Universidade de Lisboa

Faculdade de Motricidade Humana

Prevalência e Fatores Determinantes do Consumo das Substâncias Ilícitas que Melhoram o Desempenho em Praticantes de Fitness em Ginásios

Ana Sofia Rodrigues Tavares

Orientador: Professor Doutor Sidónio Olivério da Costa Serpa

Coorientador: Prof. Doutor Luís Gabriel Gago Horta

Tese especialmente elaborada para a obtenção de grau de Doutor em Motricidade Humana, na especialidade de Psicologia do Exercício e do Desporto

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A ti Miguel, pelo companheirismo, amor e paciência

Ao meu Amor Beatriz

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TÍTULO DA TESE: Prevalência e Fatores Determinantes do Consumo das Substâncias Ilícitas que Melhoram o Desempenho em Praticantes de Fitness em Ginásios

Resumo

O presente conjunto de investigações pretendeu estudar a prevalência e os fatores determinantes do consumo de substâncias ilícitas que melhoram o desempenho, em praticantes de *fitness* em ginásios portugueses. Para a sua consecução, realizou-se um primeiro estudo cujo objetivo foi compilar as evidências disponíveis na literatura acerca da prevalência e conceptualização dos fatores psicossociais que podem influenciar o uso destas substâncias nesta população específica, baseado no modelo da Teoria do Comportamento Planeado (TCP) (Ajzen, 1991), nomeadamente, em Portugal, que justificassem, ou não, este trabalho. Seguidamente, procedeu-se à adaptação do "Questionário de Atitudes perante o Doping no Desporto" (Serpa et al., 2001), baseado no referido modelo (Ajzen, 1991), ao contexto do *fitness*, efetuou-se a sua distribuição e realizou-se a sua validação psicométrica, para avaliar os constructos incluídos no modelo teórico. No terceiro estudo, foi investigada a prevalência do uso deste tipo de substâncias na amostra obtida e a sua associação com os fatores sócio demográficos, perfil da prática de atividade física e modalidades praticadas. Foi ainda investigada a influência social dos pares neste tipo de comportamento, bem como os motivos para a toma, a forma de aquisição, vias de administração, efeitos colaterais e, também, hábitos tabágicos e de consumo de álcool. Por fim, foram identificados e analisados os preditores das intenções de consumo de substâncias ilícitas que melhoram o desempenho nestes praticantes e em que medida o género e a toma de substâncias influenciam os constructos considerados na TCP (atitudes, crenças, normas subjetivas e intenções).

No total, participaram 453 utilizadores de ginásios, praticantes de várias modalidades, com idades compreendidas entre os 16 e os 79 anos. Os dados foram analisados através de modelos de equações estruturais, aplicando-se análises fatoriais de índole confirmatória, assim como, análises multigrupos, médias latentes e testes de invariância *one-way* Anova. Foi ainda utilizada regressão logística múltipla binária, teste Qui-Quadrado ou simulação de Monte Carlo ou teste Exato de Fisher. Foram calculados *odds ratios* e os respetivos intervalos de confiança de 95%.

Os resultados do primeiro estudo revelaram que existe uma prevalência considerável no consumo de substâncias que varia de acordo com a área geográfica estudada, tendo implicações em termos de saúde pública, sendo de fundamental importância o estudo dos fatores psicossociais que influenciam este comportamento. Não foi encontrado qualquer estudo formal sobre a situação em Portugal. No estudo seguinte, verificou-se boas propriedades psicométricas do instrumento para avaliar as atitudes face ao consumo de substâncias ilícitas que melhoram o desempenho no *fitness*, podendo ser aplicado como ferramenta de diagnóstico e identificação. Os resultados do terceiro estudo comprovaram a utilização deste tipo de substâncias no contexto do *fitness* português, nomeadamente, o consumo de diuréticos e esteroides anabolisantes,

bem como a associação com as demais variáveis consideradas (género, habilitações académicas, perfil de prática e modalidades praticadas), tendo-se verificado a influência social dos pares como peça chave neste tipo de comportamento. Os resultados do quarto estudo asseveraram as fortes relações entre as atitudes, normas subjetivas e as crenças, sendo todos eles preditores das intenções para o uso de substâncias, destacando-se as normas subjetivas, como o principal preditor. Verificaram-se diferenças entre os géneros e entre os que não tomam e tomam estas substâncias, em relação aos constructos considerados na TCP.

Implicações para a intervenção, limitações e direções futuras para a investigação são também apresentadas e discutidas.

Palavras-chave: fatores determinantes, prevalência, substâncias ilícitas que melhoram o desempenho, praticantes de *fitness*, modelo do comportamento planeado.

TITLE OF THE THESIS: Prevalence and Determinants of Illicit Performance-Enhancing Substances use in Gym users

Abstract

The present investigation aimed to study the prevalence and determinants of illicit performance-enhancing substances (PES) use in gym users. Therefore, a first study was carried out to compile the available evidence in the literature about the prevalence and conceptualization of the psychosocial factors that may influence the use of these substances in this specific population, based on the model of the Theory of Planned Behavior (TPB), (Ajzen, 1991), namely in Portugal, whether or not they justified this work. In addition, the "Doping Attitudes Questionnaire in Sport" (Serpa et al., 2001) was adapted to the context of fitness, its distribution was made, and their psychometric validation was performed to evaluate the constructs included in the theoretical model (Ajzen, 1991). In the third study, the prevalence of the use of this type of substance in the sample obtained was investigated and its association with the socio demographic factors, profile of the practice of physical activity and modalities practiced. It was also investigated the social influence of peers in this type of behavior, as well as the reasons for taking, the way of acquisition, ways of administration, side effects and smoking habits and alcohol consumption. Finally, predictors of the intention to use PES among these gym users were identified and analyzed and whether gender and use of PES influence the TPB variables (attitudes, beliefs, subjective norms and intentions).

In total, 453 gym users, practitioners of various modalities, aged between of 16 and 79 years participated in the study. The data were analyzed through structural equation models, applying factorial analyzes of a confirmatory nature, as well as multi-group, latent mean analyzes and One-Way Anova test. We also used binary multiple logistic regression, Chi-square test or Monte Carlo simulation or Fisher's exact test. Odds ratios and their respective 95% confidence intervals were calculated.

The results of the first study revealed that there is a considerable prevalence in the consumption of substances that varies according to the geographic area studied, having implications in terms of public health, and being of fundamental importance the study of the psychosocial factors that influence this behavior. No formal studies were found on the situation in Portugal. In the following study, we verified good psychometric properties of the instrument to evaluate the attitudes towards the consumption of PES in the fitness, being able to be applied as a tool of diagnosis and identification. The results of the third study confirmed the use of this type of substances in the Portuguese fitness context, namely the consumption of diuretics and anabolic steroids, as well as the association with other variables considered (gender, academic qualifications, practice profile and practiced modalities), and the social influence of peers has been a key factor in this type of behavior. The results of the fourth study asserted the strong relationships between attitudes, subjective norms and beliefs, all of

which are predictors of PES use intentions, standing out subjective norms as the main predictor. There were differences between gender and between PES users and nonusers in terms of the TPB´s variables.

Implications for the practice, limitations and future directions for the research are discussed.

Keywords: determinants, prevalence, illicit performance-enhancing substances, gym users, model of planned behavior.

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Capítulo I

Introdução Geral

Introdução

A utilização de substâncias que melhoram o desempenho (do inglês *performance-enhancing substances* (PES)) ou de métodos para melhorar o rendimento de um atleta em desportos competitivos é um tópico pertinente e atual, transversal a todos os *stakeholders* envolvidos no desporto e cuidados de saúde.

De acordo com a Agência Mundial Antidopagem (AMA), o comportamento considerado *doping* refere-se ao uso de substâncias ilícitas e métodos que melhoram o desempenho. Atualmente, devem ser cumpridos dois dos três critérios seguintes para que uma substância ou método seja incluído na lista proibida da AMA: (1) Evidência médica ou outra evidência científica, efeito farmacológico ou experiência que a substância ou método, sozinho ou em combinação com outras substâncias ou métodos, tem potencial para melhorar ou melhora o desempenho desportivo; (2) Evidência médica ou outra evidência científica, efeito farmacológico ou experiência de que o uso da substância ou método representa um risco real ou potencial para a saúde do atleta; (3) A determinação, pela AMA, de que a utilização da substância ou método viola o espírito desportivo descrito na introdução do Código (WADA, 2015).

A utilização de PES, seja legal ou ilegal, pode ocorrer em todos os níveis de atividade física - estudantes de ensino médio ou atletas universitários, atletas profissionais, competidores olímpicos internacionais, atletas recreativos e praticantes de *fitness* em ginásios. A nível profissional e olímpico, bem como os atletas filiados numa federação desportiva, cada atleta é responsável pelas substâncias que consome e deve saber se alguma dessas substâncias está na Lista Proibida do Código Mundial Antidopagem, que é publicada anualmente pela AMA. A nível recreativo, não há regulamentação, sendo a Dinamarca um dos poucos países com controlos de drogas em ginásios e centros de *fitness* (Thualagant & Pfister, 2012).

Durante as últimas duas décadas, a incidência de *doping* entre os atletas recreativos nos Estados Unidos e na União Europeia aumentou de cerca de 5 para mais de 20%. A percentagem de utilizadores masculinos é 3 a 7 vezes maior do que a das mulheres com esse comportamento. De todas as atividades físicas recreativas possíveis, o *bodybuilding* lidera o consumo destas substâncias. Além dos esteróides, os atletas recreativos consomem efedrina e anfetaminas devido à sua ação estimuladora e lipolítica, hormona de crescimento humano, clenbuterol e insulina, devido ao seu

potencial anabólico, bem como hormona gonadotrofina coriónica humana para prevenir a atrofia testicular e anti estrogénios para prevenir a ginecomastia (Peters, Schulz, & Michna, 2002).

O primeiro estudo a chamar a atenção para o problema do consumo de PES em ginásios, foi publicado no final do ano de 1997, por Korkia e Stimson, baseando-se nos resultados obtidos numa amostra de 1667 praticantes de 21 ginásios na Grã-Bretanha. Nesse estudo, 9,1% dos homens e 2,3% das mulheres relataram ter usado esteróides anabolisantes e 6,1% dos homens e 1,4% das mulheres afirmaram usá-los regularmente. Destacava-se a grande variabilidade de consumo entre ginásios, já que, em alguns deles não se verificou a existência de nenhum praticante consumidor, enquanto em outros ginásios quase 50% dos praticantes declararam consumir esteróides anabolisantes. A grande maioria dos utilizadores relataram usar múltiplos esteróides anabolisantes em simultâneo, administrados oralmente e / ou injetados e em doses bem acima do tratamento terapêutico recomendado (Korkia & Stimson, 1997).

Os resultados apurados na Grã-Bretanha foram replicados em outros estudos elaborados em vários países, estes não só com o objetivo de avaliar a prevalência do uso de esteróides anabolisantes, mas também, para identificar as doenças orgânicas causadas pelo uso dessas substâncias.

Estas situações são atualmente consideradas um problema de saúde pública, dado que foi demonstrado que substâncias tais como esteróides anabolisantes, estimulantes, eritropoietina, hormona de crescimento humano e diuréticos têm a capacidade de produzir efeitos significativos no aumento de desempenho e que, por sua vez, podem estar associados a efeitos colaterais graves ou mesmo fatais, se utilizados prolongadamente (Baron, Martin, & Magd, 2007).

Apesar dos numerosos estudos efetuados no domínio da dopagem no desporto, apenas se realizaram algumas tentativas de explicações abrangentes que pudessem, com aceitável grau de certeza e numa base teórica adequada, determinar os fatores e a extensão da sua relevância, para os atletas chegarem à decisão de utilizar substâncias dopantes no desporto. Para além deste facto, a maioria dos estudos foi efetuada em amostras de atletas profissionais, enquanto os atletas recreativos foram, muito raramente, sujeitos a este tipo de estudos (Mitić & Radovanović, 2011).

No âmbito da atividade física, as pessoas que utilizam os ginásios provêm de condições sociodemográfica diversificadas, em que o consumo de substâncias que melhoram o desempenho não é utilizado apenas com a finalidade de melhorar o

rendimento físico, mas também para obter um corpo mais musculado, especialmente para os homens, e mais magro, no caso das mulheres, cujo objetivo é uma perda de peso mais rápida. Existem várias razões para as pessoas, especialmente os homens jovens, utilizarem este tipo de substâncias, a par dos seus treinos, nomeadamente, para acelerar os seus resultados, como forma de emulação das suas estrelas favoritas no desporto profissional, visando melhorar a força e a construção de um corpo musculado, ganhando uma vantagem competitiva contra oponentes, ou, ainda, cedendo à pressão dos pares, e tornando-se mais desejável sexualmente (EHFA, 2012).

De acordo com Mougios (2002), o típico atleta recreativo que consome substâncias que melhoram o desempenho é um jovem praticante de *bodybuilding,* do sexo masculino, que utiliza, principalmente, esteróides anabolisantes obtidos no mercado negro, cujas habilitações académicas é o ensino médio, trabalha num escritório e é solteiro.

Segundo Morente-Sánchez e Zabala, (2013), além da investigação médica, analítica e fisiológica, a pesquisa antidopagem também deve incluir estudos sociológicos, comportamentais e éticos das atitudes e crenças dos atletas no uso de substâncias proibidas no desporto e atividade física (Kirby, Guerin, Moran, & Matthews, 2016).

Nos últimos anos tem-se vindo a testemunhar um aumento do interesse na pesquisa dos fatores psicossociais associados à propensão para o consumo de substâncias ilícitas para melhorar o desempenho, por parte de atletas de elite e de atletas recreativos (Barkoukis, Lazuras, & Tsorbatzoudis, 2016), em especial, o estudo das atitudes, uma vez que fornece elementos essenciais para o entendimento dos mecanismos psicológicos conducentes aos comportamentos e, consequentemente, dá suporte a estratégias de prevenção do consumo de PES (Serpa, Faria, Marcolino, Reis, & Ramadas, 2003).

O conceito de atitude é tido como um dos conceitos fundamentais da Psicologia Social, tendo sido alvo de inúmeras definições, destacando-se a proposta por Ajzen e Fishbein (2000), que definem a atitude como sendo uma disposição estável para responder, de forma consistente, favorável ou desfavoravelmente, a um objeto psicológico, de forma a predizer e explicar o comportamento humano. De um modo geral, as atitudes são vistas sob uma perspetiva multidimensional, enquanto sistemas complexos, compostas por três componentes: a) componente afetiva; b) componente comportamental, e; c) componente cognitiva. A componente afetiva é caracterizada

através de uma carga afetiva favorável ou desfavorável, que permite predispor o indivíduo à concretização do comportamento. A componente comportamental, é uma componente desencadeadora de comportamentos, que deve estar de acordo com as cognições e afetos relativos ao objeto social – representa a intencionalidade das atitudes. A componente cognitiva, refere-se às representações que cada indivíduo possui acerca do objeto em questão, incluindo os conhecimentos, crenças, implicações, convicções ou outras informações acerca do objeto da atitude (Serpa et al., 2003).

No que respeita a formação das atitudes, esta tem em consideração duas linhas teóricas fundamentais: a) linha cognitivista, e; b) linha conceptual. A linha cognitivista centra-se nos processos cognitivos, nomeadamente na avaliação das crenças que contribuem para o delineamento das atitudes. A linha conceptual centra-se no "efeito da mera exposição", tendo por base as experiências emocionais, ou seja, não existe uma alteração das crenças, mas sim uma mudança no posicionamento do individuo face ao objeto.

Dos modelos teóricos sócio cognitivos e motivacionais da predição do comportamento, destacam-se o Modelo da Ação Racional, formulada por Ajzen e Fishbein (1980) e o Modelo do Comportamento Planeado (Ajzen, 1985), que se desenvolveu a partir do anterior e ao qual foi adicionado o conceito de perceção de controlo do comportamento (Armitage & Conner, 2001). Quer um, quer outro modelo, focam-se nos constructos teóricos relativos aos fatores motivacionais individuais, enquanto determinantes da probabilidade de vir a realizar um comportamento específico. Ambos os modelos postulam que o melhor preditor do comportamento são as intenções face ao comportamento, o qual, por sua vez, é determinado pelas atitudes face ao comportamento e as perceções normativas sociais acerca deste (Montaño & Kasprzyk, 2008). O Modelo da Ação Racional (Ajzen & Fishbein, 1980), assenta no princípio dos indivíduos considerarem as implicações das suas ações antes de decidirem aderir ou não a um determinado comportamento, ou seja, as ações com relevância social estão perante um controlo volitivo – comportamento que está sobre o controlo do individuo, não necessitando habilidades, oportunidades, destrezas ou cooperação com os outros, mas apenas a motivação – e é segundo este que as intenções originam o comportamento. Apesar do reconhecido sucesso desta teoria, esta apresentou como limitação, o facto de especificar que o comportamento em estudo deve estar sob o controlo do individuo (Gatch & Kendzierski, 1990). Neste sentido, e por forma a ultrapassar esta limitação, Ajzen (1985), propôs a Teoria do Comportamento Planeado

(TCP), que é considerada uma extensão da teoria da ação racional, uma vez que descreve três componentes conceptuais determinantes da intenção, em substituição das duas componentes presentes na teoria da ação racional (atitudes e normas subjetivas). O controlo comportamental percecionado – terceira componente, é definido como sendo a perceção que o individuo tem acerca do grau de dificuldade de operacionalização do comportamento em causa, refletindo, desta forma, as experiências anteriores do indivíduo, permitindo a previsão de obstáculos e impedimentos passíveis de interferirem na realização do comportamento (Serpa et al., 2003). De um modo geral, o modelo do comportamento planeado sugere que a intenção comportamental (que é o precursor e o preditor) das ações para assumir ou recusar um comportamento saudável (Ajzen, 1991) é determinada pela atitude do indivíduo em relação ao comportamento, que reflete (i) "o grau em que uma pessoa tem uma avaliação favorável ou desfavorável do comportamento em questão; (ii) norma subjetiva, refere-se à pressão social percebida para realizar ou não realizar o comportamento; e (iii) controlo comportamental percecionado, refere-se à facilidade ou dificuldade percebida de realizar o comportamento, supondo-se que reflita a experiência passada, bem como impedimentos e obstáculos previstos" (Ajzen, 1991, p.188).

