

# **Prevalence and social-cognitive determinants of the use of performance enhancing substances by Portuguese gymgoers**

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# PREVALENCE AND SOCIAL-COGNITIVE DETERMINANTS OF THE USE OF PERFORMANCE-ENHANCING SUBSTANCES BY PORTUGUESE GYM-GOERS

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## 1. BACKGROUND

- . Doping is not confined to elite and competitive sport, but is also spread throughout health clubs, gymnasia and other recreational activities<sup>1</sup>.
- . The long-term use of performance-enhancing substances (PES; e.g., Anabolic-androgenic steroids or AAS, stimulants, erythropoietin, diuretics) without proper control has been associated with several physical disorders and psychological symptoms<sup>2</sup>.
- . The theory planned behavior (TPB) is one of the most commonly used frameworks to describe individuals' doping intentions and behavior<sup>3</sup>.
- . Significant associations between PES use and gender have also been found<sup>1</sup>.

## 2. AIMS

- (1) Investigate the extent of PES use, according to the WADA Prohibited List (2017);

## 4. RESULTS

. Eleven-point one percent of the participants ( $n = 50$ ) reported use of PES, being 69.4% male ( $n = 34$ ).

. The most popular PES uses, according to the WADA Prohibited List (2017), were diuretics (46%), AAS (44%), substances that reduce side effects (e.g., tamoxifen, clomiphene) (26%), stimulants (22%), chorionic gonadotrophin (18%), growth hormone and beta-2 agonists (16%).

. Ten percent reported insulin and cannabinoids use and 8% reported EPO and corticosteroids use.

. Results support the TPB framework in predicting intentions to PES use in our gym-goers sample [ $\chi^2(113) = 97.597, p = .849, CFI = 1.000, TLI = 1.00, RMSEA = .000, 90\% IC [.000 - .000], SRMR = .051$ ].

. Subjective norms, beliefs and attitudes predicted intentions and 75% of the variance associated with PES use intention was accounted for by its 3 predictors.

