A philosophical debate on the morality of doping is interesting but beyond the scope of our meta-analysis.

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Dear Editor,

We would like to thank Dr Arandjelovic [1] for taking the time to read our meta-analysis, which statistically synthesized the personal and psychosocial predictors of doping use in sport and other physical activity settings. Unfortunately, his remarks reveal a misunderstanding regarding the scope of our paper. In essence, Dr Arandjelovic charged us with 'seasoning' our science with moralistic bias. He then presents a number of philosophical questions that, although important and relevant to

the doping landscape, have nothing to do with our meta-analysis or the studies contained within it. This distance between our work and the philosophical challenges to anti-doping policy and practice is further underscored by the invitation to engage in an intellectual debate on these issues in a sports ethics or medical ethics journal.

It is worth reiterating that our meta-analysis was not conceived to examine current anti-doping policy and practice, nor to present views in favor or against the moral aspect of doping/performance enhancing drug use. Our meta-analysis served to objectively analyze empirical studies examining doping intentions and doping use in order to determine the strongest psychosocial correlates (both positive and negative), as well as potential moderator variables. The included empirical studies tested, among other predictor variables, morality-related variables such as moral norms and moral disengagement, variables that we obviously included in our review. In our discussion, and on the basis our results, we (very) briefly state that the findings highlight the significance of morality in preventing doping use. Whilst we advocate intellectual debate on issues relating to current anti-doping policy and practice, and we are cognizant of the arguments in favor of the legalization of doping in sport [2-5], these are moot points beyond the scope of our meta-analysis. Further, these articles did not test personal or psychological predictors of doping use and, thus, were not included in our meta-analysis.

We are also responding to Dr Arandjelovic because we feel that the readers might benefit from reading our views on the issues that he raised in his letter. The ‘doping is illegal’ heuristic is commonplace in the literature describing doping substances and behaviors [6-10]. Inclusion of the term ‘illegal’ in the context of our study reflects a dialogical process of interpretation whereby ‘illegal’ relates to the intentional breaking of anti-doping rules, through the use of Prohibited substances and methods. These rules are constituted and enforced within the sporting context [11]. To illustrate, an athlete from any country who participates in sport under the authority of any signatory of the World Anti-Doping Code (WADC), Government, or other sports organisation accepting the Code, found to have administered testosterone enanthate without a therapeutic use exemption, would face sanction for committing an anti-doping rule violation. Having said this, we are mindful that we might have conveyed the view that doping is simply about the use of Prohibited substances and methods. To clarify, the World Anti-Doping Agency’s (WADA) definition of doping

is far more encompassing. Taken directly from the WADC, doping is defined as "the occurrence of one or more of the anti-doping rule violations set forth in Article 2.1 through Article 2.10 of the Code" [12, p.18]. In Article 2.1 a rule violation is the "Presence of a Prohibited Substance or its Metabolites or Markers in an Athlete's Sample". Similarly in Articles 2.2, through to 2.10, rule violations include the use or attempted use, possession, trafficking and administration or attempted administration of a "Prohibited Substance or Prohibited Method" [12].

In the context of health and fitness, we agree that the issue of morality is questionable and alternative perspectives need to be viewed. In fact, the morality variables included in our review were predominantly from competitive sport samples, not recreational athletes. Nevertheless, it is interesting to note that the International Federation of Bodybuilding and Fitness (IFBB) has accepted the Code and has been an official Signatory to the Code since 2003. In its preface to the Anti-Doping Rules [13] it states that the adoption and implementation of the Code is in furtherance of the "IFBB's continuing efforts to eradicate doping in the sports it governs" (p.1). The IFBB also encourages national associations to incorporate active anti-doping programs.

In some countries (e.g., Denmark), fitness enthusiasts risk social or financial sanctions from the National Anti-Doping Organisation (NADO) if they contravene anti-doping rules [14]. Whilst many NADO's do not currently intervene in this way, such initiatives appear to be motivated by a desire to promote gyms and fitness centers as 'clean' exercise environments [15]. It is worth noting that in the 2011 Communication on Sport [16] it was stated that doping remains "an important threat to sport. Use of doping substances by amateur athletes poses serious public health hazards and calls for preventive action, including in fitness centers" (p.6). Despite this assertion, there are no reliable estimates around the current prevalence of self-directed performance and image enhancing drug use in sport and fitness contexts and this absence of evidence needs to be addressed.

We do not disagree with Dr Arandjelovic's concerns about applying a detection-deterrence model in a fitness setting; it will likely be impractical and counterproductive. Still, if the threat to public health is real, there is a need to consider a preventive framework that incorporates prevention, treatment and after-care [14]. As

such, we stand by our focus on prevention in the paper, and Dr Arandjevolic's call for a harm-minimization approach would fit within this prevention framework.

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