A TCP, enquanto teoria orientadora da modificação de comportamentos, tem sido amplamente utilizada para explicar os comportamentos de risco para a saúde, nomeadamente na área do consumo de tabaco (e.g., Moriano, 2010), álcool (e.g., Hagger et al., 2012) e outras substâncias (Armitage, Conner, Loach & Willetts, 1999), demonstrando ser eficaz na predição deste tipo de comportamentos. No caso específico da investigação em dopagem no desporto, esta teoria talvez seja a mais influente para explicar comportamentos motivados, que dependem da vontade do indivíduo, entre eles, o abuso de substâncias dopantes, permitindo, desta forma, uma perspetiva teórica para investigar os comportamentos relacionados com o *doping* no desporto (Barkoukis et al., 2016; Chan et al., 2015; Goulet, Valois, Buist, & Côté, 2010;). No entanto, de acordo com Barkoukis, Lazuras e Tsorbatzoudis (2016) e Kavussanu e Ring (2017), vários modelos integrativos psicológicos específicos (Modelo de Ciclo de Vida; Modelo de Controle de Drogas no Desporto; Teoria da Influência Triádica - Modelo Integrativo no Contexto de Dopagem e Modelo Transcontextual) têm sido propostos para explicar o uso do PES no desporto, uma vez que é considerado um "fenómeno multifacetado que requer diferentes níveis de explicação e compreensão dos processos psicossociais" (Barkoukis et al., 2016, p.44). Contudo, segundo Lazuras (2016), embora diferentes

modelos integrativos de uso de *doping* incluam modelos gerais de predição comportamental, como a TCP (Ajzen, 1991), nenhum dos estudos empíricos desses modelos incorporou medidas ou analisou os efeitos da influência contextual (isto é, o contexto socioeconómico desportivo e o contexto sociocultural mais amplo), apesar de esta poder ter um efeito profundo na ação-iniciação do consumo deste tipo de substâncias.

A meta-análise realizada por Ntoumanis et al. (2013), concluiu que as atitudes pró-*doping* e as crenças normativas tendenciosas (isto é, superestimando a prevalência real e a aceitabilidade social do uso de *doping*), previam de forma direta as intenções positivas face ao *doping*. Estas conclusões implicam que a Teoria do Comportamento Planeado - e as suas extensões - oferecem uma estrutura útil para a compreensão do processo de tomada de decisão para o uso de substâncias que melhoram o desempenho (Ntoumanis, Ng, Barkoukis, & Backhouse, 2013).

Segundo Backhouse et al. (2016), tem havido um aumento no número de estudos, desde 2007, realizados em praticantes de *fitness* em ginásios e em *bodybuilders,* que autodeclaram o uso de substâncias que melhoram o desempenho, verificando-se um maior foco no estudo da prevalência do uso de esteróides anabolisantes, em detrimento de outro tipo de PES (Backhouse, Whitaker, Patterson, Erickson, & McKenna, 2016). É ainda de salientar, o facto de permanecer quase inteiramente por estudar, as determinantes psicossociais, nomeadamente, as atitudes em relação à utilização de outras substâncias que melhoram o desempenho, que não os esteróides anabolisantes, por parte dos praticantes de *fitness* em ginásios (Backhouse, Kenna, Robinson, & Atkin, 2007). Os mesmos autores constataram, ainda, que a maioria dos estudos efetuados carece da aplicação de marcos teóricos para orientar as questões de pesquisa. No entanto, quando tal se verifica, a Teoria do Comportamento Planeado é o modelo mais utilizado enquanto referencial teórico (Backhouse et al., 2016).

De acordo com Hauw, Roten, Mohamed, e Philippe (2016), foram propostos vários instrumentos para medir as atitudes, no âmbito da pesquisa dos comportamentos relacionados com o *doping* no desporto, sendo alguns dos instrumentos, medidas *ad hoc* ou escalas, cujo foco são as atitudes em relação a substâncias específicas, principalmente esteróides anabolisantes. Estes tipos de instrumentos são muitas vezes desenvolvidos com o intuito de serem utilizados numa única pesquisa, não sendo alvo de validação psicométrica, o que compromete as inferências realizadas a partir destes

(Petróczi & Aidman, 2009). Por forma a colmatar esta lacuna, várias medições diretas das atitudes (questionários de autopreenchimento) têm sido propostas na área da dopagem. Em 2002, Petróczi desenvolveu uma escala unidimensional de 17 itens – *Performance Enhancement Attitude Scale* (PEAS), que permite medir quantitativamente e de forma direta, as atitudes face ao *doping*, tendo sido aplicada (Petróczi, 2007) e revista (Petróczi & Aidman, 2009) desde então. No entanto, está altamente vocacionada para a medição das atitudes face ao *doping* em atletas de competição (Hauw et al., 2016). Paralelamente, foram ainda propostos outros instrumentos que medem as atitudes implícitas (e.g., *Doping Implicit Association Test, Doping Brief Implicit Association Test* e *Pictorial Doping Brief Implicit Association Test*), mas também estes, direcionados aos atletas de competição.

O questionário Português desenvolvido por Serpa et al. (2001) – "Questionário de Atitudes perante o *Doping* no Desporto", baseia-se no Modelo do Comportamento Planeado (Ajzen, 1991), e foi desenvolvido com o intuito de medir as atitudes face ao consumo de *doping* em contexto desportivo. O questionário permite avaliar quatro dimensões distintas: a) atitudes relativamente ao comportamento de consumir *doping*, isto é, a componente avaliativa de tal comportamento por parte do sujeito; b) crenças, o que significa as convicções do sujeito quanto ao efeito do *doping* no sentido de melhorar a prestação; c) normas subjetivas, ou seja, a perceção do sujeito quanto ao que as pessoas, que são para ele significativas, pensam sobre o consumo de substâncias dopantes e d) intenções sobre as circunstâncias em que os indivíduos pensam que tomariam, ou não, *doping* (Serpa et al., 2003). Os seus 31 itens são classificados em uma escala de 7 pontos de tipo *Likert*. Apesar deste questionário ter sido originalmente desenvolvido para ser aplicado em contexto desportivo, apresentou-se como potencial instrumento de partida para a adaptação ao contexto de *fitness,* uma vez que, demonstradas as suas qualidades psicométricas (validade e fiabilidade), pode fornecer medidas fiáveis dos fatores que influenciam a formação das atitudes face ao consumo de PES, em praticantes de *fitness* em ginásios, por forma a compreender os determinantes que desencadeiam este comportamento nesta população específica.

Problema de Investigação

A crescente tendência mundial pela procura de forma física adequada e de qualidade de vida, é hoje uma realidade que atravessa todas as faixas etárias e é independente do género ou classe social. A preocupação excessiva com a aparência e a estética pode levar ao consumo indiscriminado de substâncias que melhoram o desempenho em praticantes de *fitness* em ginásios, pondo em causa a sua saúde.

De acordo com Saba (1999, citado por Proença, 2011), o ambiente dos ginásios e *health clubs* fomenta os padrões estéticos estereotipados, como o corpo magro, com baixa quantidade de gordura ou com elevado volume e tónus muscular (Proença, 2011).

O "Plano Nacional para a redução dos Comportamento aditivos e das Dependências 2013-2020", salienta que, o Meio Desportivo, um dos contextos de intervenção do Plano, deverá ser alvo de um olhar mais atento e de investimento de carácter continuado, nomeadamente no que concerne a realidade dos frequentadores de ginásios e centros de *fitness*, uma vez que são necessários estudos que melhor clarifiquem o impacto das substâncias utilizadas para o aumento do desempenho físico e moldagem do corpo junto desta população específica (SICAD, 2015).

Em Portugal não existem, praticamente, estudos sobre o uso de substâncias dopantes fora do desporto de competição, salientando-se um estudo desenvolvido em 2011 pela *European Health & Fitness Association* (EHFA, 2011), com o apoio da Comissão Europeia, em que foram envolvidos 9 países, entre eles Portugal, em parceria com a Associação de Empresas de Ginásios e Academias de Portugal (AGAP), o organismo que representa este setor no nosso país. Os resultados obtidos neste estudo apontam para 4,2% dos frequentadores dos ginásios portugueses que reconhece que utiliza este tipo de substâncias, destacando-se substâncias tais como esteróides anabolisantes e as ditas drogas sociais como as anfetaminas, cocaína e *ecstasy*. De salientar que o valor médio encontrado para os clientes dos ginásios portugueses foi quase o dobro, quando comparado aos seus congéneres europeus (2,7%) onde ocorreu o inquérito (EHFA, 2011) e o facto do inquérito ter sido distribuído pelos ginásios e centros de *fitness* associados à AGAP, estabelecimentos nos quais o consumo de substâncias que melhoram o desempenho será provavelmente menos prevalente, levando a crer que esta percentagem estará certamente subestimada no que se refere à realidade portuguesa (Horta, 2017). No que respeita ao conhecimento acerca dos

determinantes psicossociais, nomeadamente, as atitudes em relação à utilização de outras substâncias que melhoram o desempenho, que não os esteróides anabolisantes, por parte desse tipo de praticantes, terão sido efetuados poucos estudos, desconhecendo-se a existência deste tipo de abordagem, em termos nacionais.

Tendo em consideração os aspetos abordados, bem como as linhas estratégicas de ação enunciadas pela Comissão Europeia sobre a prevenção do *Doping* fora do desporto de competição (Backhouse et al., 2014) e o "Plano Nacional para a redução dos Comportamento aditivos e das Dependências 2013-2020" (SICAD, 2015), torna-se primordial investigar a prevalência do consumo de substâncias ilícitas que melhoram o desempenho, pelos praticantes de *fitness* em ginásios portugueses e os fatores determinantes (atitudes, crenças e normas subjetivas) que influenciam as intenções para o consumo deste tipo de substâncias, tendo por base o modelo preconizado na TCP. Este conjunto de investigações pretende contribuir para o levantamento das determinantes psicossociais relacionadas com o consumo de PES e, ainda que modestamente e se assim os *stakeholders* o entenderem, servir de base a futuros programas de intervenção que contrariem a propagação desta situação com elevado impacto em termos de saúde pública.

Objetivos de estudo

Considerando o problema de investigação apresentado e com base no modelo de suporte a esta investigação, nomeadamente o modelo da Teoria do Comportamento Planeado (Ajzen, 1991) apresentado na figura 1, definimos como objetivo geral deste estudo, investigar a prevalência e as determinantes psicossociais da utilização de substâncias ilícitas que melhoram o desempenho nos praticantes de *fitness* em ginásios, em Portugal. Como objetivos específicos, propusemos (1) compilar as evidências disponíveis acerca da conceptualização dos fatores psicossociais que podem influenciar o uso de substâncias ilícitas que melhoram o desempenho em praticantes de fitness; (2) adaptar e validar psicometricamente uma escala de atitudes – QAD-*Fit*, que permita recolher informação sobre as atitudes dos praticantes de fitness em ginásios face ao consumo de substâncias que melhoram o desempenho, através da adaptação do Questionário de Atitudes Perante o Doping no Desporto (QADS) desenvolvido por Serpa et al. (2001); (3) determinar a prevalência do consumo de substâncias ilícitas que

melhoram o desempenho em praticantes de *fitness* em ginásios portugueses e investigar a relação desse comportamento com fatores sócio demográficos e com o consumo de álcool e tabaco; e (4) identificar os preditores das intenções de consumo de substâncias ilícitas que melhoram o desempenho nos praticantes de *fitness* em ginásios e em que medida o género e a toma de substâncias influenciam os constructos considerados na TCP.

A operacionalização do objetivo geral, bem como dos objetivos específicos acima mencionados implica a consecução de diversos desideratos, inerentes a cada um dos estudos que consubstanciam a presente tese. Neste sentido, o estudo apresentado no capítulo II propõe-se identificar o estado da literatura – mediante a elaboração de uma revisão sistemática de literatura acerca da prevalência, atitudes, crenças e conhecimentos em praticantes de *fitness* em ginásios, de acordo com a TCP, com o intuito de compilar as evidências disponíveis acerca da conceptualização dos fatores psicossociais que podem influenciar o uso de substâncias ilícitas que melhoram o desempenho nesta população específica. Seguidamente, o capítulo III apresenta um estudo cujo propósito foi validar o questionário QAD-*Fit*, que foi adaptado a partir do questionário proposto por Serpa et al. (2001) e que foi utilizado na avaliação dos constructos (atitudes, crenças, normas subjetivas, intenções) que integram a presente tese de investigação. O capítulo IV contempla um estudo de cariz descritivo, com o objetivo de estabelecer a prevalência do consumo de substâncias ilícitas que melhoram o desempenho numa amostra de praticantes de *fitness* em ginásios portugueses, e investigar a relação desse comportamento com fatores sócio demográficos (idade, género, estado civil, habilitações académicas, ocupação), características de treino (anos de treino, frequência de treino e tempo despendido em cada treino) e modalidades praticadas em ginásio. Adicionalmente, investigou-se também o tipo de substâncias mais comummente utilizadas, de acordo com a lista de substâncias proibidas da AMA, bem como a frequência de utilização, efeitos adversos associados à toma, fontes de aquisição, vias de administração, motivos para a toma e a influência dos pares e pressão social. Foi ainda investigada a associação da toma destas substâncias, com o consumo de álcool e tabaco, uma vez que os comportamentos aditivos tendem a facilitar a predisposição para outros tipos de consumos perniciosos (Allahverdipour, Jalilian, & Shaghaghi, 2012; Nicos, Constantinos, Stavros, Michael, & Christina, 2008). Finalmente e tendo em consideração a perspetiva multidimensional que orienta as abordagens investigacionais no âmbito desta temática, no capítulo V, propomo-nos

identificar os preditores das intenções de consumo de substâncias ilícitas que melhoram o desempenho nos praticantes de *fitness* em ginásios e em que medida o género e a toma de substâncias influenciam os constructos considerados na TCP (atitudes, crenças, normas subjetivas e intenções para a toma de substâncias).

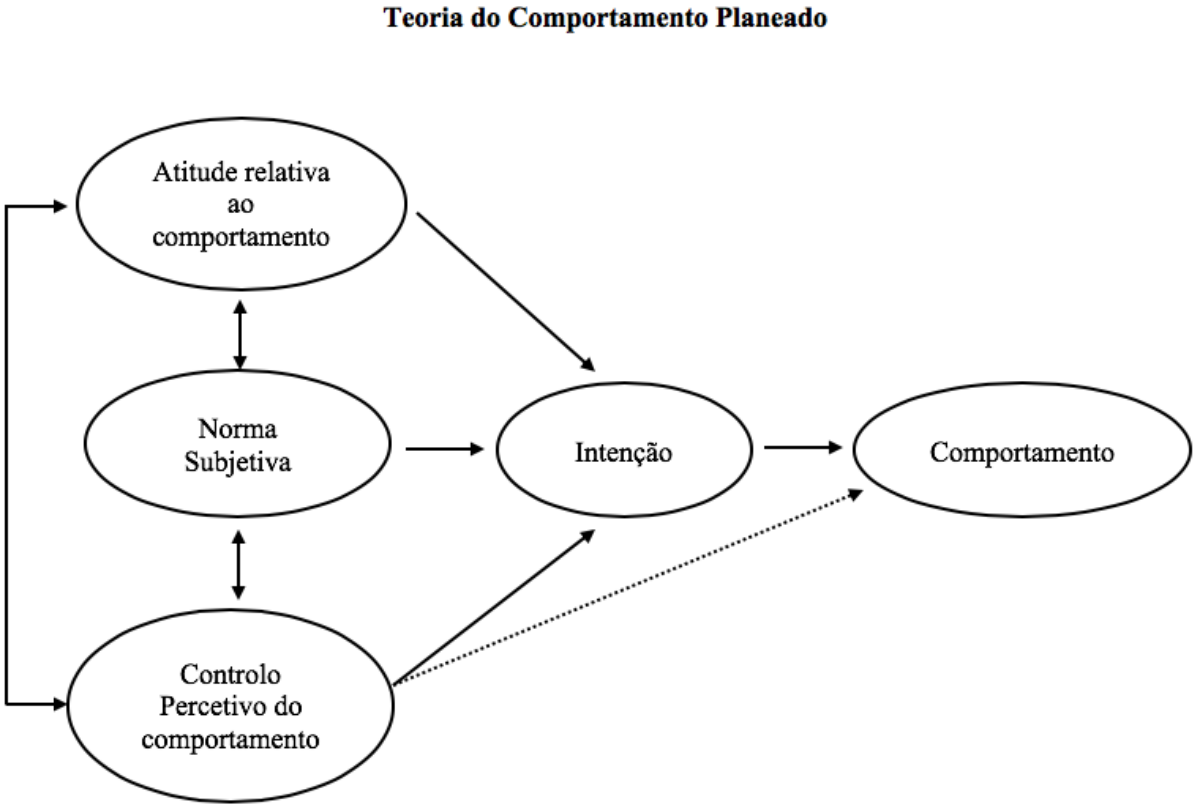

Figura 1. Teoria do comportamento planeado (Adaptado de Ajzen, 1991, p.182).

Estrutura da tese

A forma como esta tese se encontra estruturada está de acordo com o estatuído pelo Regulamento de Doutoramentos da Faculdade de Motricidade Humana, referente às normas definidas pelo Despacho nº 857/2010 publicado no Diário da República, 2.ª série, nº 102, de 25 de maio. Em decorrência, apresenta-se sob a forma de uma compilação de artigos, publicados ou submetidos para publicação em revistas científicas internacionais com arbitragem científica e fator de impacto, estando por este motivo

organizados em resumo, introdução, metodologia, resultados, discussão, conclusões e referências.

A fim de cumprir os objetivos propostos nesta tese, o documento é apresentado em quatro capítulos principais. O presente capítulo é dedicado à introdução geral, enquadramento do problema de investigação e objetivos de estudo. Do segundo ao quinto capítulo, apresenta-se os quatro estudos realizados, referentes ao consumo de substâncias ilícitas que melhoram o desempenho em praticantes de *fitness* em ginásios portugueses. O sexto capítulo pretende fazer uma discussão generalizada dos resultados exibidos nos diversos estudos, realizando para tal um epítome dos principais resultados obtidos com os estudos efetuados, de forma a permitir um melhor esclarecimento acerca do contributo de cada estudo. Pretende-se ainda realizar uma reflexão sobre a investigação efetuada, as principais limitações identificadas e sugestões sobre futuros estudos e propostas de intervenção. Por último, o sétimo capítulo corporiza as conclusões finais sobre a tese.

Capítulo II

Estudo 1

Psychosocial Factors and Performance Enhancing Substances in Gym Users: A Systematic Review

Psychosocial Factors and Performance Enhancing Substances in Gym Users: A Systematic Review[1]

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Abstract

The use of performance-enhancing substances (PES) occurs among gym/fitness center users**.** This systematic review aimed to analyze studies describing prevalence, attitudes, beliefs, and knowledge, as conceptualized in the Theory of Planned Behavior (TPB), influenced by the use of PES by this population. Twenty-six articles were identified from a systematic approach following the PRISMA statement via electronic databases (SPORTDiscus™, PubMed, Scopus, Web of Science, B-On and Psychology and Behavioral Science Collection) and hand-searching bibliographies of reference lists. Only peer-reviewed primary research published in English, Portuguese and Spanish (1997-2016), focusing on gym/fitness center users and providing information on psychosocial factors (e.g., attitudes, beliefs, intention, social influence/ peer pressure) towards using PES, were included. It was concluded that the most prevalent substance used were anabolic-androgenic steroids (AAS). Attitudes of male bodybuilders using AAS as the prevalent drug are mainly related to aesthetic issues. Important influences come from groups (e.g., friends, training colleagues) and instructors. Although some AAS users indicated a general lack of knowledge of the potentially harmful effects of these drugs, others were aware of the side effects. The TPB illustrated a relationship between psychosocial factors influencing gym users to use PES.

