submitted), we found Cronbach alpha values ranging from 0.70 to 0.84 among all the groups studied. In fact, the manuscript is being developed in collaboration with the original author of PEAS (Andrea Petróczi), and the process has been carefully followed (double translation and back translation by two experts, experts review, pilot study, test-retest using a sample of 519 participants, and the use of PEAS with 18 different samples ( $n=5861$  in total), ranging from 12 to 75 years -amateur and professional football players, young football players, young cyclists, university students from Spain and UK (in English), coaches of different sports, women elite cyclists, women elite triathletes, women elite footballers, men elite cyclists, and recreational cyclists. Cronbach alphas for analysed sample in this study were 0.85 female triathletes and 0.78 for female cyclists, respectively.

On the hand, from the total sample, four cyclists and four triathletes ( $n=8$ ) were interviewed about some aspects related to better know their experience and opinion about the issue, by means of a semi-structured interview. All of interviewed participants were top-

level athletes who had belonged to Spanish National cycling/triathlon teams, and consequently, they had competed in International Championships previously (European championship, world cup, or Olympic Games). Along the research, similar terms such as “doping”, “drugs” or “banned substances” were considered those substances that are prohibited by the WADA or other governing body in training and/or sport competition, and so it was explained to subjects before answering the questionnaire.

**Data collection**

The whole sample completed the PEAS (by means of a personal online link). Written informed consent was sent in the same mail to read before completing the anonymous questionnaire voluntarily. There was no time limit for completing them.

Semi-structured interviews were conducted by one of the authors. The interviewer was a female researcher specifically trained. Interviews lasted on average for more than 2 hours and took place in a location chosen by the participants. All interviews were audio taped and transcribed accurately to be analysed by means of the software QSR NVivo 8. The semi-structured interview protocol and data treatment was adapted from a similar study (Lentillon-Kaestner and Carstairs 2010). Participants were asked about aspects that seek to delve

into the reasons of doping in their sport: three words associated with doping; three reasons for initiation in doping; three responsible agents of doping; “do you know any doping user?”; “have you ever been suggested to dope?”; “have you ever used doping substances?”; and, finally, “would you use an undetectable drug that would significantly improve performance?”. In order to win participants’ confidence and raise the data’s reliability, the next steps were taken. First, before the interviews, the aim of this study was clearly explained. Second, the athletes were warranted complete anonymity: the names of towns, teams, races, cyclists and other people were deleted from the transcript. Third, the cyclists signed a form with their names and the names of the researchers and indicated their rights (i.e. participate was voluntary and they were allowed to stop the interview or their participation in this study whenever they decided). Finally, the document with information concerning the interviewees (names, e-mail, and phone number) was deleted to guarantee anonymity; and data is presented by means of acronyms (C: cyclist; T: triathlete).

**Analyses**

Data characteristics were shown as frequencies, percentages, mean, and standard deviation. Regarding PEAS data, the Kolmogorov-Smirnov Test was applied to ensure a normal distribution of the results, followed

**Table 1.** Descriptive statistics and comparison between Spanish female competitive under-licensed cyclists and triathletes\*

PEAS (Performance Enhancement Attitude Scale)	Total sample (n=206)		Cyclists (n=80)		Triathletes (n=126)		p
	Mean	SD	Mean	SD	Mean	SD	
1. Legalizing performance enhancements would be beneficial for sports.	1.70	(1.43)	1.79	(1.51)	1.65	(1.38)	.503
2. Doping is necessary to be competitive.	1.32	(1.01)	1.41	(1.19)	1.25	(0.87)	.379
3. The risks related to doping are exaggerated.	1.80	(1.47)	1.99	(1.61)	1.68	(1.37)	.162
4. Recreational drugs give the motivation to train and compete at the highest level.	1.54	(1.32)	1.68	(1.49)	1.46	(1.19)	.333
5. Athletes should not feel guilty about breaking the rules and taking performance-enhancing drugs.	1.36	(1.12)	1.31	(1.04)	1.40	(1.17)	.596
6. Athletes are pressured to take performance-enhancing drugs.	3.21	(1.81)	3.34	(1.87)	3.13	(1.78)	.313
7. Health problems related to rigorous training and injuries are just as bad as from doping.	3.11	(1.95)	3.33	(2.07)	2.98	(1.87)	.147
8. The media blows the doping issue out of proportion.	2.96	(1.96)	3.60	(1.99)	2.55	(1.83)	.000 <sup>1-2</sup>
9. Media should talk less about doping.	2.66	(1.89)	3.33	(2.02)	2.23	(1.67)	.000 <sup>1-2</sup>
10. Athletes have no alternative career choices. but sport	1.62	(1.37)	1.80	(1.54)	1.51	(1.24)	.155
11. Athletes who take recreational drugs use them because they help them in sport situations.	2.72	(1.85)	2.76	(1.89)	2.70	(1.83)	.749
12. Recreational drugs help to overcome boredom during training.	1.41	(1.11)	1.46	(1.18)	1.37	(1.07)	.572
13. Doping is an unavoidable part of the competitive sport.	2.17	(1.71)	2.21	(1.77)	2.15	(1.68)	.839
14. Athletes often lose time due to injuries and drugs can help to make up the lost time.	2.23	(1.53)	2.09	(1.29)	2.32	(1.67)	.649
15. Doping is not cheating since everyone does it.	1.40	(1.00)	1.74	(1.21)	1.18	(0.77)	.000 <sup>1-2</sup>
16. Only the quality of performance should matter, not the way athletes achieve it.	1.44	(1.15)	1.60	(1.19)	1.33	(1.10)	.002 <sup>1-2</sup>
17. There is no difference between drugs, fibreglass poles, and speedy swimsuits that are all used to enhance performance.	1.37	(1.03)	1.20	(0.58)	1.48	(1.22)	.822
Overall Score	34.02	(12.73)	36.63	(14.28)	32.37	(11.4)	.031 <sup>1-2</sup>