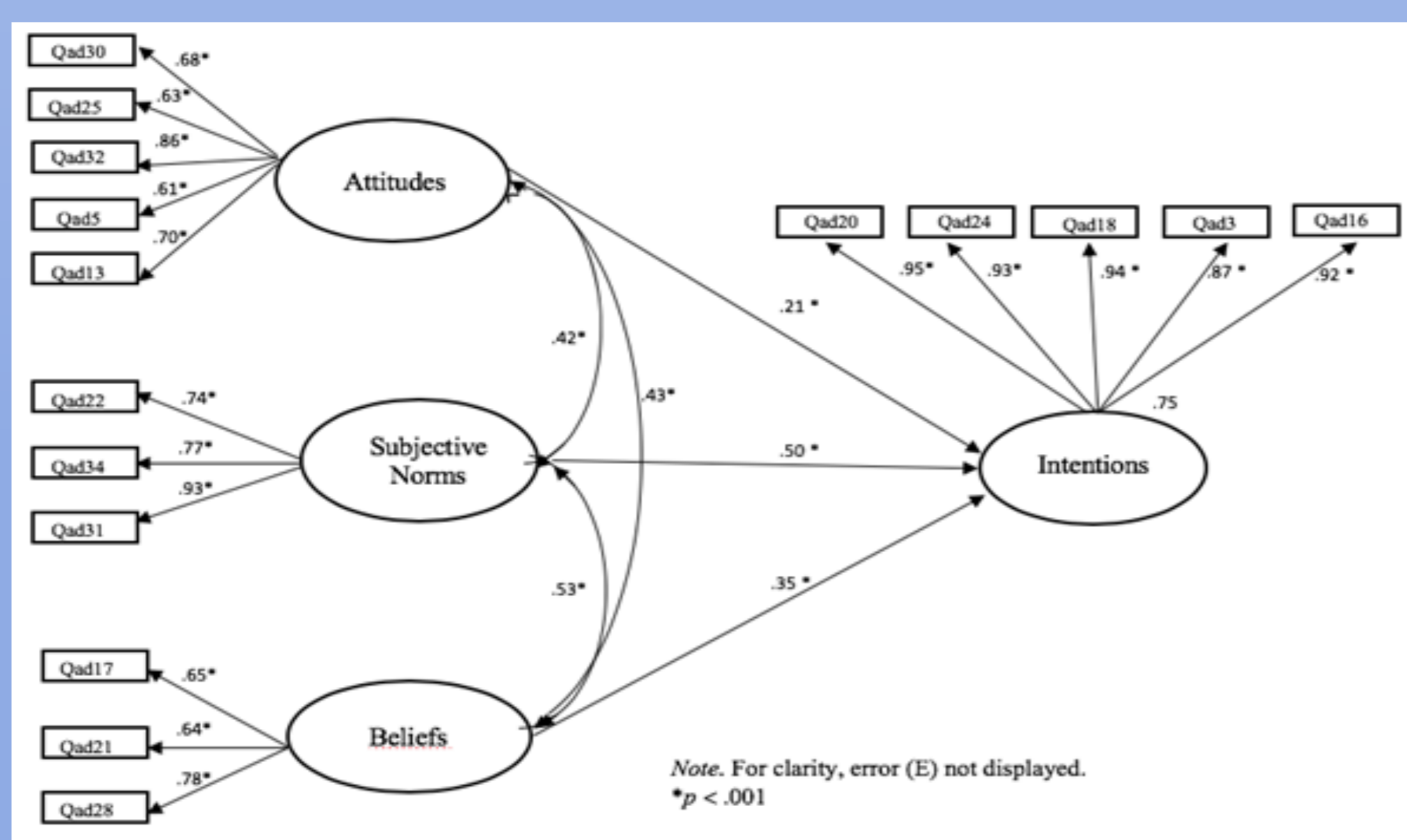


Figure 1. Hypothesized model on the TPB with a sample of gym-goers

. The model fit for structural models was satisfactory for both female [ $\chi^2(98) = 207.983$  (B-S  $p < .001$ ),  $\chi^2/df = 2.122$ , CFI = .964, TLI = .956, RMSEA = .064, 90% IC [.052 - .076], SRMR = .051] and male [ $\chi^2(98) = 166.134$  (B-S  $p < .001$ ),  $\chi^2/df = 1.695$ , CFI = .972, TLI = .966, RMSEA = .063, 90% IC [.046 - .079], SRMR = .051] subsamples.

. Since the three invariance tests were all satisfied, the hypothesis of invariance of the predictive model across gender could not be rejected.

## 2. AIMS (CONTINUATION)

- (2) Evaluate whether the intention to use PES in a sample of gym-goers could be predicted by the variables considered within the TPB;
- (3) Examine if males were more susceptible to PES use than females.

## 3. METHOD

. A convenience sample of Portuguese gym-goers ( $n = 453$ ; 61,3% female; 38,7% male;  $35,64 \pm 13.08$  years old) completed an anonymous web-based survey about beliefs, attitudes, social influences and intentions towards use of PES as well as self-reported PES use.

. A two-step approach to maximum likelihood, structural equation modeling, multigroup analysis and t-test with the Welch correction for heterokedastic variances were performed using IBM SPSS / AMOS 24.0.

Table 1. Model fit indices for invariance tests in the structural model (male/ $n = 175$ ; female/ $n = 277$ )

Multi-Group models	$\chi^2$	df	$\Delta\chi^2$	$\Delta df$	B-S $p$	CFI	$\Delta CFI$	RMSEA
Configural invariance	374.117	196	-	-	-	.968	-	.045
Metric invariance	398.791	208	24.674	12	.016	.965	.003	.045
Scalar invariance	444.072	224	45.281	16	.001	.960	.005	.047
Structural invariance	455.490	22	11.418	3	.001	0.958	.002	.047

. In line with other studies, females believed less in the performance enhancing effects of substances, were less susceptible to the influence of significant others and had weaker intentions to use PES than males.

Table 2. Results of the gender difference analysis

Construct	M (Male; $n = 175$ )	SD	M (Female; $n = 277$ )	SD	t-test (df)	P value	Effect Size (d)
Intentions	.3694	1.923	-.245	1.369	3.669 (284.285)	< .001	.367
Subjective Norms	.1447	.853	-.093	.645	3.159 (297.971)	.002	.314
Beliefs	.1776	.991	-.117	.813	3.293 (317.383)	.001	.325
Attitudes	.1595	1.498	-.102	1.277	1.914 (327.037)	.057	.188

## 5. CONCLUSIONS

- . Subjective norms are the most important predictor of intention to use PES.
- . Prevention strategies may focus more efficiently on the processes of social/normative influence and on moral and ethical standards, relying on the credibility of reference groups to promote behavior change.
- . To improve the effectiveness of PES use prevention interventions in gym-goers, TPB's constructs need to be considered differently in females and males.

**Conflict interest:** The authors declare that they have no conflict of interest.

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