Keywords: Gym users, Performance enhancing substances, Anabolic-Androgenic Steroids, Theory of Planned Behavior.

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[1] Tavares, A.S., Serpa, S., Horta, L., & Rosado, A. (2019*).* Psychosocial Factors and Performance Enhancing Substances in Gym Users: A Systematic Review. *Revista de Psicología del Deporte/Journal of Sport Psychology*, 28(1), 131-142.

Resumen

El uso de sustancias que mejoran el rendimiento (PES) ocurre entre los practicantes de gimnasio / *fitness*. Esta revisión sistemática tuvo como objetivo analizar estudios que describen la prevalecía, las actitudes, las creencias y el conocimiento, de acuerdo con el conceptualizado en la Teoría del Comportamiento Planeado (TPB), influenciado por el uso de PES en esta población. Veintiséis artículos fueron identificados a partir de un enfoque sistemático, utilizando el PRISMA a través de bases de datos electrónicas *(SPORTDiscus™, PubMed, Scopus, Web of Science, B-On and Psychology and Behavioral Science Collection*) e búsquedas manuales de bibliografías a partir de listas de referencia. Sólo los estudios primarios revisados por pares, publicado en inglés, portugués y español (1997-2016), cuya población de estudio fueron la práctica de gimnasia / *fitness* y proporcionar información sobre los factores psicosociales (e.g., actitudes, creencias, intención, influencia social / presión de grupo) para el uso de PES, se incluyeron. Se concluyó que la PES más prevalente eran los esteroides anabolizantes (AAS). Las actitudes positivas ante el consumo de AAS, por parte de los culturistas están relacionadas principalmente con cuestiones estéticas. Importantes influencias provienen de grupos (e.g., amigos, compañeros de entrenamiento) e instructores. Aunque algunos consumidores de AAS indicaban una falta general de conocimiento sobre los efectos potencialmente nocivos de estas drogas, otros estaban conscientes de los efectos colaterales. La TPB demostró una relación entre los factores psicosociales que influencian a los practicantes de gimnasio/*fitness* para usar PES.

Palabras clave: Usuarios de gimnasio, Sustancias que mejoran el rendimiento, Esteroides anabolizantes, Teoría del Comportamiento Planeado.

Resumo

A utilização de substâncias que melhoram o desempenho (PES) ocorre entre os utilizadores de ginásios e centros de *fitness*. Esta revisão sistemática teve como objetivo analisar estudos que descrevem prevalências, atitudes, crenças e conhecimentos, conforme o preconizado na Teoria do Comportamento Planeado (TPB), influenciados pela utilização de PES nesta população específica. Vinte e seis artigos foram identificados a partir de uma abordagem sistemática seguindo o método PRISMA através de bases de dados eletrónicas (*SPORTDiscus™, PubMed, Scopus, Web of Science, B-On* e Psicologia e *Behavioral Science Collection*) e pesquisa manual de bibliografia nas listas de referências. Foram apenas incluídos artigos de pesquisa primária revistos por pares e publicados em inglês, português e espanhol (1997-2016), cuja população em estudo fossem utilizadores de ginásios e centros de *fitness* e fornecessem informações acerca de fatores psicossociais (ex., atitudes, crenças, intenções, influência social / pressão dos colegas) para a utilização de PES. Concluiu-se que as substâncias mais utilizadas foram os esteróides anabólicos androgénicos (EAA). As atitudes dos praticantes de musculação masculinos que utilizam EAA como droga prevalente estão relacionadas principalmente com questões estéticas. Os grupos (ex., amigos, colegas de treino) e instrutores têm uma influência importante na utilização deste tipo de substâncias. Embora alguns utilizadores de EAA indiquem uma falta geral de conhecimento dos efeitos potencialmente prejudiciais dessas substâncias, outros estão cientes dos efeitos colaterais. A TPB permitiu demostrar que existe uma relação entre os fatores psicossociais que influenciam os utilizadores de ginásios a usar PES.

Palavras-chave: Utilizadores de ginásios, substâncias que melhoram o desempenho, esteróides anabólicos androgénicos, Teoria do Comportamento Planeado.

Introduction

According to the American Academy of Pediatrics (2005), "A performance enhancing substance (PES) is any substance taken in non-pharmacologic doses specifically for the purposes of improving physical and sports performance. A substance should be considered performance enhancing if it benefits sports performance/physical activity by increasing strength, power, speed, or endurance (ergogenic) or by altering body weight or body composition. Furthermore, substances that improve performance (e.g., stimulants, anabolic-androgenic steroids (AAS), erythropoietin, human growth hormone, and diuretics) by causing changes in behavior, arousal level, and/or perception of pain should be considered as PES".

The use of PES, legal or illegal, can occur at all levels of sports (Lollies, 2014; Ntoumanis, Ng, Barkoukis and Backhouse, 2014). A recent systematic review showed that global high prevalence of AAS use is no longer confined to elite competitive bodybuilders and athletes (Brennan, Wells, and Van Hout, 2017).

The very first meta-analysis of the global lifetime prevalence rate of AAS use was conducted by Sagoe, Molde, Andreassen, Torsheim and Pallesen (2014a). They concluded that the overall lifetime prevalence rate across all studies on AAS use was 3.3%, with the prevalence rate for males significantly higher than for females (6.4% and 1.6%, respectively). In another systematic review and synthesis of qualitative research, it was shown that the majority of AAS users-initiated use before age 30, and negative body image, sports participation and psychological disorders preceded initiation of AAS use for most users. The paramount motives for AAS initiation were appearance, muscle/strength and enhanced sport performance (Sagoe, Andreassen and Pallesen, 2014b). AAS users tend to use a wide range of other licit and illicit substances – polypharmacy, which have potentially serious harmful effects for those engaging in such behaviors (Sagoe, Torsheim, Molde, Andreassen and Pallesen, 2015). Drugs such AAS, stimulants, erythropoietin, human growth hormone, and diuretics have the capacity to impart significant performance enhancing effects, that in the long term use can be associated with several physical disorders, psychological symptoms or even fatal side effects (Baron, Martin and Magd, 2007; Sagoe et al., 2014a).

In spite of numerous studies in the field of doping in sport, there have only been a few attempts of models which could on a theoretical basis explain the factors and the

extent of their relevance for reaching the decision to use PES in sport. Furthermore, most of the studies were carried out on samples of professional athletes, whereas recreational athletes were used quite rarely (Mitić and Radovanović, 2011). In addition to physiological and chemical approaches, anti-doping research should also include sociological, behavioral and ethical studies of athletes' attitudes and beliefs towards the use of banned substances in sport (Morente-Sánchez and Zabala, 2013).

Researchers in this field used social-cognitive and motivational models towards identifying the influential factors on PES use intentions and behavior (Chan et al., 2015). According to Armitage and Conner (2001), the most extensively researched models are the Theory of Reasoned Action (TRA) and the Theory of Planned Behavior (TPB). TPB is an extension of the TRA aiming at anticipating volitional and non-volitional behaviors by considering the measures of perceived behavioral control (Armitage and Conner, 2001; Armitage, Conner, Loach, and Willetts, 1999; Goulet, Valois, Buist and Côté, 2010). The model suggested that the behavioral intention (which is the precursor and predictor) of the actions to assume or refuse a healthy behavior (Ajzen, 1991) is determined by the individual's attitude toward the behavior, which reflects (i) "the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question; (ii) subjective norm, it refers to the perceived social pressure to perform or not to perform the behavior; and (iii) perceived behavior control, it refers to the perceived ease or difficulty of performing the behavior and it is assumed to reflect past experience as well as anticipated impediments and obstacles" (Ajzen, 1991, p.188). The TPB has been largely used in doping research to explain athletes´ PES use intention and behavior (Chan et al., 2015; Goulet et al., 2010; Ntoumanis, Ng, Barkoukis and Backhouse, 2013; Wiefferink, Detmar, Coumans, Vogels and Paulussen, 2008; Serpa, Faria, Marcelino, Reis, Ramadas, 2003), since the use of PES seems to be largely determined by personal choice (Goulet et al., 2010).

However, according to Barkoukis, Lazuras and Tsorbatzoudis (2016) and Kavussanu and Ring (2017), a number of specific psychological integrative models (Life Cycle Model; Sports Drug Control Model; Theory of Triadic Influence – integrative model in the context of doping and Trans-contextual Model) have been proposed to explain the use of PES in sport, since this is considered, a "multifaceted phenomenon that requires different levels of explanation and understanding of psychosocial processes" (Barkoukis et al., 2016, p.44). According to Lazuras (2016), though different integrative models of doping use include general models of behavioral

prediction, such as the TPB (Ajzen, 1991), none of the empirical studies of these models have incorporated measures or analyzed the effects of contextual influence (i.e., sports socioeconomic context and the broader sociocultural context), since it can have a profound effect on action-initiation to PES consumption.

Based on previous research adopting the TPB, specifically a recent meta-analysis by Ntoumanis et al. (2014), that compared and summarized all known psychological predictors of doping behavior at all performance levels and in all physical settings (Blank, Kopp, Niedermeier, Schnitzer and Schobersberger, 2016), the present systematic narrative literature review has two major objectives. First, to synthesize recent studies that describes the prevalence of PES consumption in gym/fitness center users. Second, to summarize and analyze the psychosocial factors towards using PES in this specific population, according to those conceptualized in the TPB. In this sense, the TPB may contribute to the comprehension of these behaviors and improve the effectiveness of practical interventions, to reduce them among this specific population.

The rationale for this review was to compile the available evidence to conceptualize the psychosocial factors that may influence PES use by gym/fitness center users, since there is a scarcity of existing evidence on this kind of specific population. The TPB (Ajzen, 1991) was adopted, because it is one of the most frequently used models to explain athletes doping intentions and behavior (Chan et al., 2015), it provides definitions and descriptions that are more explicit regarding the specified construct and includes a discriminate validity of the constructs (Armitage and Conner, 2000). In this study and according to the TPB, attitudes, subjective norms and perceived behavior control concern to using PES.

Method

A literature search followed the guidelines from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Moher, Liberati, Tetzlaff and Altman, 2009). Following testing of preliminary search terms, a search strategy was developed (see Figure 1). Searches were conducted in databases of health sciences and electronic platforms including (1997-2016): SPORTDiscus^{TM}, PubMed, Scopus, Web of Science, B-On and Psychology and Behavioral Science Collection. In Google Scholar, additional relevant papers were searched. In addition, the reference lists of the included articles that passed the eligibility criteria were hand-searched.

Eligibility Criteria

Only peer-reviewed primary research was included, published in English, Portuguese and Spanish with publication date from the year 1997. Only gym/fitness center users, regardless of age and gender, were included. Studies were required to provide data on psychosocial factors (e.g., attitudes, beliefs, intention, social influence/ peer pressure) towards using PES (see Figure 1).

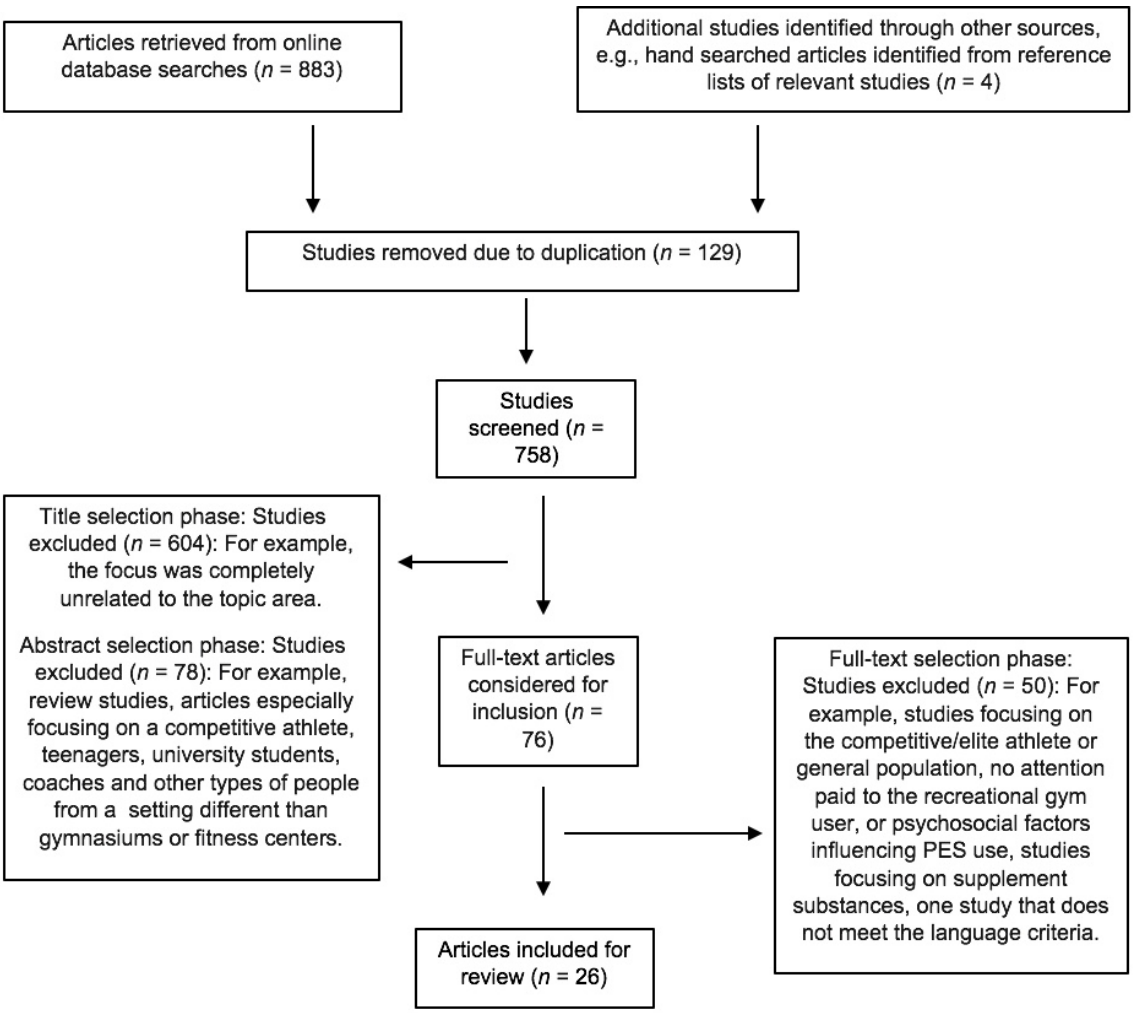

Figure 1. PRISMA diagram outlining the selection process.

Data Extraction and Quality Assessment

Important features of each study ("i.e." year, country, study design, participant, sample size, age group, methodology, risk of bias, key findings and psychosocial factors conceptualized with the TPB – attitudes, subjective norm and perceived behavioral control) were extracted and recorded in Microsoft Excel, which are charted in Tables 1 and 2. The assessment tool developed by Higgins and Altman (2008) was used to evaluate the risk of bias for the majority of individual studies. However, this tool was designed for studies using an experimental design only, so Ntoumanis et al. (2013) created other criteria for cross-sectional studies, which were adopted to evaluate the overall quality of the evidence from this systematic review, since the majority of the analyzed studies were descriptive/cross-sectional. For the qualitative study, the CASP tool (Critical Appraisal Skills Programmer, 2006) was used to evaluate the bias risk. The assessment of all studies was then conducted by two of the authors independently, ratings were compared, and disagreements were resolved by having a third author review the article under question and then coming to a consensus.

Results and Discussion

Summary of the analyzed studies

The main findings are summarized in Table 1 and Table 2. All 26 studies were conducted over a 19-year period (1997-2016), and most of them in Middle Eastern countries (38.46%), followed by Europe (34.61%) and the Americas (26.92%). The sample size ranges from 37 to 7 039, with a total of 21 083 participants across the 26 studies. All the studies compared the gym/fitness center users over a range of different ages. In terms of research design, only Petrocelli, Oberweis, and Petrocelli (2008) used a qualitative approach (grounded theory) and the other 25 were cross-sectional surveys. Methodologies were mainly structured questionnaire, web-based survey, interview (semi-structured, face-to-face, telephone) and observational (with mix interview/questionnaire; observation/questionnaire). The bias risk in the majority of the

studies was Low (57.4%), according to all assessed criteria used. From the 26 studies included for review, which provided data on psychosocial factors (according to the 3 constructs from the TPB) towards using PES, 24 measured the attitudes; 16 subjective norms and 18 perceived behavioral control.

Key Findings

Prevalence of PES consumption

The most prevalent PES was AAS. The exception was in the study of Stubbe, Chorus, Frank, de Hon, and van der Heijden (2014), in which stimulants to lose weight had the highest prevalence. The prevalence rates of PES use (especially AAS) reported across all of the studies, ranged from the lowest at 4.7% (Pedersen, 2010) and the highest at 70% (Baker, Graham, and Davies, 2006), with the vast majority reporting between 11.1% to 58%. The age of AAS initiation was predominantly adolescence (as low as 16 years) and young adult (under 30 years old). However, in Ip et al. (2015), AAS abuse is prevalent among older males (over 40 years old), showing that although AAS abuse is prevalent in young adults, it is also prevalent in middle aged men, probably due to the motivation to slow the aging process. Findings suggest that the prevalence of AAS is relatively high and a motive for public health concern. It is widespread among the individual countries represented in this study, showing that AAS use initiation occurred predominantly during adolescence and young adulthood.

Gym / Fitness center users' profile

AAS users were mostly young men, with a low level of education; most were weight trainers, training frequently and along more years (Al-Falasi et al., 2009; Leifman et al., 2011; Pedersen, 2010; Silva and Moreau, 2003; Striegel et al., 2006). Usman et al. (2015), found that misuse of AAS was significantly higher among those with a high level of education, in contrast to the findings of other studies.

Use of other substances, not PES

Some authors suggested that the use of AAS was linked to other substances. For example, in Allahverdipour et al. (2012), consumption of alcoholic drinks and smoking was related to AAS abuse. Silva and Moreau (2003), Nogueira et al. (2014) and Leifman et al. (2011) showed the association with dietary supplements and AAS use. Korkia and Stimson (1997) reported the concomitant use of social drugs. However, Striegel et al. (2006) found that AAS users more often abstain from alcohol in contrast to general illicit drug users (Brennan et al., 2017).