\*1: Strongly Disagree; 2: Through disagree; 3: Slightly disagree; 4: Slightly Agree; 5: Agree; 6: Strongly Agree.  
 1-2 Cyclists vs. Triathletes  
 NS non-significant

by the Levene test to verify the homogeneity of variance. Noting that the results followed a non-normal distribution a non-parametric analysis was conducted. The Mann Whitney-U test for PEAS variables was carried out (critical statistical significance:  $p < 0.05$ ). Statistical analyses were performed using IBM-SPSS 20.0 software. Semi-structured interviews were recorded and transcribed. Transcriptions were analysed and coded with the use of QSR NVivo 8. Lexical and thematic analyses were used concerning the interview data.

To ensure that the software did not lose information, also two researchers used manual-coding system and the data were checked until 100% concordance was got.

## Results

### PEAS - Performance Enhancement Attitude Scale

In general, the overall score (17-102) was  $34.02 \pm 12.74$ . The lowest score was observed for the item "Doping is necessary to be competitive" with  $1.32 \pm 1.01$  (1 = Strongly disagree), and the highest for "Athletes are pressured to take performance-enhancing drugs" with  $3.21 \pm 1.81$  (3 = Slightly disagree; 4 = Slightly agree).

Taking different groups into account, mean and overall score were respectively: cyclists:  $36.63 \pm 14.27$  and

triathletes:  $32.37 \pm 11.41$ . For overall score, significant differences were observed between cyclists and triathletes ( $p = 0.032$ ). In addition, there were significant differences among mean score of different groups in relation to item 8: "The media blows the doping issue out of proportion" ( $p = 0.000$ ); item 9: "Media should talk less about doping" ( $p = 0.000$ ); item 15: "Doping is not cheating since everyone does it" ( $p = 0.000$ ); and item 16: Only the quality of performance should matter. Not the way athletes achieve it ( $p = 0.002$ ). For the rest of the items no significant differences between groups were observed (see Table 1).

### Semi-structured interviews

Summary of the data obtained from semi-structured interviews is shown in table 2. Results are expressed in terms of percentage and frequencies of number of participants who made a specific statement (% n) and number of times that a specific statement was mentioned respect to the total answers given (% total answers). To make the content easy to understand we do include "others" because each one of these categories does not reach an important percentage (range of 1.39-5.56% of the total sample). Although participants had limit in their number of possible answers (e.g. three reasons for doping, three agents or

**Table 2.** Summary of Qualitative Analysis from interviews: Descriptive Statistics and Comparison between Spanish female competitive under-licensed cyclists and triathletes.

