

## INTRODUCTION

The industry of ergogenic supplements is increasing rapidly (Cole et al., 2003). Supplements may constitute an important aid for some vigorous exercise routines, but they may also be used as a hypothetical mean to achieve increases in muscular mass. This supposed effect of supplements can lead to its use by individuals who have high levels of drive for muscularity, a condition that is known to be associated with muscular dysmorphism (or as it has been called recently vigorexia, Pope et al., 1997). Another psychological factor which can influence supplement consumption is exercise dependence, a borderline problem, as most studies present a prevalence of less than 10% in regular exercisers (Palmeira & Matos, 2006). Symptoms like tolerance or continuity could lead to the use of ergogenic aids to maintain the exercise levels. Also of interest for the understanding of the use of supplements are exercise frequency, volume and intensity, which could explain the rates of consumption on a more physiological level.

## PURPOSE

The aim of present study was the analysis of the association among exercise behavior, psychosocial factors and the use of ergogenic substances in males who exercise in gym settings.

## METHODS

**Subjects:** The sample comprised 147 male subjects (age  $M=27.4$ ;  $SD=7.1$  y) representing individuals that exercise regularly in gym/health clubs in the Lisbon area which have equipment for training with high loads (exercise frequency  $M=4.3$ ;  $SD=1.3$  times/w; duration  $M=72.7$ ;  $SD=27.7$  min).

**Instruments:** Self-report measures evaluated: a) use of ergogenic substances (e.g., nutritional supplements; mass gainers; anabolic steroids); b) exercise behavior (frequency, intensity and duration); and c) psychosocial: exercise dependence (EDS-21, Hausenblas & Symon-Downs, 2002), drive for muscularity (DMS, McCreary & Sase, 2000) and theory of planned behavior (TPB) about the use of ergogenic substances. Cronbach's alpha was satisfactory for all psychometric measures ( $0.73 < \alpha < 0.93$ ).

**Procedures:** Bivariate associations were analyzed through Pearson correlations, while univariate comparisons were conducted through independent samples t-test. Multiple mediation was tested by multiple regression, following procedures described by Preacher and Hayes (2007).

## RESULTS

Table 1. Correlations among the reported use of substances, and behavioral and psychological factors.

|                       | Anabolic Steroids | Other Supplements | Intention to use |
|-----------------------|-------------------|-------------------|------------------|
| Exercise Frequency    | 0.09              | 0.29 **           | 0.37 ***         |
| Exercise Duration     | 0.23 *            | 0.11              | 0.11             |
| Exercise Intensity    | 0.37 ***          | 0.37 ***          | 0.30 ***         |
| Drive for Muscularity | 0.23 **           | 0.30 **           | 0.35 ***         |
| Exercise Dependence   | 0.27 **           | 0.30 **           | 0.45 ***         |
| Intention to Use      | 0.40 ***          | 0.61 ***          |                  |

Note: Pearson correlation: \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

## References:

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The multiple mediation models included the variables that were associated with the substance use in the bivariate correlations. A bootstrap procedure of 5000 resamples was used. Figure 1 represents the results for all subjects, in this case with no indirect effects, therefore, **intention was not mediated**. Figure 3 represents the same procedure but only for subjects with secondary dependence. In this case **exercise intensity may have mediated the effect of intention** on the reported use of anabolic steroids.

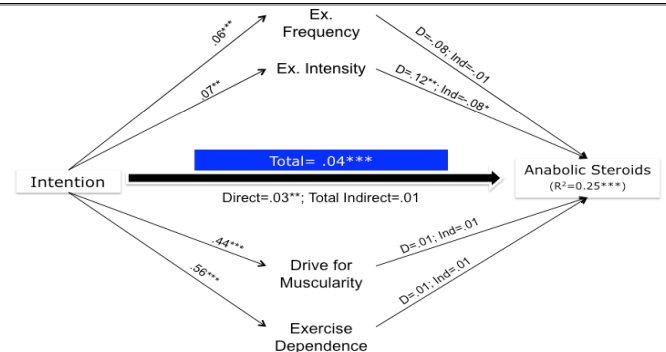


Figure 1. Multiple mediation model for the prediction of the reported use of anabolic steroids on all subjects

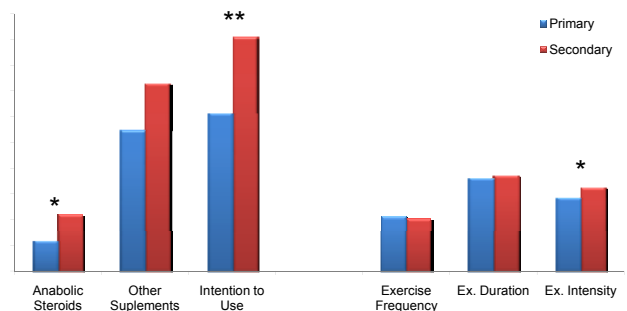


Figure 2. Comparison between primary and secondary (n=40) dependent subjects on reported and intention to use and behavioral factor. Note: T-test for independent samples. \* $p < .05$ ; \*\* $p < .01$ ; \*\*\* $p < .001$

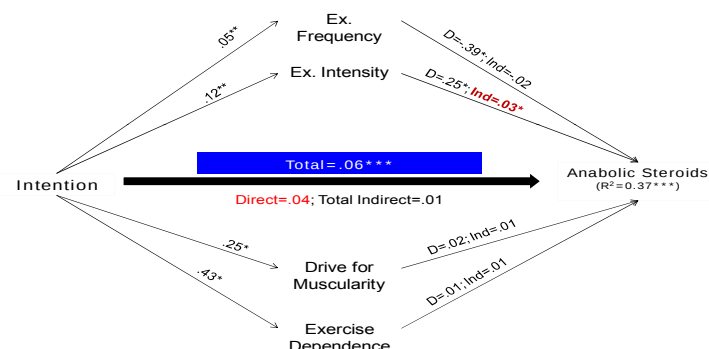


Figure 3. Multiple mediation model for the prediction of the reported use of anabolic steroids on subjects with secondary dependence only. Notice an indirect effect of exercise intensity.

## CONCLUSIONS

The reported use of AS was more than 10% higher than usually reported in the literature (Cole et al, 2003). The reported use of ergogenic substances were associated either to the exercise behavior factors and the psychosocial constructs evaluated in this study. In the latter factors, intake intention, exercise dependence and drive for muscularity were particularly associated to the reported use of ergogenic substances and AS. These constructs should be considered for the evaluation of exercise maladaptations that, paradoxically, are jeopardizing the health of the exerciser

- (1)Lusófona University of Humanities and Technologies,
- (2)Faculty of Human Kinetics