Table 1

General characteristics and summary points

Authors	Year	Country	Study design	Participant	Sample Size	Age Group	Method	Risk of Bias	Prevalence (PES, %)	Key findings
Al-Falasi et al.	2009	United Arab Emirates	Cross-sectional	Males / Females	154	Range: >20; 21-29; 30-39; 33-39; >40	Questionnaire	Low	AAS use (22%)	Misuse was significantly higher among body builders, weight lifters and commercial club users.
Allahverdipour et al.	2012	Iran	Cross-sectional	Males	253	Range: 15-28; Mean=22.2	Questionnaire	Low	AAS use (24.5%)	AAS use related to the consumption of smoking and alcohol drinks.
Alsaeed, I. and Alabkal, J.R.	2015	Kuwait	Cross-sectional	Males	194	Range: 14-19; 20-29; 30-40 ; >40	Questionnaire	Low	AAS use (22.7%)	AAS use was linked with the use of other substances.
Baker et al.	2006	UK	Cross-sectional	Predominantly males	146	Range: 15-72; Mean=33.6	Questionnaire	Potential	AAS use (70%)	The main drugs used by AAS users were Ephedrine (44%), Growth Hormone (24%), Tamoxifen (22%), Clenbuterol (21%), Insulin (14%), Human chorionic gonadotrophin (11%), Diuretics and Thyroid hormone (10% each).
Bojsen-Moller	2010	Denmark	Cross-sectional	Predominantly males	1,398	Range: 11-74; Mean=25	Inquiries submitted by an Internet and telephone	Low	PES use (15%)	While users and those who considered use of WADA-banned substances more often expressed concerns about the health risks associated with their use, users of legal

							-based system			substances did not express it to the same degree.
Grace and Davies	2001	UK	Cross-sectional	Gym users	106	Range: 15-58; Mean= 32.4	Questionnaire	Potential	AAS use (58%)	Polypharmacy was evident.
Habeeb et al.	2012	Iraq	Cross-sectional	Bodybuilders	172	Range: <19; 24; 25-29; 30-34; 35-39; 40-44	Questionnaire	Potential	AAS use (44.8%)	Two fifths of AAS users were 19 years old or younger.
Haerinejad et al.	2016	Iran	Cross-sectional	Bodybuilders	453	Range: 16-59; Mean=27.0	Face-to-face interview using a survey	Low	PES use (51.7%)	The most prevalent agents abused PES were AAS (79.4% of participants).
Ip. et al.	2015	USA	Cross-sectional	Strength-trained men	143	Men > / = 40	Web-based survey	Potential	AAS use (46.9%)	AAS abuse is prevalent among the older males which spend more time training and practicing polypharmacy. AAS users were more likely to binge drink and to report a diagnosis of an anxiety disorder.
Ip. et al.	2010	USA	Cross-sectional	Strength-trained subjects	1,519	Range: 16-73; Mean women=32.3; men=29.3	Web-based survey	Potential	AAS use (34.1%)	The majority of male AAS users were recreational exercisers and female AAS users were more likely to have been a competitive bodybuilder. AAS users practiced polypharmacy.
Khullar et al.	2016	Kuwait	Cross-sectional	Males / Females	200	Range: 18-55; Mean=29.1	Questionnaire	Low	AAS use (35%)	Lower age, smoking, and high importance on muscle tone were significant predictors of AAS use.

Korkia and Stimson	1997	Britain	Cross-sectional	Males / Females	1667	Mean women=27.1 men=29.1	Questionnaire / Interviews	Low	AAS use (7.4%)	AAS use was reported in all areas studied. Use of "cocktails" of drugs, blended with the use of social drugs and alcohol.
Leifman et al.	2011	Sweden	Cross-sectional /Observational	Males / Females	2,368	Range: 16-50 +	Questionnaire / Observation study	Potential	AAS use (5.3%)	AAS users were young men, frequent weight trainers and more often drug users. Observation studies could be an alternative to questionnaire in estimating prevalence of AAS use at gyms.
Mohammad H.	2014	Kuwait	Cross-sectional	Males	1,708	Range: 17-35; Mean=19	Questionnaire	Low	AAS use (11.8%)	-
Nogueira et al.	2014	Brazil	Cross-sectional	Bodybuilders	510	Range: 18-57	Questionnaire	Potential	AAS use (20.6%)	Use of AAS was related to the use of dietary supplements.
Pederson	2010	Denmark	Cross-sectional	Danish population / different training milieus	7,039	Range: 15-50	Survey (telephone interviews) and questionnaire	Low	PES use (4.7%)	AAS was the PES most used, except among cyclists (amphetamines).
Petrocelli	2008	USA	Grounded theory	Man weightlifters	37	Range: 19-43	Semi-structured interview	Low	-	Respondents did not demonstrate any anxiety over the possible side-effects.
Razavi et al.	2014	Iran	Cross-sectional	Man bodybuilders	250	Range: 15-45; Mean=25.5	Questionnaire	Low	AAS use (28.8%)	Mainly in adolescent and young adult bodybuilders.
Santos et al.	2011	Brazil	Cross-	Man	123	Range: 18-	Questionnaire	Potential	AAS use	Bodybuilding practitioners' use and misuse

			sectional	bodybuilders		50			(33.3%)	AAS although are aware of the health problems related to the misuse of these drugs.
Silva et al.	2003	Brazil	Cross-sectional	Bodybuilders	209	Range: <20; >40	Questionnaire	Potential	AAS use (19%)	Dietary supplements, as well as other associated drugs, were used.
Silva et al.	2007	Brazil	Cross-sectional	Males / Females	288	Range:13-74; Mean=28.5	Questionnaire applied by interviewers	Low	AAS use (11.1%)	Use of AAS and other hormones and medicines.
Striegel et al.	2006	Germany	Cross-sectional	Males / Females	621	Average age = 33.7	Questionnaire	Low	AAS use (13.5%)	AAS users are physical-achievement-oriented and trained for more years and more frequently than general fitness center members.
Stubbe et al.	2013	Netherlands	Cross-sectional	Males / Females	718	Average age = 43.4	Web-based surveys	Low	PES use (8.2%)	Randomized response technique (RRT) resulted in prevalence differences for the different types of PED. Stimulants to lose weight had the highest prevalence.
Usman et al.	2015	Pakistan	Cross-sectional	Male bodybuilders	310	Range: 15-35	Questionnaire	Potential	AAS use (64%)	Misuse of AAS was significantly higher among those with high level of education.
Wazaify et al.	2014	Jordan	Cross-sectional	Males / Females	353	Range: 12-; >47	Questionnaire	Low	PES use (8.8%)	Use of AAS and other hormones.
Wiefferink et al.	2008	Netherlands	Cross-sectional	Males / Females	144	Range: 14-65; Mean = 32	Questionnaire	Potential	PES use (15%)	Users attribute advantages to PED and are inclined to overlook the risks of using them.

Emergent Themes conceptualized from a Theory of Planned Behavior Perspective

Attitudes towards PES

Most studies concluded that gym/fitness practitioners use PES, especially AAS, for aesthetic reasons, generally driven by their dissatisfaction with physical appearance (53.8%), low self–esteem (3.8%), and the wish to become more attractive and desirable (23.1%). The main motivation for AAS use was to increase muscle mass and strength (46.2%), to improve physical performance (23.1%), to recover faster from previous training sessions (7.7%), to prevent injuries (3.8%) and to manage body size/weight (15.4%) (See Table 2). Thirteen studies (50%) investigated the knowledge of associated risks of AAS use and concluded on a general lack of knowledge or minimization of the potential harmful effects, with no proper attention to the side effects. Based on these findings, it could be argued that this population uses PES, especially AAS, due to a positive attitude towards these substances, in the sense of obtaining the desired results.

Subjective Norms

Gym/fitness center practitioners were influenced to use PES, mainly by their friends (46%), coaches (34.6%) and training colleagues (15.4%) (see Table 2), revealing the high influence of groups and coaches. The standard of beauty explored by the media (19.2%), aggressive marketing by the industry (3.8%), internet (19.2%), TV advertisement (7.7%), muscle magazines (15.4%) and peer pressure (11.5%) seem to influence and support the use of PES. In this way, perceived social pressure and peers influence on subjective norms should be taken into account when planning preventive strategies, since it may be related with the intention to use PES (Armitage and Conner, 2001).

Perceived Behavioral Control

Most of subjects perceived access to these substances as being easy and bought it from their gym instructors (15.4%), friends (19.2%), internet order/online shopping

(23.1%), pharmacy/drugstores (34.6%) or physician/veterinarians (11.5%), without medical prescription, “black market” (19.2%), and clubs/fitness centers (3.8%). Users sought advice and information about the substances from their fitness center instructors (3.8%), physicians (3.8%), training colleagues (7.7%); they studied pertinent literature or received oral information from other users, who described the results from personal experience (7.7%). Santos et al. (2011) concluded that media, magazines and newspapers had an important role in the information about AAS too. The perceived ease of access to this kind of substances and the apparent absence of impediments and obstacle to use it, may favor the PES consumption behavior.

Table 2

Psychosocial factors associated with PES users conceptualized with the Theory of Planned Behavior

Author	Attitude	Subjective norm	Perceived behavioral control
Al-Falasi et al.	Be a stronger athlete and more masculine Have bigger muscles; help win competitions Look physically better	Influenced by friends, media, trainer, health care professional, internet and the fitness magazines	Users obtained AAS from fitness stores, trainers, friends, veterinarians and online shopping
Allahverdipour et al.	Increase muscle mass strength Boost performance athletically; look better No proper attention to the side effects of PES consumption	Influenced by their friends and coaches Media and peer pressure	*
Alsaeed, I and Alabkal, JR	Have a muscular body AAS usage is not harmful to health if used correctly	Influenced by friends and coaches	Users obtained AAS from gym coach, individual supplier, pharmacy or physician, internet order and friends
Baker et al.	Predominantly used for cosmetic reasons	Influenced by friends and training colleagues	Users obtained growth hormone particularly by internet order
Bojsen-Moller	Enhanced physical appearance	Aggressive marketing by the industry	*
Grace and Davies	Improve muscle size strength; decrease recovery time from the previous training session Familiar with the medical terms for side effects with AAS use	Influenced by friends and training colleagues	No problem in obtaining AAS; users would stop using AAS if they were shown to cause serious side effects
Habeeb et al.	Enhance athletic performance; increase body size Not aware of the side effects of AAS use	Influenced by coaches, teammates, and friends	Users obtained AAS from retail stores

Haerinejad et al.	Increase muscle mass, endurance and strength; weight gain or loss Improve sport performance and physical appearance Not complete knowledge about the effects of PES before initiation.	Influenced by friends, athlete trainers, Internet and TV advertisements	Users obtained AAS from friends, training partners, gym members, dealers and drugstores
Ip et al.	Increase muscle mass strength; improve physical appearance ‘‘Slow the aging process’’	*	*
Ip et al.	Increase muscle mass / strength; improve physical appearance Plans to continue future AAS use despite the experience of some side effects	*	*
Khullar et al.	Ideal muscle tone and definition	*	*
Korkia and Stimson	Increase muscle mass, size and strength; allow harder training Improve bodybuilding, sport performance, recovery from injury	*	Illicit supply networks and manufacture
Mohammad H.	Improve physical appearance; muscle strength Only for attraction AAS consumption had limited negative impact on health, and a positive effect on physical appearance.	Encouraged by friends and coaches Clubs	"Products available and easy to obtain"
Nogueira et al.	Improve physical appearance AAS use even knowing its side effects	*	Easy access to AAS in veterinary pharmacies or on the “black market”
Pederson	Improve physical performance; to increase/reduce	*	Trafficked on the ‘black market’"

	body size		
Petrocelli et al.	Improve competitive bodybuilder appearance "Get huge "; "get ripped" Motivate by competitive obsession; frustration Be more attractive; more desirable; Not believe that "AAS will hurt them"	Influenced by friends Muscle magazines and TV series	Users obtained AAS from friends, dealers or internet sites
Razavi et al.	*	Recommended by peers, friends, and coaches; Influenced by magazine and internet	Users obtained AAS from pharmacist, black market, supermarkets or by vendors
Santos et al.	Elevate physical development, enhance aesthetics and for personal satisfaction Dissatisfaction with physical appearance; low self-esteem Ignore the side effects	Influenced by training colleagues	Users obtained AAS from drugstores, fitness center, internet or illegal markets; Information obtained from media and fitness center instructors
Silva et al.	Improve physical appearance Adverse effects can be prevented by using other products; medical follow-up helps prevent future illnesses	Standard of beauty promoted by the media; Lack of control in the marketing of AAS in pharmacies	Users obtained AAS through colleagues or in pharmacies No scientific culture about a better way to use AAS for the intended purpose; Information obtained in documents or by download or orally by other users
Silva et al.	Improve physical appearance and Increase performance; Use of AAS despite the first-hand experience of some side effects	Media and peer pressure	Users obtained veterinary products from veterinary pharmacies or "black market"
Striegel et al.	Body styling Increase strength	*	Users obtained AAS from pharmacist, physicians and dealers; Information about AAS was obtained from

			physicians, training colleagues and study of pertinent literature
Stubbe et al.	Lose weight Short-term side-effects play a minor role	*	*
Usman et al.	Increase muscle mass/ strength	Influenced by trainers, friends, internet, media, magazines	Users obtained AAS from trainers, friends and online shopping
Wazaify et al.	Increase muscular power	Influenced by friends, internet, and coach	Users obtained medications from pharmacies without a prescription
Wiefferink et al.	Become more powerful, muscled, better shaped Outcomes would be achieved in a shorter period of time than if they used no drugs at all	*	*

Note. *Not reported

Strengths and limitations

The dominance of research from English speaking countries has skewed findings in the field. Thus, an important contribution of the current study is the multi-lingual approach. Our findings also complement available evidence from quantitative studies in this area, taking into account the target population. However, some limitations must be considered when interpreting our findings. The methodology used within all the studies – questionnaires – could include people not willing to tell the truth (Peters Schulz and Michna, 2002), even if confidentiality is guaranteed through self-administered and anonymous surveys. Although the TPB provides a framework to understand how psychosocial factors such as attitudes, subjective norms and perceived behavioral control can predict PES use in gym practitioners, caution must be taken, since the studies adopted generalized direct measures of TPB constructs. Chan et al. (2015), stress the importance of indirectly measuring individual´s modal salient beliefs in conjunction with direct measures of TPB constructs.

Final remark

Our findings denote the importance of psychosocial factors influencing gym users to take AAS and other types of PES. The TPB provides a good framework to better understand these behaviors. This theory could be used in future research to provide a template when developing prevention programs to reduce PES use, taking into account interactions between individual factors, performance enhancement motivation, vulnerability to peer pressure, expectations from PES use and behavioral tendencies. In fact, the three main predictive factors for AAS abuse seem to be participant´s attitude toward PES use, perceived behavior control and subjective norms (Allahverdipour et al., 2012). The same theory could be used to promote new research trends regarding other groups of gym users besides bodybuilders, as well as different types of PES than AAS, and to expand further the current knowledge to all cultural and geographical areas, in order to deeper understanding this problem. Although TPB provides a good framework, empirical studies and theoretical positions must follow more ecological perspectives, focusing on background variables, such as moral tendencies, motivations and environmental features, since an integrative approach can greatly benefit

intervention designers and policymakers on understanding the PES abuse in gym users (Barkoukis et al., 2016).

References

American Academy of Pediatrics (2005). Use of performance-enhancing substances. *Pediatrics*,115(4),1103-6. Retrieved from http://pediatrics.aappublications.org/content/pediatrics/115/4/1103.full.pdf

Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, *50*, 179–211.

Al-Falasi, O., Al-Dahmani, K., Al-Eisaei, K., Al-Ameri, S., Al-Maskari, F., Nagelkerke, N. and Schneider, J. (2009). Knowledge, attitude and practice of anabolic steroids use among gym users in Al-Ain district, United Arab Emirates. *The Open Sports Medicine Journal*, *2*(1), 75–81. doi.org/10.2174/1874387000802010075

Allahverdipour, H., Jalilian, F. and Shaghaghi, A. (2012). Vulnerability and the intention to anabolic steroids use among iranian gym users: an application of the theory of planned behavior. *Substance Use and Misuse*, *47*(3), 309–317. doi.org/10.0.12.37/10826084.2011.633296

Alsaeed, I. and Alabkal, J. (2015). Usage and perceptions of anabolic-androgenic steroids among male fitness centre attendees in Kuwait - a cross-sectional study. *Substance Abuse Treatment, Prevention, and Policy*, *10*(1), 33. /doi.org/10.1186/s13011-015-0030-5

Armitage, C. and Conner, M. (2000). Social cognition models and health behaviour: a structured review. *Psychology y Health, 15*(2), 173–189. doi.org/10.1080/08870440008400299

Armitage, C. and Conner, M. (2001). Efficacy of the theory of planned behaviour: a meta-analytic review. *British Journal of Social Psychology, 40*, 471–499.

Armitage, C., Conner, M., Loach, J. and Willetts, D. (1999). Different perceptions of control : applying an extended theory of planned behavior to legal and illegal drug use. *Basic and Applied Social Psychology, 2*(4), 301–316. doi.org/10.1207/S15324834BASP2104

Baker, J., Graham, M. and Davies, B. (2006). Steroid and prescription medicine abuse in the health and fitness community: A regional study. *European Journal of Internal Medicine, 17*(7). doi.org/10.1016/j.ejim.2006.04.010

Barkoukis, V., Lazuras, L. and Tsorbatzoudis, H. (2016). *The psychology of doping in sport*. New York: Routledge.

Baron, D., Martin, D. and Magd, S (2007). Doping in sports and its spread to at-risk populations: An international review. *World Psychiatry, 6*(June), 118–123.

Blank, C., Kopp, M., Niedermeier, M., Schnitzer, M. and Schobersberger, W. (2016). Predictors of doping intentions, susceptibility, and behaviour of elite athletes: A meta-analytic review. *Springer Plus, 5*(1333), 1–14. doi.org/10.1186/s40064-016-3000-0

Bojsen-Møller, J. and Christiansen, A. (2010). Use of performance- and image-enhancing substances among recreational athletes: a quantitative analysis of inquiries submitted to the Danish anti-doping authorities. *Scandinavian Journal of Medicine and Science in Sports, 20*(6), 861–867. doi.org/10.1111/j.1600-0838.2009.01023.x

Brennan, R., Wells, J. and Van Hout, M. (2017). The injecting use of image and performance-enhancing drugs (IPED) in the general population: a systematic review. *Health and Social Care in the Community, 25*(5), 1459–1531. doi.org/10.1111/hsc.12326

Chan, D., Hardcastle, S., Dimmock, J., Lentillon-Kaestner, V., Donovan, R., Burgin, M. and Hagger, M. (2015). Modal salient belief and social cognitive variables of anti-doping behaviors in sport: Examining an extended model of the theory of planned behavior. *Psychology of Sport and Exercise, 16*(P2), 164–174. doi.org/10.1016/j.psychsport.2014.03.002

Critical Appraisal Skills Programmer. (2006). *10 questions to help you make sense of qualitative research*. Oxford: CASP.