	Total sample (n = 8)		Cyclists (n = 4)		Triathletes (n = 4)	
	% n	% Total Answers	% n	% Total Answers	% n	% Total Answers
<b>Three words associated with doping</b>						
Cheating	62.5 (5/8)	20.8 (5/24)	25.0 (1/4)	8.3 (1/12)	100 (4/4)	25.0 (4/12)
EPO	25.0 (2/8)	8.3 (2/24)	25.0 (1/4)	8.3 (1/12)	25.0 (1/4)	8.3 (1/12)
Illness	25.0 (2/8)	8.3 (2/24)	0 (0/4)	0 (0/12)	50.0 (2/4)	16.7 (2/12)
Others		62.5 (15/24)		83.3 (10/12)		41.6 (5/12)
<b>Three responsible agents of doping</b>						
Coach/Manager	75.0 (6/8)	33.3 (6/24)	75.0 (3/4)	25.0 (3/12)	75.0 (3/4)	25.0 (3/12)
Athletes	62.5 (5/8)	20.8 (5/24)	50.0 (2/4)	16.7 (2/12)	75.0 (3/4)	25.0 (3/12)
Doctor	50 (4/8)	16.6 (4/24)	25.0 (1/4)	8.3 (1/12)	75.0 (3/4)	8.3 (1/12)
Others		37.5 (9/24)		50 (6/12)		41.6 (5/12)
<b>Three reasons for initiation in doping</b>						
Sport achievements	75.0 (6/8)	25.0 (6/24)	100 (4/4)	33.3 (4/12)	50.0 (2/4)	16.7 (2/12)
Contract/Money	75.0 (6/8)	25.0 (6/24)	75.0 (3/4)	25.0 (3/12)	75.0 (3/4)	25.0 (3/12)
Others		50.0 (12/24)		41.6 (5/12)		58.3 (7/12)
<b>Do you know any doping user?</b>						
Yes	50.0 (4/8)	50.0 (4/8)	75.0 (3/4)	75.0 (3/4)	25.0 (1/4)	25 (1/4)
<b>Have you ever been suggested to dope?</b>						
Yes	25.5 (2/8)	25.5 (2/8)	25.0 (1/4)	25.0 (1/4)	25.0 (1/4)	25.0 (1/4)
<b>Have you ever used doping substances?</b>						
Yes	0 (0/8)	0 (0/8)	0 (0/4)	0 (0/4)	0 (0/4)	0 (0/4)
<b>Would you use an undetectable drug that would significantly improve performance?</b>						
Yes	12.5 (1/8)	12.5 (1/8)	25.0 (1/4)	25.0 (1/4)	0 (0/4)	0 (0/4)

% n: percentage of total sample of each group (Total sample cyclists and Triathletes);  
% Total Answers: percentage of 100% total answers.

yes/no answers), they could keep on talking about the related topic given more interesting information. Besides, to enlighten some data specific statements related to specific topics are shown “quoted”. Different groups (total sample, cyclists and triathletes) were then described.

The following information was obtained for each item:

1. Three words associated with doping: the most mentioned words were “cheating” [% n: 62.5 (5/8); % total answers: 20.8 (5/24)], “EPO” [% n: 25.2 (2/8); % total answers: 8.3 (2/24)], and “illness” [% n: 25.5 (2/8); % total answers: 8.3 (2/24)]. Comparing both groups, cyclists mentioned 12 different words on the whole and “cheating” was just one of them [% n: 25% (1/4); % total answers: 8.3% (1/12)], while “cheating” was mentioned for all the triathletes [% n: 100% (4/4); % total answers: 33.33% (4/12)]. We selected two different statements such as: “I think doping is a real problem. I wish the game was 100% free of doping” (T2) and “Doping is always there, who does not admit it is lying” (C1).

2. Three responsible agents of doping: the most mentioned agents were “coach” [% n: 75.0 (6/8); % total answers: 25.0 (6/24)], “athlete” [% n: 62.5 (5/8); % total answers: 20.8 (5/24)], and “doctor” [% n: 50.0 (4/8); % total answers: 16.6 (4/24)]. In relation to different analysed groups, for triathletes the previous three agents were mentioned equally [% n: 75.0 (3/4); % total answers: 25.0 (3/12)] while cyclists mentioned more times “coach” than others [% n: 75.0 (3/4); % total answers: 25.0 (3/12)]. “Of course, that is very difficult to break chain where everyone (doctors, Labs, media...) contributes to the plot” (C3). “Society itself is also culpable for giving such publicity about doping” (C2).

3. Three reasons for the initiation in doping: the most mentioned reasons were “sport achievements” [% n: 75.0 (6/8); % total answers: 25.0 (6/24)], and “contract/money” [% n: 75.0 (6/8); % total answers: 25.0 (6/24)]. Taking into account the different groups, “sport achievements” was mentioned by all cyclists [% n: 100.0 (4/4); % total answers: 33.3 (4/12)] while “money” was the most mentioned reason for triathletes [% n: 75.0 (3/4); % total answers: 33.3 (3/12)]. “Doping is not free, it is not like a box of aspirins; I am not going to spend the salary on something I do not know if it will be worthwhile. If it is guaranteed that using a doping substance I win the Paris-Roubaix and its award of 3 million of Euros. I would spend 70 Euros on this product to go like a motorbike” (C1). “Triathlon is a very young sport. in which there is no money yet; if there is no money, doping is impossible” (T3). “I would accede to dope if my career depended on it” (C1).

4. “Do you know any doping user?” Four riders of the total sample stated, “yes” (4/8; 50.0%). exactly 3 cyclists (3/4; 75.0%) and one triathlete (1/4; 25.0%). “I have seen female cyclists who were injected vitamins and/or recoveries (at least, I guess), but I used to do it as well; in the case of prohibited substances practice I guess everything would be developed in

intimacy” (C3). “Unfortunately, more and more people from other sport modalities are becoming to triathlon; because there are fewer doping controls in triathlon than in the sport modalities where they come from” (T1).