Goulet, C., Valois, P., Buist, A. and Côté, M. (2010). Predictors of the use of performance-enhancing substances by young athletes. *Clinical Journal of Sport Medicine, 20*(4), 243–248. doi.org/10.1097/JSM.0b013e3181e0b935

Grace, F., Baker, J. and Davies, B. (2001). Anabolic androgenic steroid use in recreational gym users: A regional sample of the Mid-Glamorgan area. *Journal of Substance Use, 6*(3). doi.org/10.1080/14659890152558804

Habeeb, M., Kasim, W., Khamees, L., Hawi, M. and Khashoom, Q. (2012). Athletes' perceptions toward substance use in Baghdad City. *American Journal of Men's Health, 6*(6), 462–471. doi.org/10.1177/1557988312446508

Haerinejad, M., Ostovar, A., Farzaneh, M. and Keshavarz, M. (2016). The prevalence and characteristics of performance-enhancing drug use among bodybuilding athletes in the South of Iran, Bushehr. *Asian Journal of Sports Medicine, 7*(3), e35018. doi.org/10.5812/asjsm.35018

Higgins, J. and Altman, D. (2008). *Assessing risk of bias in included studies. Cochrane handbook for systematic reviews of interventions: Cochrane book series*. doi.org/10.1002/9780470712184.ch8

Ip, E., Barnett, M., Tenerowicz, M., Kim, J., Wei, H. and Perry, P. (2010). Women and anabolic steroids: An analysis of a dozen users. *Clinical Journal of Sport Medicine, 20*(6), 475–481. doi.org/10.1097/JSM.0b013e3181fb5370

Ip, E., Trinh, K., Tenerowicz, M., Pal, J., Lindfelt, T. and Perry, P. (2015). Characteristics and behaviors of older male anabolic steroid users. *Journal of Pharmacy Practice, 28*(5), 450.

Kavussanu, M. and Ring, C. (2017). Moral identity predicts doping likelihood via moral disengagement and anticipated guilt. *Journal of Sport and Exercise Psychology, 39*(4), 293–301. doi.org/10.1123/jsep.2016-0333

Khullar, N., Scull, N., Deeny, M. and Hamdan, E. (2016). Prevalence and predictors of anabolic-androgenic steroid use among gym users in Kuwait: A preliminary study. *International Journal of Men's Health, 15*(2), 144–156. doi.org/10.3149/jmh.1502.144

Korkia, P. and Stimson, G. (1997). Indications of prevalence, practice and effects of anabolic steroid use in Great Britain. *International Journal of Sports Medicine, 18*(7), 557–562. doi.org/10.1055/s-2007-972681

Lazuras, L. (2016). Social-cognitive predictors of doping use. In L. Barkoukis, Vassilis; Lazuras (Ed.), *The psychology of doping in sport* (pp. 44–61). London and New York: Routledge.

Leifman, H., Rehnman, C., Sjöblom, E. and Holgersson, S. (2011). Anabolic androgenic steroids-use and correlates among gym users-an assessment study using questionnaires and observations at gyms in the Stockholm Region. *International Journal of Environmental Research and Public Health, 8*(12), 2656–2674. doi.org/10.3390/ijerph8072656

Lollies, F. (2014). *Prevalence and determinants of doping in recreative triathlon*. Retrieved from http://essay.utwente.nl/66860/

Mitić, P. and Radovanović, D. (2011). The motives for doping drug use in nonprofessional athletes and methods of prevention. *Education, 9*(2), 203–212.

Mohammad, H. (2014). Anabolic-androgenic steroids amongst Kuwaiti males. *College Student Journal, 48*(1), 120–129.

Moher, D., Liberati, A., Tetzlaff, J. and Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Medicine, 6*(7), e1000097. doi.org/10.1371/journal.pmed.1000097

Morente-Sánchez, J. and Zabala, M. (2013). Doping in sport: a review of elite athletes' attitudes, beliefs, and knowledge. *Sports Medicine, 43*(6), 395–411. doi.org/10.1007/s40279-013-0037-x

Nogueira, F., Brito, A., Oliveira, C., Vieira, T. and Gouveia, R. (2014). Anabolic-androgenic steroid use among Brazilian bodybuilders. *Substance Use and Misuse, 49*(9), 1138–1145. doi.org/10.3109/10826084.2014.912062

Ntoumanis, N., Ng, J., Barkoukis, V. and Backhouse, S. (2013). *A statistical synthesis of the literature on personal and situational variables that predict doping in physical activity settings*.

Ntoumanis, N., Ng, J., Barkoukis, V. and Backhouse, S. (2014). Personal and psychosocial predictors of doping use in physical activity settings: a meta-analysis. *Sports Medicine, 44*(11), 1603.

Pedersen, I. (2010). Doping and the perfect body expert: social and cultural indicators of performance-enhancing drug use in Danish gyms. *Sport in Society, 13*(3), 503.

Peters, C., Schulz, T. and Michna, H. (2002). *Biomedical side effects of doping*. Köln.

Petrocelli, M., Oberweis, T. and Petrocelli, J. (2008). Getting huge, getting ripped: A qualitative exploration of recreational steroid use. *Journal of Drug Issues, 38*(4), 1187–1205. doi.org/10.1177/002204260803800412

Pope, H., Wood, R., Rogol, A., Nyberg, F., Bowers, L. and Bhasin, S. (2014). Adverse health consequences of performance-enhancing drugs: an endocrine society scientific statement. *Endocrine Reviews, 35*(3), 341–375. doi.org/10.1210/er.2013-1058

Razavi, Z., Moeini, B., Shafiei, Y. and Bazmamoun, H. (2014). Prevalence of anabolic steroid use and associated factors among body-builders in Hamadan, West province of Iran. *Journal of Research in Health Sciences, 14*(2), 163–166.

Sagoe, D., Andreassen, C. S. and Pallesen, S. (2014). The aetiology and trajectory of anabolic-androgenic steroid use initiation: a systematic review and synthesis of qualitative research. *Substance Abuse Treatment, Prevention and Policy, 9*(1), 24.

Sagoe, D., McVeigh, J., Bjørnebekk, A., Essilfie, M.-S., Andreassen, C. and Pallesen, S. (2015). Polypharmacy among anabolic-androgenic steroid users: A descriptive metasynthesis. *Substance Abuse: Treatment, Prevention, and Policy, 10*(12), 1–19. doi.org/10.1186/s13011-015-0006-5

Sagoe, D., Molde, H., Andreassen, C., Torsheim, T. and Pallesen, S. (2014). The global epidemiology of anabolic-androgenic steroid use: a meta-analysis and meta-regression analysis. *Annals of Epidemiology, 24*(5), 383–398. doi.org/10.1016/j.annepidem.2014.01.009

Santos, A., Rocha, M. and Silva, M. (2011). Illicit use and abuse of anabolic-androgenic steroids among Brazilian bodybuilders. *Substance Use and Misuse, 46*(6), 742–748. doi.org/10.0.12.37/10826084.2010.534123

Serpa, S., Faria, N., Marcelino, P., Reis, C., Ramadas, S. Dopagem e psicologia [Doping and psychologie]. Lisboa: Centro de Estudos e Formação Desportiva; 2003.

Silva, L. and Moreau, R. (2003). Uso de esteróides anabólicos androgênicos por praticantes de musculação de grandes academias da cidade de São Paulo [Use of anabolic-androgenic steroids among body builders in major gym centers in São Paulo]. *Revista Brasileira de Ciências Farmacêuticas, 39*(3), 327–333. doi.org/10.1590/S1516-93322003000300012

Silva, P., Machado Júnior, L., Figueiredo, V., Cioffi, A., Prestes, M. and Czepielewski, M. (2007). Prevalência do uso de agentes anabólicos em praticantes de musculação de Porto Alegre [Prevalence of the use of anabolic agents among strength training practitioners in Porto Alegre]. *Arquivos Brasileiros de Endocrinologia and Metabologia, 51*(1), 104–110. doi.org/10.1590/S0004-27302007000100017

Striegel, H., Simon, P., Frisch, S., Roecker, K., Dietz, K., Dickhuth, H.-H. and Ulrich, R. (2006). Anabolic ergogenic substance users in fitness-sports: A distinct group supported by the health care system. *Drug and Alcohol Dependence, 81*(1), 11–19. doi.org/10.1016/j.drugalcdep.2005.05.013

Stubbe, J., Chorus, A., Frank, L., de Hon, O. and van der Heijden, P. (2014). Prevalence of use of performance enhancing drugs by fitness centre members. *Drug Testing and Analysis, 6*(5), 434–438. doi.org/10.1002/dta.1525

Usman, H., Rashid, F., Ayub, H., Ayub, A., Akram, N., Walter, S. and Matin, S. (2015). Knowledge, awareness and practices of harmful effects of anabolic steroids among body builder in Rawalpindi and Islamabad. *Pakistan Armed Forces Medical Journal, 65*(2), 282–285.

Wazaify, M., Bdair, A., Al-Hadidi, K. and Scott, J. (2014). Doping in gymnasiums in Amman: The other side of prescription and nonprescription drug abuse. *Substance Use and Misuse, 49*(10), 1296–1302. doi.org/10.3109/10826084.2014.891625

Wiefferink, C., Detmar, S., Coumans, B., Vogels, T. and Paulussen, T. (2008). Social psychological determinants of the use of performance-enhancing drugs by gym users. *Health Education Research, 23*(1), 70–80. doi.org/10.1093/her/cym004

Capítulo III

Estudo 2

Psychometric properties of the Questionnaire of Attitudes towards Doping in Fitness (QAD-Fit)

Psychometric properties of the Questionnaire of Attitudes towards Doping in Fitness (QAD-Fit)[2]

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Abstract

Aim: The purpose of this study was to test the psychometric proprieties of the Questionnaire of Attitudes towards Doping in Fitness (QAD-Fit), originally developed by Serpa and colleagues and adapted to Portuguese gym/fitness context. Methods: A cross sectional survey utilizing a web self-administered questionnaire was used. The sample was composed of 453 gym/fitness center practitioners, aged between sixteen and seventy-nine years old (M = 35.64; SD = 13.08), enrolled in several gym activities. Results: The confirmatory factorial analysis provided support to the four-factor structure proposed. All factors displayed good internal consistency, convergent validity, and discriminant validity. Multi-group analysis revealed cross-validity and the model´s invariance. The correlation between QAD-Fit and the Doping-related Theory of Planned Behavior Measures (DRTPBM) revealed evidence of its concurrent validity. Conclusion**:** The findings of this research revealed that QAD-Fit is a psychometrically valid and reliable instrument to assess attitudes towards doping consumption in gym and fitness settings.

Keywords: Attitudes towards doping, gym/fitness practitioners, confirmatory factor analysis.

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Introduction

Within recreational sports, people using fitness centers come from a very wide range of demographics and backgrounds. Performance-enhancing substances (PES - e.g., stimulants, anabolic-androgenic steroids (AAS), erythropoietin, human growth hormone, and diuretics) are used by this kind of practitioners for many reasons and motives[1]. A recent systematic review[2], concluded that gym/fitness practitioners use PES, especially AAS, due to aesthetic reasons, generally driven by their dissatisfaction with physical appearance, followed by low self–esteem and the wish to become more attractive and desirable. The same study points out that the main motivation to use this kind of substances, was to increase muscle mass and strength, to improve physical performance, to recover faster from previous training sessions, to prevent injuries and to manage body size/weight. Alongside these reasons and motivations for the use of PES, perceived social pressure and peers influence on subjective norms, play an important influence towards a positive attitude towards PES use in gym users[2].

Taking into account that attitudes can be used to predict doping behavior[3], anti-doping research should include, alongside with physiological and chemical approaches, sociological, behavioral and ethical studies of athletes' attitudes and beliefs towards the use of PES, since it seems to involve a set of essentially volitional behaviors[4,5]. However, the choice of using PES is regulated by a complex system of dynamic relations between social cognitions and behavior, influenced by a range of circumstances, situations and individual characteristics that must be considered within the theoretical framework describing the pattern of these relations[6]. In this sense, though some psychological integrative models (eg., Sports Drug Control Model, Trans-contextual Model, Life Cycle Model) have been pointed out to clarify the use of PES in sport[7,8], the Theory of Planned Behavior (TPB) is one of the most frequently used framework to explain athletes doping intentions and behavior[9], since it offers descriptions and definitions that are more understandable about the specified construct and includes a discriminant validity of the constructs[10,11]. According to the Theory of Planned Behavior (TPB), behavioral intention of the actions to assume or refuse a healthy behavior[12] is determined by the individual's attitude towards the behavior, subjective norms and perceived behavioral control (PBC)[13].

Since individual's attitude towards the behavior reflects the evaluation of the consequences of engaging in the target behavior, attitudes are often used as a proxy for doping behavior, with the assumption that those who use PES will show greater leniency towards doping than those who do not[5,14,15]. To assess attitudes towards doping, a valid and reliable instrument is required[15]. However, Morente-Sanchéz, Femia-Marzo and Zabala[4] stated that just a few studies used validated tools to assess attitudes towards doping, while the majority of researchers used ad hoc measurements without psychometric testing, which compromise the reliability and validity of the findings. In this way, ad hoc measures, developed and used for a single research, without demonstrated reliability and validity should be avoided, since test scores are interpreted as the individual´s attitude and inferences are made for a specific population[15].

In order to address this gap, several direct measures (self-report questionnaires) of attitudes and thus behaviors have been proposed in doping research[14]. The Performance Enhancement Attitude Scale (PEAS) is an example of a self-reported explicit measure of a generalized doping attitude[15]. However, PEAS is used in doping research as other validated psychometric assessments, which measure an affective implicit doping attitude (eg., Doping Implicit Association Test, Doping Brief Implicit Association Test and Pictorial Doping Brief Implicit Association Test) only in terms of elite sport[6]. Serpa, Leitão, Marcolino, Faria, Ramadas and Reis[16] proposed a multidimensional model of attitudes towards doping in sports - "Questionnaire of Attitudes towards Doping in Sports" (QADS) based on the TPB. The goal was to create an instrument which measures the factors that influence the formation of young people's attitudes and, consequently, a better understanding of the triggering of doping behaviors[17].

The Questionnaire of Attitudes towards Doping in Sports has four dimensions associated with doping behavior: (1) attitudes towards doping consumption; (2) beliefs, meaning the subject's beliefs regarding the effect of doping in order to improve performance; (3) intentions about the circumstances in which individuals think they would or would not take doping; and (4) subjective norms, that is, the subject's perception of what people who are significant to him think about the consumption of doping substances. It comprises 31 items, scored on a 7-point Likert type scale[17]. Several authors validated this instrument in different populations[17]. For example, Opdenacker, Vanden Auweele and Serpa[18] studied a sample of young Belgian athletes

with ages ranging from 14 to 18 years, and added 3 items to the factor subjective norms, because of the small number of items included in this factor. So, the QADS used consisted of 34 items with 15 items belonging to the concepts of intentions, 7 items to attitudes, 7 items to subjective norms and 5 items to beliefs, showing a satisfactory internal consistency.

To date, and to our knowledge, QADS showed exploratory validity evidence and satisfactory reliability results in almost all the different populations tested[17], but a more refined analysis was not performed, namely, a confirmatory factorial analysis. Therefore, the aim of this study was to analyze the psychometric proprieties of the QADS, terminologically adapted to the target population in this study – gym/fitness center practitioners and was designated as "Questionnaire of Attitudes towards Doping in Fitness" (QAD-Fit), in order to provide a psychometrically valid and reliable instrument. More specifically, we intended to analyze the factor structure as it was proposed by the QADS´ authors. Furthermore, into a more refined analysis, we (i) tested the model to determine its internal consistency and convergent validity; (ii) tested the invariance of the structure with a cross validation strategy; and (iii) explored the concurrent validity with a sample of Portuguese gym/fitness center practitioners.

Having a valid and reliable instrument that can provide measures of the factors that influence the formation of gym/fitness center practitioners 'attitudes is essential, to better understand the triggering of doping behaviors in this specific population.

Method

Participants and data collection

A convenience sample of 453 Portuguese gym/fitness center practitioners, aged between sixteen and seventy-nine years old (M = 35.64; SD = 13.08), participated in this research. The sample size required for this study that uses a structural equation model (SEM) was calculated by A-priori sample size calculator for SEM[19]. Participants were involved in several gym activities (e.g., 57% cardio fitness, 56.5% bodybuilding, 27.8% stretching, 27.2% localized). From those, 277 were female and 175 males.

Prior to data collection, the study was reviewed by the University Ethics Board. Upon approval, participants were recruited by Gyms and Fitness center clubs that were

invited and accepted to participate (by institutional e-mail / Facebook) and through a social network (Facebook).

The survey Web link directed potential subjects to an informed consent page, providing additional information regarding the study and detailing methods used to maintain confidentiality and anonymity. Then, an electronic version of the "Questionnaire of Attitudes towards Doping in Fitness" (QAD-Fit) and the Portuguese version of the Doping-related Theory of Planned Behavior Measures[20] (for concurrent validity purpose) were completed via the same online link. The questionnaires took approximately 10 minutes to complete. No individually identifiable data were collected, Internet provider addresses were not logged, and data transfer was encrypted.

Measures

The "Questionnaire of Attitudes towards Doping in Sports" (QADS) is an originally Portuguese questionnaire that was developed by Serpa et al.[16] and is based on the theory of planned behavior (TPB)[12]. It includes four dimensions to evaluate attitudes (7 items), beliefs (5 items), intentions (15 items) and subjective norms (7 items), and its 34 items are scored on a seven-point Likert-type scale ranging from (1) *totally disagree to* (7) *totally agree*. The items 2, 4, 5, 11, 13, 19, 25, 30 and 32, must be reversed[16]. A higher score would mean a more positive attitude towards doping consumption. The QADS was used within the sport context. Therefore, in the present study, we changed some of the items, in order to better describe the fitness context instead of the sport environment. For example, we replaced the word athlete by practitioner (items 1, 2, 5) and we rephrased sentences, replacing sport expressions to fitness expressions, in order to focus the practitioner in the fitness context. In this study and after these adaptations, we designated the instrument as "Questionnaire of Attitudes towards Doping in Fitness" (QAD-Fit) (Appendix). Finally, the QAD-Fit was tested with 30 participants (pilot study) to ensure that the questionnaire was perfectly clear and understandable, which was confirmed immediately by means of an interview with each participant.

Doping-related Theory of Planned Behavior Measures (DRTPBM)[20] was translated to Portuguese, adapted and validated for this study, to be used for concurrent validity proposes, since that is known to accurately measure almost the same constructs as QAD-Fit. Once approval was obtained from the original scale author, the translation of the DRTPBM was performed, according to Beaton, Bombardier, Guillemin, Ferraz

and Bosi[21], using a five-stage process. In this way, a brief description of the psychometric validation of this scale will be presented in this article. The original version[20] has four subscales, attitudes (6 items); subjective norms (2 items); perceived behavioral control (3 items); and behavioral intentions (3 items). According to Lucidi, Zelli, Mallia, Grano, Russo and Violani[20], this scale was conceptualized through TPB, with reference to the motives or goals that adolescents typically report for doping use, such as seeking to improve performance and /or physical appearance. Items were answered on a five – point Likert scale.

Data Analysis

Data Analysis was performed using SPSS (version 22.0) and AMOS 22.0 (SPSS Inc. Chicago IL). A confirmatory factor analysis (CFA) was performed to assess the psychometric proprieties of the QAD-Fit instrument. The maximum likelihood (ML) method was used. Following the discovery of unsatisfactory fit, modification indices and standardized estimates were examined to evaluate for alternative models or probable item removals. To retain an item, a factor load equal to or greater than .50 within a single factor was used[22].

Univariate skewness and kurtosis of items were examined, as well as multivariate normal distribution using Mardia´s (1970) coefficient of multivariate kurtosis[23].

Internal consistency (reliability) of the constructs was assessed through composite reliability, and we followed the recommendation of Fornel and Larcker[24] to calculate composite reliability (CR), in which it is recommended that values ≥ .7 indicate a proper value of CR.

Convergent validity was evaluated through the average variance extracted (AVE), whereby the values of AVE ≥ .5 are appropriate indicators of convergent validity[25].

Discriminant validity was established when the AVE for each construct went beyond the squared correlations between that construct and any other[25]. In order to identify QAD-Fit´ factorial invariance, cross validation procedures were used with a multi-group analysis strategy[26-28].

Assessment of model fit was based on multiple indicators[29,30], namely: chi-square (X^2) statistical test, the ratio of chi-square to its degree of freedom (X^2/df), comparative-of-fit-index (CFI), goodness-of-fit index (GFI), parsimony comparative of-fit index (PCFI), parsimony goodness-of-fit index (PGFI), and root mean square error of approximation (RMSEA). Research practices using these indices state that values for the X^2/df should be less than 3, PCF and PGFI above .60, while values above .95 for the CFI and GFI, and below .06 for the RMSEA represent a good fit[31-34].

To study the adequacy of model replication, a multi-group confirmatory factor analysis (MGCFAs) using four steps was conducted with the calibration sample (n = 231) and the second sample, as validation sample (n = 222), in which we compared four nested models[35]. First, to test configural invariance (i.e., participants from different groups conceptualize the constructs in the same way), we tested the model by constraining the factorial structure to be the same across groups[36]. Second, to test metric invariance (i.e., if different groups respond to the items in the same way), we tested the model by constraining all factor loadings to be the same across groups[36]. Third, to test the scalar invariance (i.e., observed scores are related to the latent scores), we tested the model by constraining the intercepts of items to be the same across groups[36]. Factorial invariance was accepted when the models did not differ significantly (p > .05), according to the chi-square statistic difference[22,37]. However, the chi-square difference statistic is known to reject models even when violations are minor, particularly when the sample size is large[38]. Therefore, we also considered Cheung and Rensvold[39] suggestion that a difference of CFI of less than or equal to .01 is an indication that the constrained parameters are invariant.

Concurrent validity was analyzed by Pearson´s correlation coefficients between the QAD-Fit´s and the Doping – related TPB Measures´dimensions[20], as well as their total score values[40].

Results

Preliminary analysis

The results confirm the univariate normality assumptions, taking into account that absolute values of skewness and kurtosis are below 3 and 7, respectively[41] (See Table 1). Yet, Mardia´s coefficient indicated a lack of multivariate Gaussian distribution

(Coefficient = 63.210)[42]. To deal with this, a bootstrapping procedure of Bollen and Stine[43] was applied to adjust the *p* value of the chi-square statistic.

Table 1
Factor descriptive statistics for QAD-Fit

Factor	M	SD	Min	Max	Skewness	Kurtosis
Intentions	2.18	1.66	1.00	7.00	1.39	.76
Attitudes	2.99	1.47	1.00	7.00	.67	-.07
Subjective norms	1.66	1.08	1.00	6.00	1.79	2.36
Beliefs	3.43	1.40	1.00	7.00	.01	-.59
Global	2.57	1.15	1.00	6.75	.99	.47

Note. M = Mean; SD = Standard Deviation; Min = Minimum; Max = Maximum.

Evaluation of Model Fit

At first, not all estimated factor loadings exceeded the cut-off point of .50[22], ranging from .26 to .92. The goodness-of-fit indices produced for this first-order measurement model indicated poor fit (X^2 = 502.162, B-S $p < .03$; X^2/df = 3.44, PCFI = .81, PGFI = .69, CFI = .94, RMSEA = .073, 90% CI [.066 - .081]) showing that the hypothesized measurement model is inconsistent with observed data and it is interpreted as evidence against the adequacy of the model.

Due to the lack of support from CFA performed, post hoc model adjustments were conducted in an effort to develop a better fitting model. The results in the original model (first-order-model) indicated that not all items loaded significantly on its construct. In the interest of scientific parsimony, all scale items that showed unacceptable factor loadings were removed[44]. The number of items eliminated from the model was as small as possible and we tried to leave at least three per factor, in accordance with the recommendation of O´Rourke and Hatcher[45]. Furthermore, examination of the modification indices (MI) suggested some error correlations that improved the fit of the model. A large error covariance between items 13 and 25 remained present (MI = 11.560, EPC = .28), suggesting that allowing the two errors to correlate would significantly improve model fit. Examining items 13 (“Selling PES should be punished”) and 25 (“Instructors who give PES to their practitioners should be punished”), it was clear that they had a higher degree of overlap. According to Byrne[44],

given the redundancy between both items, we decided to correlate the two errors involved.

The indices of fit indicated a noteworthy improvement of the hypothesized first-order model, as reported in Table 2.

After these procedures, the model adjusted to the data. The results demonstrated an acceptable fit (X^2 = 204.383, B-S $p < .03$; X^2/df = 2.107, PCFI = .79, PGFI = .67, CFI = .98, RMSEA = .049, 90% CI [.040 - .059]). Composite reliability values ranged from .74 (Beliefs) to .97 (Intentions), indicating that the constructs were internally consistent. Evidence for convergent validity was obtained, since AVE values ranged from .50 (Beliefs) to .87 (Intentions), being greater than the recommended standard of .50[24].

Furthermore, all constructs were considered to exhibit discriminant validity, because all AVE values exceeded the appropriate square factor correlations. Overall, the measurement model was within the required criteria and showed good psychometric proprieties.

Table 2
QAD-Fit Re-specified first-Order Model-Factor Loading, Z-values, Composite Reliability (CR) and Average Variance Extracted (AVE).

QAD-Fit factors/items	Loadings	Lower	Upper	*p*	Z - value	CR	AVE
ITENT						.971	.871
Item 20	.961	.944	.974	.001	-		
Item 24	.944	.926	.959	.002	45.904		
Item 18	.942	.917	.959	.002	45.248		
Item 3	.879	.845	.906	.002	34.054		
Item 16	.939	.920	.954	.001	44.577		
ATTITU						.836	.507
Item 30	.796	.732	.853	.001	-		
Item 25	.663	.596	.724	.001	13.685		
Item 32	.808	.753	.854	.001	16.733		
Item 5	.652	.573	.722	.001	13.513		
Item 13	.577	.499	.640	.001	11.708		
SN						.858	.672
Item 22	.676	.587	.751	.002	-		
Item 34	.821	.768	.865	.002	15.628		
Item 31	.940	.876	.977	.002	16.855		
BEL						.743	.495
Item 17	.594	.530	.661	.001	-		
Item 21	.713	.651	.785	.001	10.678		
Item 28	.788	.711	.840	.001	11.009		

Note. ITENT = Intentions; ATTITU = Attitudes; SN = Subjective norms; BEL = Beliefs.

The data analysis proceeded in an attempt to fit a model with four first order factors and a second-order-factor. Consequently, we hypothesized that the first order factors are explained by a higher order factor, which in the case of QAD-Fit is a second-order factor designated "behavioral predisposition towards doping". The second-order measured model (Figure 1) showed an overall acceptable fit to the data (X^2 = 208.246, B-S $p < .03$; X^2/df = 2.103, PCFI = .81, PGFI = .69, CFI = .98, RMSEA = .049, 90% [CI = .040 - .059]).

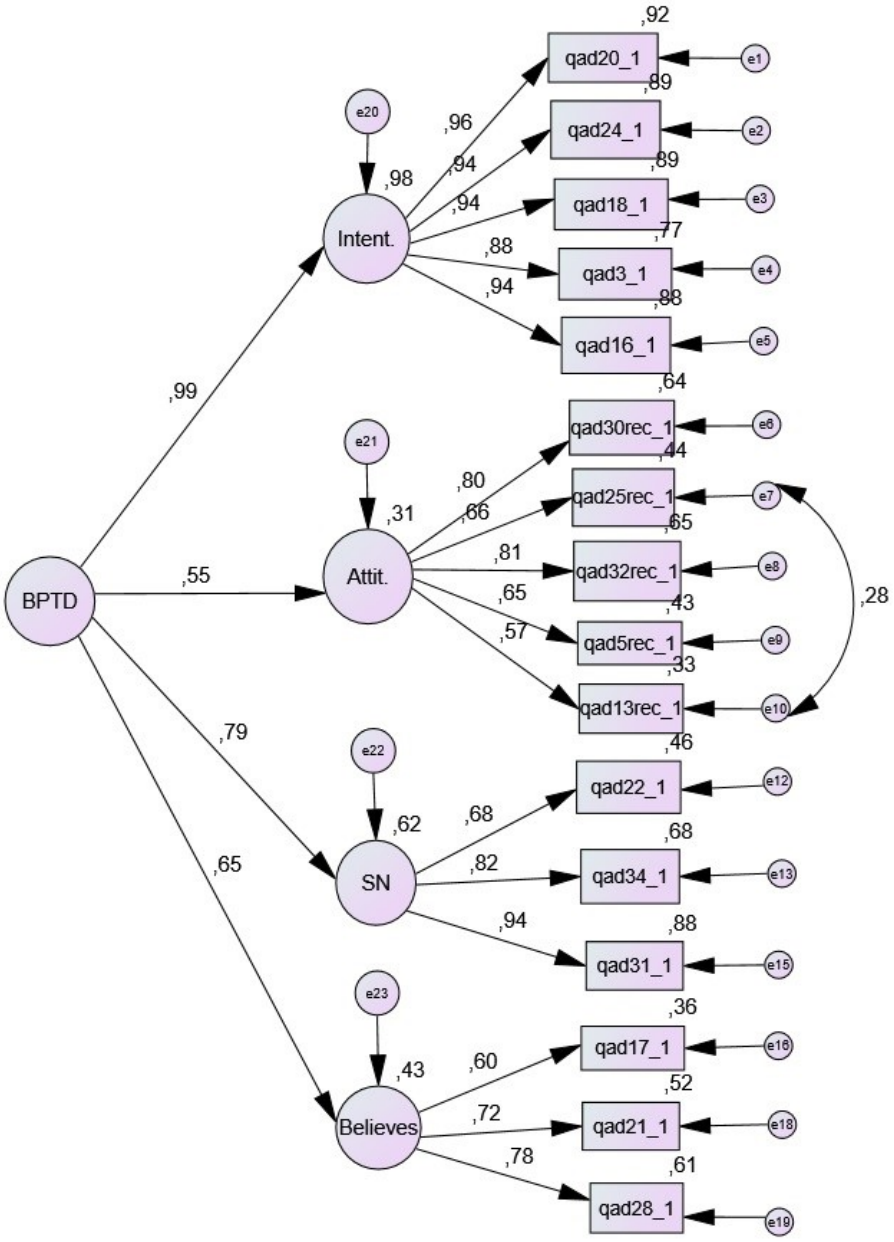

Figure 1. Re-specified second-order model of the QAD-Fit Multidimensional behavioral predisposition towards doping scale.

Cross-validity

In order to study the adequacy of model replication, cross-validation procedures were used[28]. More specifically, a cross-validation technique using a multi-group analysis with two equivalent samples in their characteristics (*n* calibration sample = 231; *n* validation sample = 222) and then a technique of parameter-invariance to verify the equivalence between the two groups[26]. As exposed in Table 3, the fit of the unconstrained model [Model A (full configural invariance): $X^2(220) = 417.005$ (B-S $p < .03$); PCFI = .885; CFI = .966; RMSEA = .045] was acceptable. The fit of this model provides the baseline value against which all subsequently specified invariance models are compared[44]. The models with constrained factor loadings [Model B (full metric invariance): $X^2(223) = 420.658$ (B-S $p < .03$); PCFI = .897; CFI = .966; RMSEA = .044], and with constrained intercepts [Model C (full scalar invariance): $X^2(239) = 444.369$ (B-S $p < .03$); PCFI = .960; CFI = .964; RMSEA = .044], showed a satisfactory fit. The X^2 statistic showed no significant differences between Model A and Model B [X^2 dif (3) = 3.653; $p = .301$] and also no significant differences between Model A and Model C [X^2 dif (19) = 27.364; $p = .096$]. There were no differences in the CFI values for all model comparisons. Thus, the results demonstrated the model´s invariance in both samples, indicating that the factorial structure of the scale was stable in the two independent samples[39].

Table 3
Results of the Multi-Group Analysis across the Unconstrained Model and the Constrained Models of the QAD-Fit (Calibration sample: *n* = 231; Validation sample: *n* = 222)

Multi-Group models	X^2	df	ΔX^2	Δdf	B-S *p*	CFI	PCFI	RMSEA
Model A	417.005	220	-	-	-	.966	.885	.045
Model B	420.658	223	3.653*	3	< .03	.966	.897	.044
Model C	444.369	239	27.363*	19	< .03	.964	.960	.044

Note. X^2 = chi-square; *df* = degrees of freedom; ΔX^2 = chi-square difference; Δdf = degrees of freedom difference; B-S *p* = Bolen-Stine *p*-value; CFI = comparative fit index; PCFI = parsimony comparative fit index; GFI = goodness of fit index; PGFI = parsimony goodness of fit index; RMSEA = root mean square error of approximation.
* *p*-value >.05.

Concurrent validity

Assessing concurrent validity involves comparing a new test with an existing test (of the same nature) to verify if they produce similar results. If both tests produce similar results, then the new test is said to have concurrent validity. In this case, we used the Portuguese version of the Doping-related TPB Measures[20] to compare with the "Questionnaire of Attitudes towards Doping in Fitness" (QAD-Fit).

In accordance with the previously mentioned, the Doping-related TPB Measures[20] was translated, adapted and validated in Portuguese for concurrent validity purposes.

Once approval was obtained from the original author, the translation of the Doping-related TPB Measures[20] was performed, according to Beaton et al.[21] guidelines.

The procedures adopted were similar to those used in QAD-Fit (participants, data collection and data analysis).

The results obtained for the CFA of the Portuguese version of the Doping-related TPB Measures, indicated that not all items loaded significantly on its construct, according to the original model (4 factors)[20]. Due to the lack of support from CFA performed, post hoc model adjustments were conducted in an effort to develop a better fitting model. After these procedures, we obtained a first-order model with only three factors (attitudes, subjective norms and behavior intentions) and 11 items, adjusted to the data (Table 4). The factor perceived behavior control was removed from the analysis considering that the items don't meet AFC criteria. Lucidi et al.[20], in their validation of the scale, founded also poor but satisfactory indicators of reliability for this factor.

Our results demonstrated an acceptable fit ($X^2 = 110.697$; $p = .000$; $X^2/df = 2.77$; PCFI = .72; PGFI = .58; CFI = .99; RMSEA = .06, 90% CI [.049 - .077]). Composite reliability values ranged from .80 (Subjective Norms) to .96 (Intentions), indicating that the constructs were internally consistent. Evidence for convergent validity was obtained, since AVE values ranged from .66 (Subjective Norms) to .90 (Intentions), being greater than the recommended standard of .50[24].

Furthermore, all constructs were considered to exhibit discriminant validity, because all AVE values exceeded the appropriate square factor correlations. Overall, the measurement model was within the required criteria and showed good psychometric properties.

The data analysis proceeded in an attempt to fit a second-order-factor model. The second-order measured model showed, as expected, an overall acceptable fit to the data (X^2 = 110.697; p = .000; X^2/df = 2.77; PCFI = .72; PGFI = .58; CFI = .99; RMSEA = .06, 90% CI [.049 - .077]).

In order to study the adequacy of model replication, cross-validation procedures were used[28], using a multi-group analysis with two equivalent samples in their characteristics (n calibration sample = 231; n validation sample = 222) and then a technique of parameter-invariance to verify the equivalence between the two groups[26]. The fit of the unconstrained model [Model A: X^2(80) = 168.525; PCFI = .716; PGFI = .570; CFI = .984; GFI = .940; RMSEA = .050] was acceptable. The fit of this model provides the baseline value against which all subsequently specified invariance models are compared[44]. The models with constrained factor loadings [Model B (: X^2(88) = 174.468; PCFI = .788; PGFI = .625; CFI = .984; GFI = .938; RMSEA = .047], and with constrained variances/covariances [Model C: X^2(91) = 178.016; PCFI = .814; PGFI = .646; CFI = .984; GFI = .937; RMSEA = .046], showed a satisfactory fit. The X^2 statistic showed no significant differences between Model A and Model B [X^2 dif (8) = 5.943; p = .654] and also no significant differences between Model A and Model C [X^2 dif (11) = 9.491; p = .577]. There were no differences in the CFI values for all model comparisons. Thus, the results demonstrated the model´s invariance in both samples, indicating that the factorial structure of the scale was stable in the two independent samples.

Table 4

Portuguese version of DRTPBM Re-specified first Order Model-Factor Loading, Z-values, Composite Reliability (CR) and Average Variance Extracted (AVE).

DRTPBM factors/items	Loadings	Z - value	CR	AVE
BITENT			.963	.898
Item 1	.870	23.434		
Item 2	.999	30.029		
Item 3	.969	28.277		
ATTITU			.943	.734
Item 1	.731	17.877		
Item 2	.806	20.587		
Item 3	.902	24.612		
Item 4	.960	27.496		
Item 5	.873	23.315		
Item 6	851	22.350		
SN			.795	.660
Item 1	.846	19.054		
Item 2	.777	17.325		

Note. BITENT =Behavior Intentions; ATTITU = Attitudes; SN = Subjective norms.

By studying the concurrent validity based on the interrelations between the scores of the two questionnaires, we obtained the results presented in Table 5, related to the correlations between QAD-Fit and the Portuguese version of the Doping-related TPB Measures. Results reveal that the two scales were positively correlated. The attitudes towards doping scores were also positively related to behavior intentions, attitudes and subjective norms and total Portuguese version of the Doping related TPB Measures scores.

Table 5
Correlation Matrix between QAD-Fit and Portuguese version of DRTPBM.