5. “Have you ever been suggested to dope?” Two participants of the total sample stated “yes” (2/8; 25.0%). one per each group (1/4; 25.0%). “Managers and coaches used to offer. I have been also offered, and the used to say: ‘if you want to get your aims, you should know the rules of the game’; but that takes a significant economic cost, which is not easy to take” (C3)

6. “Have you ever used doping substances?”; all answers were “no”.

7. “Would you use an undetectable drug that would significantly improve performance?” One cyclist stated, “yes” (1/8; 12.5%). “No, for the simple fact that it is not my job. I’m not professional, so it is not an obligation for me” (C1). “Probably, most professional cyclists would do it” (C3). “No, today I do not take what is forbidden even without side effects” (AT2).

Regarding impact media, “it does not depend on being male or female; it depends on fame of the rider’s name” (C4). “Positive cases were assumed worse in males than female cyclists as male cyclists earn more, their rewards are greater and. Therefore, their media coverage is most widespread” (C3).

The issue related to differences between sports appeared along interviews: “I think cycling has been used like a major scapegoat, we are always at the news media for the same topic (doping), and nobody does not stop to think that thousands cyclists pass doping controls and just 1% fail. However in football, for example, players are not tested so many times. Probably, there are many more positive cases” (C4). “I have been tested in many occasions, so many. For example, I remember in Beijing (2008 Olympics Games), just off the plane they were waiting for us, and they did not let us leave the bag in the Olympic Village” (C3).

Regarding current used strategies and hypothetical solution proposals to eradicate doping in sport, participants also gave their opinion: “The effectiveness of drug testing has changed. Before almost everything was allowed because almost nobody failed in a doping control; but now, if someone uses doping substances is much more easily caught” (C3). Regarding doping prevention from Spanish Cycling Federation. I must say that it was not working on it before, but now it is” (C4). “I have never heard anything related to doping prevention from Federation but I guess they will be the most interested in this topic because it is too dirty for the sport” (T4). “I do not know if from the Spanish Triathlon Federation are doing something related to doping prevention; if they are doing it. I have not seen it” (T3). “We must educate society saying that doping is not good and that high performance can be achieved by means of training naturally. Unfortunately, doping is considered as normal” (C2).

## Discussion

The results of this study showed that female competitive under-licensed Spanish cyclists and triathletes, in general, are not permissive in relation to doping. However, cyclists were significantly more permissive towards the use of banned substances than triathletes. In addition, results from semi-structured interviews have shown interesting and specific information and statements (e.g. reasons for use or responsible agents), which should be taken into account. In order to operate consequently, it could be interesting to analyse them exhaustively looking for the causes of that certain permissiveness. This study supports the idea that, apart from more efficient controls, anti-doping prevention and education programmes could be the key to win the battle against doping in sport. The culture can be changed by means of controls but also by means of anti-doping prevention programmes trying to change attitudes and behaviours. In fact, Lance Armstrong argued to justify his doping that “this was the culture”, so this could be a key point. According to the current scientific literature in this field (Morente-Sánchez & Zabala. 2013) there are no previous specific studies that assessed attitudes towards doping in female athletes by means of a validated measurement tool.

Regarding results from PEAS in this study, for the whole sample, overall score (17-102) was  $34.02 \pm 12.74$ . Hence, female competitive under-licensed Spanish cyclists and triathletes, in general, are against of doping. Despite of the fact that female triathletes are less permissive towards the banned substances use than female cyclists ( $p=0.032$ ), the comparison with scores from different kind of samples previously mentioned make us believe those scores were low and non-worrying, though comparisons were made with men samples. So, according to this scale the higher score, the more permissive attitude towards doping you show. Other study that used this validated scale (PEAS) was developed by Uvacek et al. (2011). In this study, among 82 Hungarian competitive athletes assessed (45 females, 45%), confessed doping users (12%) scored, as expected, significantly higher score on PEAS ( $p<0.05$ ) when compared with those who reported no use of banned drugs ( $46.8 \pm 13.32$  and  $34.43 \pm 8.74$ , respectively). Morente-Sánchez, Mateo-March and Zabala (2013) assessed attitudes towards doping in 72 cyclists (21 females, 29.2%) from Spanish national cycling teams comparing different Olympic disciplines; regarding four different groups, data were: Mountain Bike:  $30.28 \pm 6.92$ ; Bicycle Motocross:  $42.46 \pm 10.74$ ; Track:  $43.22 \pm 12.00$ ; Road:  $34.91 \pm 6.62$ . Likewise, in other study (Morente-Sánchez et al. 2012), with a sample of 2022 (45 females, 2.2%) amateur cyclists as sample (confessed users = 164; non users = 1858), overall scores were, respectively:  $48.87 \pm 15.98$  and  $40.98 \pm 11.95$ . Petróczy and Aidman (2009) analysed several samples such as elite athletes from Hungary ( $n=102$ ; confessed users = 5; non-user = 97) obtaining the following scores respectively ( $39.20 \pm 17.54$  vs.  $35.85 \pm 10.12$ ).

This validated tool has also been used in non-athlete sample in this sense. Female competitive Spanish cyclists and triathletes showed a more lenient attitude towards doping ( $41.59 \pm 10.85$   $34.02 \pm 12.74$ ) than USA coaches ( $30.26 \pm 9.28$ ), but less permissive than Sports Sciences UK students ( $36.23 \pm 13.00$ , age:  $21.47 \pm 5.53$ ), Canadian students ( $37.94 \pm 11.25$ , age:  $20.9 \pm 2.04$ ), USA students ( $37.57 \pm 12.60$ , age:  $20.12 \pm 2.18$ ) (Petróczy and Aidman, 2009), and being very similar to Spanish students ( $34.69 \pm 9.31$ , age:  $22.09 \pm 3.26$ ) (Freire-SantaCruz et al. 2011).

In the whole, females showed a similar or lower scores than different male groups with which comparisons were established, what could mean that cyclists and triathletes women are made aware of doping. As practical application, we could consider that those more permissive groups, whose scores are quite close to doper's, need a deep analysis and monitoring.

On the other hand, information from semi-structured interviews allowed us to get more specific information using direct questions in different perspectives related to this topic like “words associated to doping”, “reasons for use”, or “responsible agent”. For instance, in general, the most associated word to doping was “cheating”, being mentioned for the four interviewed triathletes. It is remarkable that terms like “performance” or “win” did not appear in the first positions in the order of the most mentioned answers. Besides, comparing both groups, cyclists mentioned 12 different words on the whole and “cheating” was just one of them while “cheating” was mentioned for all the triathletes. Moreover, C1 recognized that “doping is always there; who does not recognize it is lying”. This honest statement is not new in the scientific literature of this field. “Doping in sport? This is an endless whirl” stated Callaway in the journal *Nature* (Callaway, 2011: p283) showing his pessimistic point of view regarding this phenomenon of doping in sport. Similar results were stated by Backhouse et al. (2007) in their deep review reported to WADA.

Regarding agents responsible of doping Somerville et al. (Somerville and Lewis 2005) reported that the doctor was the first option for 62% (46/74) of athletes in their study. Other study, using a sample of 34 British junior team athletes, noted that coaches provided the greatest influence (65%), followed by sports dieticians (30%) and doctors (25%) (Nieper 2005). On the other hand, results of this research are in accordance to Lentillon-Kaestner et al. (2011) who stated that the pressure from team staff and doctors on cyclists' use of banned substances has become less important and direct after the latest doping scandals such as Festina case in 1998 or Puerto case in 2006. Though “coach/manager” is considered the main doping influencing agent for this sample, they also recognized themselves like responsible largely. “I would accede to dope if my career depended on it”, stated C1. So, despite of the fact that other agents could influence her, the intentions were evident being her the responsible agent. According to C3, “everyone (doctors, labs, media...) contributes to the plot”, so it seems essential

to raise awareness and re-education of both professional groups (doctors and coaches) besides athletes, due to their recognized and checked influence on athletes (Morente-Sánchez & Zabala, 2013). It might be worrying a statement from one of the amateur triathlete interviewed (T1) which emphasize the figure of the athlete like agent responsible of doping: “Unfortunately, more and more people from other sport modalities are coming to triathlon because there are fewer doping controls in triathlon than in the sport modalities where they come from”. This is a fact as some recognized cyclists that were found positive changed their career to practice triathlon. So it could be suggested that punishments should be for all sports and modalities.

In relation to reasons for initiation in doping, “sport achievements” and “contract/money” were the most mentioned in general, being the first one mentioned for 100% of interviewed cyclists and the second one for 75% of triathletes. “If it is guaranteed that using a doping substance I will win. I will use it” was stated by C1. Similar results were found in others studies. In one of them, 8 young elite cyclists were interviewed and admitted that they were opened to use doping substances themselves if it was the key to continuing their cycling career, but only after they became professional (Lentillon-Kaestner and Carstairs 2010). In the same way, other research with 978 German elite athletes reported that the most repeated reasons for drug use were to achieve athletic success (86%) and for financial gain (74%) (Striegel et al. 2010). In addition, in other study (n=40), various factors were acknowledged as potential reasons for use: most notably injury recovery and the economic pressures of elite sport (Bloodworth and McNamee 2010).