Scales	QAD-Fit- A	QAD-Fit-SN	QAD-Fit-I	QAD-Fit- B	QAD-Fit-TS
DRTPBM- A	.535**	.499**	.657**	.535**	.659**
DRTPBM- SN	.536**	.471**	.615**	.510**	.618**
DRTPBM- BI	.463**	.573**	.666**	.502**	.668**
DRTPBM- TS	.570**	.576**	.724**	.577**	.727**

Note. QAD-Fit- A = Attitudes; QAD-Fit-SN = Subjective Norms; QAD-Fit-I = Intentions; QAD-Fit- B = Beliefs; QAD-Fit- TS = Total score; DRTPBM- A = Attitudes; DRTPBM- SN = Subjective Norms; DRTPBM- BI = Behavior Intentions; DRTPBM- TS = Total score.
** *Bolen-Stine p* < .01.

Discussion

The purpose of this study was to test the factorial validity of the "Questionnaire of Attitudes towards Doping in Fitness" (QAD-Fit), originally developed by Serpa et al.[16], in a Portuguese gym/fitness practitioner's population.

The confirmatory factorial analysis performed on QAD-Fit with a sample of 453 gym/ fitness practitioners confirmed the factorial structure (four-factor) similar to the original version[16]. However, some items revealed unacceptable factor loadings on their different constructs and were eliminated. The differences between the two forms are minimal and shorten the questionnaire. In this way, the scale modifications resulted in a shortened questionnaire containing 16 items, representing the original four factors[16]. A short questionnaire is preferable in terms of gym/fitness settings, considering the practical conditions of application.

The factor analysis using the re-specified model showed an acceptable fit of the data and confirmed the four first-order constructs, as well as a second-order construct. The model showed composite reliability, convergent and discriminant validity.

Furthermore, the model invariance in the two independent samples was supported, indicating the comparisons are valid and differences/similarities between groups can be meaningfully interpreted[36] (cross validity). According to Mâroco[37], this is a pivotal step when evaluating the psychometric properties of a scale, and this procedure has been reported when validating scales in recent studies conducted in the sports scenario (e.g., Correia, Rosado and Serpa[46]; Martins, Rosado, Ferreira and Biscaia[47]).

Therefore, the use of model invariance in the two independent samples on the present study could be considered strong and an important finding to highlight about the QAD-Fit, representing a contribution to the measure of the attitudes towards PES consumption in this specific population (gym users), since the study by Serpa et al.[16] did not consider this validation procedure.

QAD-Fit´s concurrent validity has been ascertained with the Portuguese version of DRTPBM and, as expected, scores showed appropriate concurrent validity with measures of attitudes, subjective norms and behavioral intentions[20], providing additional support for its construct validity.

All dimensions of the QAD-Fit showed a statistically significant relationship with the second-order construct (behavioral predisposition towards doping), with the strongest predictor being Intentions. This factor concerns reasons leading to take or not take PES, followed by subjective norms, that is, the subject's perception of what significant people (instructors, colleagues, relatives) think about the consumption of PES and in third place comes beliefs, which relates to the subject's views regarding the effect of PES in order to achieve goals and to improve the performance and physical appearance, and the last factor is attitudes towards PES consumption, that is, the evaluative component of such behavior by the subject, reinforcing the idea that the understanding of attitudes towards doping will possibly be one of the first steps to consider in the study of the associated psychological factors[17]. The study and measures of attitudes through QAD-Fit use, complemented with other tools (e.g., interviews[48], Implicit Association Test (IAT)[49] or biochemical tests[4,50] could contribute to effective and ecologically valid intervention strategies for gym/fitness practitioners, towards doping prevention.

Limitations

Finally, although results provide support to QAD-Fit psychometric characteristics, there are limitations that need to be acknowledged. First, further replications with the resulting model must be done in the future and with other populations, since post hoc procedures were used, which refined the measurement instrument (though this approach does not compromise the integrity of the a prior model[51]) . Second, this study is a cross-sectional survey, and, as such, its findings do not inform about the concretization of the behavior of doping consumption in those who

showed positive attitudes to doping. Future research will benefit from longitudinal designs for attaining predictive validity of the QAD-Fit version and mixed-method approaches might be particularly conducive to the study of a set of circumstances and contradictions which could possibly characterize one´s experience with PES use in the context of gym/fitness settings[7].

Conclusions

The findings of this present research revealed that QAD-Fit is a psychometrically valid and reliable instrument for researchers, fitness center instructors, physicians and psychologists, who want to assess attitudes towards doping consumption in gym/fitness settings, thus filling the identified gap in this area of knowledge[4]. At the same time, this scale could be considered a possible solid measurement tool for further studies on the doping attitude, which could allow direct comparisons and meta-analyses of independent studies, thus serving the scientific community involved in doping research.

References

1. The European Health & Fitness Association. Final report section 3 – definitions and background. Bruxelles; 2012. Available from: http://www.fitness.be/src/Frontend/Files/.../Final_Report_280212.pdf [Accessed 14th June 2018].
2. Tavares AS, Serpa S, Horta L, Rosado A. Psychosocial factors and performance enhancing substances in gym users: A systematic review. Rev Psicol del Deport/J Sport Psychol. 2019;28(1): in press.
3. Ntoumanis N, Ng J, Barkoukis V, Backhouse S. Personal and Psychosocial Predictors of Doping Use in Physical Activity Settings: A Meta-Analysis. Sport Med. 2014 Nov;44(11):1603.
4. Morente-Sánchez J, Femia-Marzo P, Zabala M. Cross-cultural adaptation and validation of the Spanish version of the P performance enhancement attitude scale (Petróczi , 2002). J Sport Sci Med. 2014;13(February):430–8.

5. Soltanabadi S, Tojari F, Manouchehri J, Sciences S, Branch CT. Validity and reliability of measurement instruments of doping attitudes and doping behavior in Iranian. Indian J Fundam Appl Life Sci. 2014;4(S4):280–6.
6. Petróczi A, Backhouse SH, Barkoukis V, Brand R, Elbe A-M, Lazuras L, et al. A call for policy guidance on psychometric testing in doping control in sport. Int J Drug Policy. 2015;26(11):1130–9. doi: 10.1016/j.drugpo.2015.04.022.
7. Barkoukis V, Lazuras L, Tsorbatzoudis H. The psychology of doping in sport. New York: Routledge, 2016. 248 p.
8. Kavussanu M, Ring C. Moral identity predicts doping likelihood via moral disengagement and anticipated guilt. J Sport Exerc Psychol. 2017;39(4):293–301. doi: 10.1123/jsep.2016-0333.
9. Chan DKC, Hardcastle S, Dimmock JA, Lentillon-Kaestner V, Donovan RJ, Burgin M, et al. Modal salient belief and social cognitive variables of anti-doping behaviors in sport: Examining an extended model of the theory of planned behavior. Psychol Sport Exerc. 2015;16(P2):164–74. doi: 10.1016/j.psychsport.2014.03.002
10. Armitage CJ, Conner M. Social cognition models and health behaviour: A structured review. Psychol Health. 2000;15(2):173–89. doi: 10.1080/08870440008400299.
11. Armitage CJ, Conner M. Efficacy of the Theory of Planned Behaviour: A meta-analytic review. Br J Soc Psychol. 2001;(40):471–99.
12. Ajzen I. The Theory of Planned Behavior. Organ Behav Hum Decis Process. 1991;(50):179–211.
13. Kirby K, Guerin S, Moran A, Matthews J. Doping in elite sport. In: Barkoukis, Vassilis; Lazuras LTH, editor. The Psychology of Doping in Sport. London and New York: Routledge; 2016. p. 3–17.
14. Hauw D, Roten FC Von, Mohamed S, Philippe RA. Psychometric properties of the French-language version of the Performance Enhancement Attitude Scale (PEAS). Rev Eur Psychol Appl. 2016;66(1):15–21. doi: 10.1016/j.erap.2015.09.003.
15. Petróczi A, Aidman E. Measuring explicit attitude toward doping : Review of the psychometric properties of the Performance Enhancement Attitude Scale. Psychol Sport Exerc. 2009;10(3):390–6. doi:10.1016/j.psychsport.2008.11.001.
16. Serpa S, Leitão J, Marcolino P, Faria N, Ramadas S, Reis C. Psychological aspects of doping in sports: development of the “Questionnaire of attitudes towards

doping.” In: A. Papaioannou MG& YH, editor. 10th World Congress of Sport Psychology, Skiathos, Greece, June/July 2001. University of Thessaly & Hellenic Society of Sport Psychology; 2001.

17. Serpa S, Faria N, Marcolino P, Reis C, Ramadas S. Dopagem e psicologia. Lisboa: Centro de Estudos e Formação Desportiva, 2003.
18. Opdenacker J. Attitudes towards doping and motivation to practice sports in 14 to 18 year old athletes. Leuven.Thesis [Master in Sport and Exercise Psychology.] - Katholieke Universiteit; 2004.
19. Soper, D. S. A-priori sample size calculator for structural equation models [Software]. Available from: https://www.danielsoper.com/statcalc/calculator.aspx?id=89 [Accessed 18th June 2017].
20. Lucidi F, Zelli A, Mallia L, Grano C, Russo PM, Violani C. The social-cognitive mechanisms regulating adolescents' use of doping substances. J Sports Sci. 2008;26(5):447–56. doi: 10.1080/02640410701579370.
21. Beaton DE, Bombardier C, Guillemin F, Ferraz, Bosi M. Guidelines for the process of cross-cultural adaptation of self report measures. Spine. 2000; 25(24):3186–3191.
22. Loehlin JC. Latent variable models: An Introduction to factor, path, and structural equation analysis. Mahwah: Lawrence Erlbaum Associates. 2003.
23. West SG, Finch JF, Curran PJ. Structural equation models with nonnormal variables: Problems and remedies. In: Hoyle RH, editor. Structural equation modeling: Concepts, issues, and applications. Thousand Oaks, CA, US: Sage Publications, Inc., 1995. p. 56–75.
24. Fornell C, Larcker D. Evaluating structural equation models with unobservable variables and measurement error. J Marketing Res. 1981; 18(3): 39–50.
25. Hair J, Anderson R, Tatham R, Black W. Multivariate data analysis. Upper Saddle River: Prentice Hall, 2009.
26. Brown T. Confirmatory factor analysis for applied research. New York: The Guildford Press, 2006. 475 p.
27. Davey A, Savla J. Statistical power analysis with missing data: A structural equation modeling approach. New York: Taylor and Francis Group, 2010. 369 p.

28. Schumacker RE, Lomax RG. A beginner's guide to structural equation modeling. 2nd ed. Mahwah: Psychology Press, 2004.
29. Hu LT, Bentler PM. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Struct Equ Model. 1999;6(1):1–55.
30. Marsh HW. Application of confirmatory factor analysis and structural equation modeling in sport and exercise psychology. In: Tenenbaum G, Eklund RC, editors. Handbook of sport psychology. New York: Wiley, 2007. p. 774–798.
31. Arbuckle JL. Amos 18 reference guide (version 18). Amos 18 User's Guide. Chicago, IL: Statistical Package for the Social Science, 2009. 635 p.
32. Bentler PM, Bonett DG. Significance tests and goodness of fit in the analysis of covariance structures. Psychol Bull. 1980;88(3):588–606.
33. Blunch NJ. Introduction to structural equation modelling using SPSS and AMOS. London, England: SAGE, 2008.
34. Kline RB. Principles and practice of structural equation modeling. New York: Guilford, 1998.
35. Vandenberg RJ, Lance CE. A review and synthesis of the measurement invariance literature: Suggestions, practices, and recommendations for organizational research. Organ Res Methods. 2000;3(1):4–70.
36. Milfont TL, Fischer R. Testing measurement invariance across groups: Applications in cross- cultural research. Int J Psychol Res. 2010;3(1):111–21.
37. Marôco J. [Análise de equações estruturais: Fundamentos teóricos, software e aplicações]. 2nd ed. Pêro Pinheiro, Portugal: Report Number; 2014. 389 p. Portuguese.
38. Chen FF. Sensitivity of goodness of fit indexes to lack of measurement invariance. Struct Equ Model. 2007;14(3):464–504.
39. Cheung G, Rensvold R.Evaluating goodness-of-fit indexes for testing measurement invariance. Struct Equ Modeling: A Multidisciplinary Journal. 2002;9(2):233–255.
40. Campbell D, Fiske D. Convergent and discriminant validation by the multitrait–multimethod matrix. Psychol Bull. 1959;56(2):81–105.
41. Kline RB. Beyond significance testing: Reforming data analysis methods in behavioral research. Washington: American Psychological Association, 2004. 325 p.
42. Bentler PM, Wu EJC. EQS/windows user's guide. Los Angeles: BMDP Statistical Software, 1993. 180 p.

43. Bollen KA, Stine RA. Bootstrapping goodness-of-fit measures in structural equation models. In: Bollen, Long J, editors. Testing structural equation models. Newbury Park: SAGE Focus Edition, 1993. p. 111–135.
44. Byrne BM. Structural equation modeling with Amos: Basic concepts, applications, and programming. New York: Taylor and Francis Group, 2010. 2009 p. doi: 10.4324/9781410600219.
45. O'Rourke N, Ph.D., R.Psych., Hatcher L. A step-by-step approach to using sas® for factor analysis and structural equation modeling. 2nd Ed. North Carolina: SAS Institute Inc., Cary, 2013. 444 p. doi: 10.1111/insr.12111_2.
46. Correia M, Rosado A, Serpa S. Fear of failure in sport : A Portuguese cross-cultural adaptation. Motriz Rev Educ Fis. 2016;22(4):376–382. doi: 10.1590/S1980-6574201600040024.
47. Martins P, Rosado A, Ferreira V, Biscaia R. Examining the validity of the Athlete Engagement Questionnaire (AEQ) in a Portuguese sport setting. Motriz Rev Educ Fis. 2014;20(1):1–7. doi:10.1590/S1980-65742014000100001.
48. Lentillon-kaestner V, Hagger MS, Hardcastle S. Health and doping in elite-level cycling. Scand J Med Sci Sports. 2012;22(5):596–606. doi: 10.1111/j.1600-0838.2010.01281.x.
49. Brand R, Wolff W, Thieme D. Using response-time latencies to measure athletes ' doping attitudes : the brief implicit attitude test identifies substance abuse in bodybuilders. Subst Abus Treat Prev Policy. 2014;9(36):1–10.
50. Morente-Sánchez J, Zabala M. Doping in sport: A review of elite athletes attitudes, beliefs, and knowledge. Sport Med. 2013;43(6):395–411. doi: 10.1007/s40279-013-0037-x.
51. Hofmann R. Establishing factor validity using variable reduction in confirmatory factor analysis. Educ Psychol Meas. 1995;(55):572–582.

Appendix

QAD-Fit

	Discordo totalmente	Discordo	Discordo em parte	Sem opinião	Concordo em parte	Concordo	Concordo totalmente
	1	2	3	4	5	6	7
3. Tomaria substâncias que melhoram o desempenho para conseguir concretizar os meus objetivos de prática da atividade física.							
5. Quando o praticante se classifique em competições devido à ingestão de substâncias que melhoram o desempenho, deveria ser desclassificado.							
13. Deveria ser punida a venda de substâncias que melhoram o desempenho.							
16. Para obter a aparência física que desejo, eu tomaria substâncias que melhoram o desempenho.							
17. As substâncias que melhoram o desempenho ajudam a melhorar as capacidades físicas.							
18. Para aumentar as minhas capacidades físicas, eu tomaria substâncias que melhoram o desempenho.							
20. Para ter um físico mais perfeito, eu tomaria substâncias que melhoram o desempenho.							
21. O consumo de substâncias que melhoram o desempenho, ajuda a desenvolver a autoconfiança.							
22. Eu tomaria substâncias que melhoram o desempenho, se a maioria das pessoas que conheço aprovassem.							
24. Para conseguir atingir um objetivo que desejo muito, eu tomaria substâncias que melhoram o desempenho.							
25. Os instrutores que dão substâncias que melhoram o desempenho aos seus praticantes deveriam ser punidos.							
28. O consumo substâncias que melhoram o desempenho ajuda o bem-estar dos praticantes.							
30. O consumo substâncias que melhoram o desempenho é uma forma de batota.							
31. Para ser admirado (a) fisicamente, eu tomaria substâncias que melhoram o desempenho.							
32. Um praticante deve atingir os seus objetivos por si próprio e não com a ajuda de substâncias que melhoram o desempenho.							
34. Para agradar fisicamente aos outros, eu tomaria substâncias que melhoram o desempenho.							

Capítulo IV

Estudo 3

Prevalence of performance-enhancing substance use and associated factors among Portuguese gym/fitness users

Prevalence of performance-enhancing substance use and associated factors among Portuguese gym/fitness users[3]

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Abstract

Background: Nowadays, doping is not confined to elite sport, it is also spread throughout gymnasia and fitness centres, and it is seen as a public health concern. Studies focusing on performance-enhancing substances (PES) use among gym users are few and mostly concern the practice of bodybuilding and the use of anabolic-androgenic steroids (AAS), without providing information about social indicators to further explore why this specific population use these substances. *Objectives:* To investigate the extent of PES use and examine the way social indicators, exercise profile and gym modalities influence the use of these substances among a sample of gym users. *Methods:* Cross-sectional descriptive study, among a convenience sample of 453 Portuguese gym users, recruited directly by five institutional gyms´ e-mail and Facebook. Data were collected via a structured web-based survey**,** between October and November 2017. Multiple binary logistic regression, the Chi-Square test or Monte Carlo Simulation or Fisher's exact test were used. The odds ratios and their respective 95% confidence intervals were calculated. *Results:* 11,1% of gym users reported the use of prohibited PES, which varies significantly according to gender, education, exercise profile and type of practice. Gender was associated with the class of PES used. Polypharmacy was a common practice among users, increasing the risk of side-effects. Peer effect and media appear to be strikingly important in the misuse of PES. *Conclusion:* Results provide precise insight into the specific factors associated with PES use, which could support prevention strategies in gym/fitness context.

Keywords: Performance-enhancing substances; gym users; prevalence; social indicators.

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Introduction

According to Backhouse et al. (2014), anti-doping efforts have historically focused on the detection and deterrence of doping in elite and competitive sport, through National Anti-Doping Organizations (NADOs). However, nowadays there is recognition that doping is not confined to this broader context, but is also spread throughout health clubs, gymnasia and other recreational activities. In a recent systematic review, Brennan, Wells, and Van Hout, (2017), confirmed that the global high prevalence of anabolic-androgenic steroids (AAS) use is not confined any more to elite athletes and competitive bodybuilders. This situation is seen as a problematic phenomenon, since it has potential to grow, and could be seen as an emerging public health and societal concern (Backhouse et al., 2014; Mougios, 2002).