Focusing on the direct questions such as “do you know any doping user?”. Have you ever been suggested to dope?” or “Have you ever used doping substances?”, it was observed that four (three cyclists. one triathlete) of the eight interviewed athletes recognize to know doping users and no one said that had ever used any doping substances. However, a common limitation of this type of studies is that answers may be deliberately false, as the subjects questioned may not wish to reveal that they or their teammates use banned substances, even if the researchers guarantee anonymity and confidentiality. Revising the latest scientific literature in this field, it is interesting to observe the appearance of a concept so-called “false consensus effect” (Morente-Sánchez; and Zabala 2013; Petróczi et al. 2008; Uvacsek et al. 2011), which suggests that athletes who have a history of PED use overestimate the prevalence of drug use among other athletes. So, an individual's decision to take banned substances could be influenced by the assumption that his or her rivals are also using doping (Vangrunderbeek and Tolleneer 2010). In this sense, the statement made by T2, “I wish the game was 100% free of doping”, could have different connotations. In addition, regarding use an undetectable drug that would significantly improve performance, also so-called “magic drug” less than

10% of 403 talented young athletes answered affirmatively (Bloodworth et al. 2010). In this study, just a cyclist said “yes”, but there were statements that can be found less optimistic: “Probably, most professional cyclists would do it” (C3).

Triathletes and cyclists showed his disagreement about the differences in relation to doping treatment between cycling and others sports. “I think cycling has been used like a major scapegoat, we are always at the news media for doping cases” said C4. Other statement as interesting as curious was made by C3, “just off the plane they were waiting for us, and not let us leave the bag in the Olympic Village”. As a curiosity, the first doping case in Beijing 2008 was the one of a Spanish female cyclist on that occasion. In this sense, different treatments among different types of sports in relation to doping have been studied in several investigations. English professional footballers were tested for drugs less often than many other elite athletes, only about 33% per year, according to Waddington et al. (2005). Therefore, since doping is a general issue, we suggest that all sport federations follow the same anti-doping protocols to avoid unfair situations among sports, and also punishments should be taken into account by all sports and federations, using the same framework.

Finally, regarding to proposed solutions to win the battle against doping it could be interesting to emphasize what C2 stated: “we must educate society saying that doping is not good and that high performance can be achieved by means of training naturally. Unfortunately, doping is considered as normal”. According to this perspective appears the so-called “athlete 2.0” concept as a collaborative challenge combining high-quality and individualized training values and ethics in sport (Zabala and Atkinson 2012). This concept supports the idea of sport based on ethics and science as a collaborative challenge for all the stakeholders, which should also provide optimal education to the athletes.

One of the professional female cyclists interviewed, C3, who also work as coach with children, mentioned how young cyclists often inform her about doping cases, which means that doping is present from earliest ages. There are studies that stated that preventive measures are necessary to establish and fortify attitudes towards doping at an early stage (Lentillon-Kaestner et al. 2011; Peters et al. 2009). Controls are obviously needed as well as more effective educational programmes that do not mean great investments since “controlling doping only by tests is not sufficient; a profound change in the attitudes, which should be monitored repeatedly, is needed” (Alaranta et al. 2006). So, we encourage institutions to invest the same amount of money but balancing the costs of controls and prevention programmes from early ages (Morente-Sánchez and Zabala 2013). Indeed, the Spanish Cycling Federation has been conducting an intervention project called “Preventing to Win” since 2009 with the aim of educating the cyclists and coaches of the future (Zabala et al. 2009). It is not about spending more money; it is about giving more importance to psychological



prevention programmes. We encourage institutions not to fail on what we call “institutional hypocrisy” that can be detected when it is said prevention is important but there is no funding or it is just a ridiculous current (0-5 % of the total amount for prevention vs. 95-100% for controls).

Since drug testing alone can fail, as this was proven in the case of Lance Armstrong. We believe that education is the only way to truthfully minimise the doping culture and reduce the cases of doping in the middle to long term. We suggest that it is important to educate the people surrounding athletes, as they are often the most influential or people who induce and/or support the use of banned substances by athletes should also be punished. Nevertheless, if we educate athletes, they can search for appropriate sources of information and also evaluate its quality. Focusing in cycling and triathlon particularly, we consider, after lasts and media doping cases that nowadays is the ideal moment to work together against doping to win this battle. Event organisers and sport federations should work together to modify the rules of each competition in order to deter dopers (i.e. allowing longer recovery between stages and/or reducing the distance covered in competitions). Sport science researching world will play a decisive role in this battle against doping analysing the current situation deeply by means of studies like this to detect risky groups and their causes. Consequently, to design specific training and educational programs to get more “athletes 2.0”. The programmes targeting athletes and those stakeholders around them must be carefully planned and developed as a middle- to long-term objective to ultimately change attitudes towards doping, and so the doping culture.

### Conclusions

The main conclusion of this study is that female competitive under-licensed Spanish cyclists and triathletes, in general, are not permissive in relation to doping. However, cyclists were significant more permissive towards the use of banned substances than triathletes. In addition, results from semi-structured interviews have shown interesting and specific information and statements (e.g. reasons for use or responsible agents), which should be taken into account. In order to operate consequently, it could be interesting to analyse them exhaustively looking for the causes of that certain permissiveness. This study supports the idea that, apart from more efficient controls, anti-doping prevention and education programmes could be the key to better fight the battle against doping in sport.

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### References

1. Ajzen I (1991) The theory of planned behaviour: Some unresolved issues. *Organizational Behavior and Human Decision Processes* 50: 179-211
2. Alaranta A, Alaranta H, Holmila J, Palmu P, Pietila K, Helenius I (2006) Self-reported attitudes of elite athletes towards doping: differences between type of sport. *International Journal of Sports Medicine* 27: 842-846
3. Anshel MH, Russell KG (1997) Examining athletes' attitudes toward using anabolic steroids and their knowledge of the possible effects. *Journal of Drug Education* 27: 121-145
4. Backhouse S, Mc Kenna J, Robinson S, Atkin A (2007) Attitudes, behaviours, knowledge and education - drugs in sport: past, present and future. Report to the World Anti-Doping Agency (WADA)
5. Bassons C (2000) *Positif*. Stock, Paris
6. Bloodworth A, McNamee M (2010) Clean Olympians? Doping and anti-doping: the views of talented young British athletes. *International Journal of Drug Policy* 21: 276-282
7. Bloodworth A, Petróczy A, Bailey R, Pearce G, McNamee MJ (2010) Doping and supplementation: the attitudes of talented young athletes'. *Scandinavian Journal of Medicine & Science in Sports* 22:293-301
8. Callaway E (2011) Sports doping: racing just to keep up. *Nature* 475: 283-285
9. Catlin D, Fitch K, Ljungqvist A (2008) Medicine and science in the fight against doping in sport. *Journal of Internal Medicine* 264: 99-114
10. Dodge T, Jaccard JJ (2008) Is abstinence an alternative? Predicting adolescent athletes' intentions to use performance enhancing substances. *Journal of Health Psychology* 13: 703-711
11. Donovan RJ, Egger G, Kapernick V, Mendoza J (2002) A conceptual framework for achieving performance enhancing drug compliance in sport. *Sports Medicine* 32: 269-284
12. Freire-SantaCruz C, Morente-Sánchez J, Femia-Marzo P, Zabala M (2011) Attitude towards performance-enhancing drugs in Spanish Sport Sciences university students. Book of Abstracts of the 16th Annual Congress of the European College of Sport Science – 6-9 July 2011 Liverpool - United Kingdom: 619-620.
13. Harriss DJ, Atkinson G. Update – Ethical Standards in Sport and Exercise Science Research. *International Journal of Sports Medicine* 2011; 32: 819-821.
14. Kimmage P (1998) *Rough Ride: behind the wheel with a pro cyclist*. Random House UK
15. Lentillon-Kaestner V, Carstairs C (2010) Doping use among young elite cyclists: a qualitative psychosociological approach. *Scandinavian Journal of Medicine & Science in Sports* 20: 336-345
16. Lentillon-Kaestner V, Ohl F. (2011). Can we measure accurately the prevalence of doping? *Scandinavian Journal of Medicine & Science in Sports* 21:132-42
17. Lentillon-Kaestner V, Hagger M, Hardcastle S (2012) Health and doping in elite-level cycling. *Scandinavian Journal of Medicine & Science in Sports* 22: 596-606
18. Lucidi F, Zelli A, Mallia L, Grano C, Russo P, Violani C (2008) The social-cognitive mechanisms regulating adolescents' use of doping substances. *Journal of Sports Sciences* 26: 447-456
19. Morente-Sánchez J, Freire C, Ramírez-Lechuga J, Zabala M (2012) Attitudes towards doping in participants of a popular long-distance road cycling event according to their doping behavior: users vs non-



- users. Book of Abstracts of the 17th Annual Congress of the ECSS 4-7 July 2012 Bruges-Belgium: 270-271
20. Morente-Sánchez J, Zabala M (2013) Doping in sport: a systematic review of elite athletes' attitudes, beliefs and knowledge. *Sports Medicine* 43:395-411
  21. Morente-Sánchez J, Mateo-March M, Zabala M. (2013). Attitudes towards Doping and Related Experience in Spanish National Cycling Teams According to Different Olympic Disciplines. *PLoS One* 21;8(8):e70999
  22. Nieper A (2005) Nutritional supplement practices in UK junior national track and field athletes. *British Journal of Sports Medicine* 39: 645-649
  23. Ohaeri JU, Ikpeme E, Ikwuagwu PU, Zamani A, Odejide OA (2004) Use and awareness of effects of anabolic steroids and psychoactive substances among a cohort of Nigerian professional sports men and women. *Human Psychopharmacology* 8: 429-432
  24. Özdemir L, Nur N, Bağcıvan I, Bulut O, Tezeren G (2005) Doping and performance enhancing drug use in athletes living in Sivas, Mid-Anatolia: A brief report. *Journal of Sports Science and Medicine* 4: 248-252
  25. Papadopoulos FC, Skalkidis I, Parkkari J, Petridou E (2006) Doping use among tertiary education students in six developed countries. *European Journal of Epidemiology* 21: 307-313
  26. Peters C, Schulz T, Oberhoffer R, Michna H (2009) Doping and Doping Prevention: Knowledge, Attitudes and Expectations of Athletes and Coaches. *Deutsche zeitschrift fur sportmedizin* 60: 73-78
  27. Petróczi A (2007) Attitudes and doping: a structural equation analysis of the relationship between athletes' attitudes, sport orientation and doping behaviour. *Substance Abuse Treatment, Prevention, and Policy* 2: 34
  28. Petróczi A, Aidman E (2009) Measuring explicit attitude toward doping: Review of the psychometric properties of the Performance Enhancement Attitude Scale. *Psychology of Sport and Exercise* 10: 390-396
  29. Petróczi A, Mazanov J, Nepusz T, Backhouse S, Naughton D (2008) Comfort in big numbers: Does over-estimation of doping prevalence in others indicate self-involvement? *Journal of Occupational Medicine and Toxicology* 3: 3-19
  30. Pitsch W, Emrich E, Klein M (2005) Häufigkeit des Dopings im Leistungssport [Doping in elite sports in Germany: results of a www survey]: Ergebnisse eines www-surveys. *Leipziger Sportwissenschaftliche Beiträge* 46: 63-77
  31. Schneider AJ (2006) Cultural nuances: doping, cycling and the tour de France. *Journal of Sport & Social* 9: 212-226
  32. Schwerin MJ, Corcoran KJ (1996a) Beliefs about steroids: user vs. non-user comparisons. *Drug Alcohol Depend* 40: 221-225
  33. Schwerin MJ, Corcoran KJ (1996b) A Multimethod Examination of the Male Anabolic Steroid User1. *Journal of Applied Social Psychology* 26: 211-217
  34. Somerville S, Lewis M (2005) Accidental breaches of the doping regulations in sport: is there a need to improve the education of sportspeople? *British Journal of Sports Medicine* 39: 512-516
  35. Strelan P, Boeckmann RJ (2003) Research Notes A New Model for Understanding Performance-Enhancing Drug Use by Elite Athletes. *Journal of Applied Sport Psychology* 15: 176-183
  36. Striegel H, Ulrich R, Simon P (2010) Randomized response estimates for doping and illicit drug use in elite athletes. *Drug Alcohol Depend* 106: 230-232
  37. Tahtamouni LH, Mustafa NH, Alfaouri AA, Hassan IM, Abdalla MY, Yasin SR (2008) Prevalence and risk factors for anabolic-androgenic steroid abuse among Jordanian collegiate students and athletes. *The European Journal of Public Health* 18: 661-665
  38. Tricker R, Connolly D (1997) Drugs and the Collegiate athlete: An Analysis of the Attitudes of Student Athletes at Risk. *Journal of Drug Education* 27: 105-119
  39. Uvacsek M, Nepusz T, Naughton D, Mazanov J, Ránky M, Petróczi A (2011) Self-admitted behavior and perceived use of performance-enhancing vs psychoactive drugs among competitive athletes. *Scandinavian Journal of Medicine & Science in Sports* 21: 224-234
  40. Vangrunderbeek H, Tolleneer J (2010) Student attitudes towards doping in sport: Shifting from repression to tolerance? *International Review for the Sociology of Sport* 46: 346-357
  41. Voet W (1999) *Massacre à la chaîne: revelations sur 30 ans de tricheries*. Calmann-Lévy, Paris
  42. WADA The World Antidoping Code: the 2012 prohibited list -International standard. 2012. Available at <http://www.wada-ama.org/> (accessed August 1, 2012).
  43. Waddington I, Malcolm D, Roderick M, Naik R (2005) Drug use in English professional football. *British Journal of Sports Medicine* 39: e18-e18
  44. Zabala M, Atkinson G (2012) Looking for the "athlete 2.0": A collaborative challenge. *Journal of Science of Cycling* 1: 1-2
  45. Zabala M, Sanz L, Durán J, Morente-Sánchez J (2009) Doping and professional road cycling: Perspective of cyclists versus team managers. *Journal of Sports Science and Medicine* 8: 102-103