On the other hand, many of the health strategic policies currently advocate the promotion of physical activity, since physical inactivity leads to the development of a series of non-communicable diseases (e.g., coronary heart diseases, type 2 diabetes, breast and colon cancer), as well as premature mortality worldwide (Lee et al., 2012). A recent research (European Commission, 2017) showed that two in five Europeans (40%) exercise or play physical activity at least once a week. Portugal is one of the European countries where people are less likely to exercise or play sport (European Commission, 2017), showing that only about 6.6% memberships were purchased at gymnasia and fitness centers (AGAP, 2016).

At the same time, previous studies (Baker, Graham, & Davies, 2006; Sagoe & Pallesen, 2018) showed that the use of prohibited performance-enhancing substances (PES) (e.g., anabolic-androgenic steroids (AAS), stimulants, erythropoietin (EPO), human growth hormone, and diuretics) have increased among gym users, in order to improve appearance and performance rather than looking for a health-promoting activity, which could be seen as the dark side of exercise (Lazuras, 2017). According to Molero, Bakshi, and Gripenberg (2017), the research base on PES use among gym users is limited, and developing knowledge is imperative in orientating preventive efforts, since the long term use of these substances can be associated with psychological symptoms (e.g., depressive symptoms, antisocial and violent behaviors, suicidality) and several physical disorders (e.g., wide variety of cardiovascular, psychiatric, metabolic,

endocrine, neurologic, infectious, hepatic, renal, and musculoskeletal disorders) or even fatal side effects (Baron, Martin, & Magd, 2007; Pope et al., 2014).

Epidemiological studies focusing on the PES use among gym users are few (Molero et al., 2017) and most of them essentially concern the practice of bodybuilding and focus mainly on the use of AAS, without providing information about social indicators to further explore why the use of PES has been adopted by many gym users (Pedersen, 2010). A recent systematic review (Tavares, Serpa, Horta, & Rosado, 2019), which analyzes studies conducted by Middle Eastern, European and American countries showed that among the gym/fitness center practitioners, the most prevalent PES used were AAS and the prevalence rates reported across the studies analyzed ranged between 4.7% and 70%, with the vast majority reporting between 11.1% to 58%. The same study pointed out that AAS users were mostly young men, with a low level of education, most of them were weights practitioners, training frequently and along more years.

To date, in Portugal, the studies that have investigated the prevalence of PES use and analyzed the relative importance of social indicators (gender, age, educational background) and cultural patterns (different practices involved in sports training) among gym/fitness settings are scarce and fairly recent. In fact, as far as we know, the only study made among gym users – Fitness Against Doping Project (FAD) – which takes into consideration some of these factors, was done in 2011 by the European Health and Fitness Association (EHFA), with the support of the European Commission (covering 8 countries, one of them Portugal). The results of the survey on consumers (gym users), showed that 4.2% of respondents in Portugal confessed to use PES, against the European average of 2.7% (EHFA, 2011). The same study pointed out that, in general, male users of fitness centers are much more likely to take PES than female counterparts, the "peak" age for the use of PES being in the group of 25-49 years old, and 37.2% reported that they participated in another sport. Another study conducted in 3 gymnasia of Oporto city (Massada, Ribeiro, & Ferreira, 2011), focusing on bodybuilders, showed that 63.6% of the participants (n = 32) used PES (11.6% were AAS).

According to Backhouse et al. (2014), it is needed information about the prevalence of PES use and information on specific substances (beyond AAS) that are used, as well as the determinants and correlates of PES use in order to improve the prevention of doping in recreational sport. In view of the above stressed aspects, we aimed to investigate the extent of PES use, according to some relevant PES included in the WADA Prohibited List (2017) and examine the way social indicators (age, gender,

educational background, marital status, occupation), exercise profile (time practicing physical activity, training frequency, time spent during each workout) and kind of gym modalities and federated sport practice, influence the use of these substances among a sample of Portuguese gym/fitness users. Furthermore, we wanted to study the peers and social influence in PES use, alongside the motives for use, sources, ways of administration, self-reported side-effects and alcohol and smoking habits, since some studies suggested that the use of PES was associated with other high risk behaviors, including use of alcohol or smoking cigarettes (Allahverdipour, Jalilian, & Shaghaghi, 2012; Nicos, Constantinos, Stavros, Michael, & Christina, 2008).

Methods

Participants and data collection

The research design employed was a quantitative, cross-sectional descriptive study. Ethical approval for conducting the study was obtained from the University Ethics Board of Faculty of Human Kinetics, before data collection.

Upon approval, participants were recruited by five Gyms and Fitness center clubs that were invited and accepted to participate (by institutional e-mail) and through social network (Facebook). Data collection took place between October and November 2017.

Although the sampling process was non-random, the sample size required for this study was calculated by a sample size calculator for prevalence survey (Glaziou, 2017). The calculations indicated that 387 participants would be needed to obtain a maximum error of 2% in the estimation of prevalence rate of use of PES, with a confidence interval of 95%. The prevalence was estimated based on the study of the EHFA (2011), which reported that the prevalence rate of consumption of substances that improve performance in gym users in Portugal was 4.2%.

A convenience sample of 453 Portuguese gym/fitness center users (277 females and 175 males), aged between sixteen and seventy-nine years old (Mean (*M*) = 35.64; Standard Deviation (*SD*) = 13.08), participated in this research.

Prior to data collection, the survey web link directed potential subjects to an informed consent page, providing additional information regarding the study and detailing methods used to maintain confidentiality and anonymity. Then, a web-based

survey, administered via REDCap software (Version 5.11.4, Vanderbilt University), was utilized to access various domains of gym/fitness center users. No individually identifiable data was collected, Internet provider addresses were not logged, and data transfer was encrypted.

Instrument for data collection

Data were collected using a modified web-based survey, based on other questionnaires previously used among amateur athletes and gym users (Lentillon-Kaestner & Ohl, 2011; EHFA, 2011). The web-based survey contained 19 questions related to (1) selected socioeconomic status (age, gender, education level, marital status, occupation), (2) training characteristics (time practicing physical activity, workout frequency, time spent during each exercise session), (3) practice of federated sport, (4) self-reported use of PES, (5) prohibited substance used, according to some relevant PES included in the WADA prohibited substance list (2017) (type/name, length of use, location of purchase, reason for use, ways of administration and possible adverse effects), (6) history of smoking and (7) alcohol use.

In this survey, PES were defined as any substances taken in non-pharmacologic doses (e.g., stimulants, anabolic-androgenic steroids, erythropoietin, human growth hormone, and diuretics), specifically for the purposes of looking physically better and improving physical and sports performance, not including products such as vitamins and dietary supplements.

PES use was ascertained in various ways, supported by previous studies on doping (Lentillon-Kaestner & Ohl, 2011): in one question (Q13), participants were asked if someone or something led him/her to resort to substances that improve performance in his/her physical activity. To answer, participant had the choice between two answers ("Yes" / "No"). The answer "Yes" comes with other closed-ended questions, in which the participants specify all the options possible (e.g., instructor; friend, gym colleague, family, doctor, internet, social media, fitness magazines and others). The answer "No" comes with another closed-ended question: "If No, would you take in the future any PES? Yes/No". Another question (Q14) asked participants if as part of his/her practice; he/she had already taken substances that improve performance. To answer, participant had the choice between two answers ("Yes" / "No"). The answer "Yes" came with another closed-ended question, in which it was offered a list of 13

prohibited substances (according to the WADA prohibited substance list 2017): stimulants, beta blockers, corticosteroids, diuretics, erythropoietin, growth hormone, insulin, beta-2 agonists, AAS, substances that reduce side effects (e.g., tamoxifen, clomiphene), narcotics, cannabinoids, chorionic gonadotrophin. At the end of this list, participants could add other substances they use with an open item ("Others"). They had to give, for each substance, their frequency of use on a 4-point scale.

Prior to the beginning of the study, the web-based survey was piloted in 30 gym users, similar to those who participated in the main study. The pilot study was conducted to obtain feedback about the clarity, length, comprehensiveness, and required completion time on the study questionnaire. These data were not included in the total sample.

Processing and data analysis

The Statistical Package for the Social Sciences (SPSS, V.23 for Windows) was used for data entry, manipulation and analysis. Descriptive statistics were used to summarize and organize the data. The results are considered significant at a 5% significance level. To identify risk factors for PES use, we used multiple binary logistic regressions, using the forward conditional method to select the independent variables to enter the model, considering as independent variables the socio-demographic and the practice of physical activity. Regarding the gym modalities, since each respondent could select more than one, the Chi-Square test was used when the applicability assumption was verified or Chi-Square test by Monte Carlo Simulation or Fisher's exact test when this was not verified. When we had a table of 2 rows by 2 columns, it was also calculated the odds ratios (OR) and their respective 95% confidence intervals (95% CI). It should be noted that in some situations, the confidence intervals presented very high amplitudes, since the number of individuals who reported was too low.

Results

Profile of gym users and self-reported use of PES

In Table 1, the characteristics of the sample are described. The 453 individuals surveyed, 11.1% (n = 50) reported use of PES, being 69.4% male (n = 34). Of the participants, 5.3% were nonusers of PES with intentions to use this kind of substances in the near future.

Table 1
Demographic, socioeconomic, smoking and alcohol habits and PES use of gym users (n = 453).

		Minimum - Maximum	Mean ± Standard deviation	n (%)
Age (years)		16 - 79	35,64±13.08	
Age groups (years)	<=20			41 (9.1%)
	21 – 25			92 (20.4%)
	26 – 30			60 (13.3%)
	31 – 40			108 (23.9%)
	41 – 60			131 (29.0%)
	>=61			20 (4.4%)
Gender	Female			277 (61.3%)
	Male			175 (38.7%)
Education	No schooling			0 (0.0%)
	Primary school			0 (0.0%)
	2nd cycle school			12 (2.6%)
	Secondary school			61 (13.5%)
	Technical-professional			26 (5.7%)
	Higher Education			78 (17.2%)
	Frequency			
	University Graduate			147 (32.5%)
	Master/PhD			129 (28.5%)
Marital status	Single			230 (50.9%)
	Married			181 (40.0%)
	Divorced			34 (7.5%)
	Widow			7 (1.5%)
Occupation	Worker			299 (66.0%)
	Student			116 (25.6%)
	Unemployed			11 (2.4%)
	Retired			11 (2.4%)
	Other			16 (3.5%)
Smoking habits	No			399 (88.3%)
	Yes			53 (11.7%)
Alcohol habits	No			257 (57.0%)
	Yes			194 (43.0%)
PES use	No			402 (88.9%)
	Yes			50 (11.1%)

Identification of risk factors for PES use: sociodemographic characteristics

The binary logistic regression model to examine the relationship between sociodemographic characteristics and PES use was statistically significant ($\chi 2(10) = 47.842$, $p = .000$). A risk factor for PES use was identified as being male (OR = 3.650, 95% CI = (1.886, 7.066)), meaning that male compared to female counterpart, have an increased risk by approximately 4 times more likely to use PES. Being a student (OR = 0.278, 95% CI = (0.105, 0.739)) and having higher educational qualifications (OR = 0.731, 95% CI = (0.602, 0.887)) were identified as protective factors for PES use. These results indicate that being a student, associated to be a worker, decreases the risk of consuming PES in 72.2% and that the higher the education, the lower the risk of consuming PES in 26.9% (See Table 2). Although no statistically significant association was found between age, marital status and PES use, 32% of PES users were between 31 and 40 years and 52% were single.

Table 2
Sociodemographic characteristics as risk factors for PES use

		OR	95% CI for OR	
			Lower	Upper
Step 1[a]	Gender (Male)	4.256	2.241	8.083
	Constant	0.057		
Step 2[b]	Gender (Male)	3.835	2.000	7.355
	Education	0.728	0.599	0.884
	Constant	0.434		
Step 3[c]	Gender (Male)	3.650	1.886	7.066
	Education	0.731	0.602	0.887
	Occupation			
	Student	0.278	0.105	0.739
	Unemployed	1.765	0.409	7.611
	Retired	0.000	0.000	0.000
	Other	0.454	0.056	3.658
	Constant	0.564		

a. Variable(s) entered on step 1: Gender, being the reference category female.

b. Variable(s) entered on step 2: Education.

c. Variable(s) entered on step 3: Occupation, being the reference category "worker".

Identification of risk factors for PES use: Exercise profile

Regarding data related to the time practicing physical activity, training frequency, and time spent during each workout, we have observed that most PES users trained for over six years (48%), usually attended the gym 4 – 6 times weekly (66%) and spend approximately 1 – 2 hours training (96%). The binary logistic regression model was statistically significant ($\chi 2(2) = 37.520$, $p = .000$), showing that the frequency of training and the time spent in training are risk factors for PES use (OR = 2.682, 95% CI = (1.703, 4.224) and OR = 3.002, 95% CI = (1.401, 6.429), respectively) (Table 3).

These results reveal that with increasing training frequency and increasing time spent during each workout, the PES consumption risk increases by about 2.7 times and 3 times, respectively.

Table 3
Exercise profile as risk factor for PES use.

		OR	95% CI for OR	
			Lower	Upper
Step 1[a]	Training frequency	3.142	2.015	4.901
	Constant	0.007		
Step 2[b]	Training frequency	2.682	1.703	4.224
	Time spent during each workout	3.002	1.401	6.429
	Constant	0.001		

a. Variable(s) entered on step 1: Training frequency.
b. Variable(s) entered on step 2: Time spent during each workout.

Gym modalities and federated sport practice associated with PES use

In general, in our study, participants were involved in several gym modalities (e.g., 57% cardio fitness, 56.5% bodybuilding, 27.8% stretching, 27.2% localized) and 8.2% reported federated sport practice (type of activity under the organization of sports federations). When analyzing the association between gym modalities and PES use, the results presented in Table 4 showed that individuals who reported bodybuilding practice were more than eight times more likely to use PES, compared to individuals without bodybuilding practice (OR = 8.229, 95% CI = (3.200, 21.159)). The same was observed

in individuals who reported *Muay Thai* practice (OR = 6.351, 95% CI = (1.379, 29.247)), showing to be more than six times more likely to use PES compared to individuals without *Muay Thai* practice. On the contrary, individuals who reported Pilates practice were less (in 66%) likely to use PES compared to individuals without Pilates practice.

When we examine the relationship between gyms users with a federated sport practice and PES use, no statistically significant association was found, although gym users who reported federated sport practice (*n* = 37, 8.2%), showed to be 1.3 times more likely to use PES (OR = 1.3, 95% CI = (0.476, 3.464)) compared to individuals without federated sport practice.

Table 4
Gym modalities associated with PES use.

			PES use		Total	Pearson Chi-Square	df	*p*	OR	95% CI for PES use	
			No	Yes						Lower	Upper
Bodybuilding	No	*n*	192	5	197	25.788[a]	1	.000	8.229	3.200	21.159
		% within PES use	47.8%	10.0%	43.6%						
	Yes	*n*	210	45	255						
		% within PES use	52.2%	90.0%	56.4%						
Muay Thay	No	*n*	398	47	445			.032*	6.351	1.379	29.247
		% within PES use	99.0%	94.0%	98.5%						
	Yes	*n*	4	3	7						
		% within PES use	1.0%	6.0%	1.5%						
Pilates	No	*n*	303	45	348	5.371[a]	1	.020	0.340	0.131	0.881
		% within PES use	75.4%	90.0%	77.0%						
	Yes	*n*	99	5	104						
		% within PES use	24.6%	10.0%	23.0%						

*Fisher´s Exact Test

Peers and social influence of PES use

Of the total sample, 52 (11.5%) individuals reported that someone or something had led them to take PES in their physical activity. A percentage of 51 reported that their main source of PES use influence were friends, followed by training colleagues and the internet (30.8%), instructor (28.9%), the fitness magazines (13.5%), family and social media (7.7%).

Results showed that individuals that reported PES use were almost 14.5 times more likely to be influenced by instructor (OR = 14.488, 95% CI = (4.911, 42.742)), 30 times more likely to be influenced by friends (OR = 30.185, 95% CI = (12.232, 74.493)), 22 times more likely to be influenced by training colleagues (OR = 22.395, 95% CI = (7.402, 67.758)) and 47 times more likely to be influenced by the internet (OR = 46.730, 95% CI = (12.738, 171.428)) and 22 times more likely to be influenced by the fitness magazines (OR = 22.222, C.I. 95% = (4.189, 117.875)) (See Table5).

Table 5
Peers and social sources associated with PES use.

			PES use		Total	*p* of Fisher's Exact test	OR	95% CI for PES use	
			No	Yes				Lower	Upper
Instructor	No	Count	396	41	437	.000	14.488	4.911	42.742
		% within PES use	98.5%	82.0%	96.7%				
	Yes	Count	6	9	15				
		% within PES use	1.5%	18.0%	3.3%				
Friends	No	Count	394	31	425	.000	30.185	12.232	74.493
		% within PES use	98.0%	62.0%	94.0%				
	Yes	Count	8	19	27				
		% within PES use	2.0%	38.0%	6.0%				
Training colleagues	No	Count	397	39	436	.000	22.395	7.402	67.758
		% within PES use	98.8%	78.0%	96.5%				
	Yes	Count	5	11	16				
		% within PES use	1.2%	22.0%	3.5%				
Family	No	Count	402	46	448	.000	-	-	-
		% within PES use	100.0%	92.0%	99.1%				
	Yes	Count	0	4	4				
		% within PES use	0.0%	8.0%	.9%				
Internet	No	Count	399	37	436	.000	46.730	12.738	171.428
		% within PES use	99.3%	74.0%	96.5%				
	Yes	Count	3	13	16				
		% within PES use	.7%	26.0%	3.5%				
Social media	No	Count	402	46	448	.000	-	-	-
		% within PES use	100.0%	92.0%	99.1%				
	Yes	Count	0	4	4				
		% within PES use	0.0%	8.0%	.9%				
Fitness magazines	No	Count	400	45	445	.000	22.222	4.189	117.875
		% within PES use	99.5%	90.0%	98.5%				
	Yes	Count	2	5	7				
		% within PES use	.5%	10.0%	1.5%				

Most frequently used PES

In our study, respondents could identify a number of prohibited substances used, according to the WADA prohibited substance list (2017) used as PES. The most popular 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. With regard to "other substances", the most reported by the participants were creatinine, whey protein and amino acids, that is, nutritional supplements, which are outside the scope of the study. Concerning gender, females used mainly diuretics (73.3%) and males AAS (58.9%). A significant association was found between gender and the class of PES used, namely, females presented a positive association with the use of diuretics (p = .003, 95% CI = 0.002, 0.004)) and males with the AAS intake (p = .026, 95% CI = (0.023, 0 .029)).

Motives to use PES

When asked about the motives for PES use, 54 % of individuals reported to improve physical condition, 48% increase muscle growth and body shape, 48% to lose weight, 18% to achieve a particular goal, and 14% to aid faster healing of an injury and to extend the period of time spent on training.

Sources of PES

Users obtained PES from a variety of sources as follows: friends (47.8%) pharmacy (34.8%), internet order (32.6%) and gymnasia (17.4%).

Ways of administration

Oral (90%) and injectable intramuscular (32%) forms of PES were the most used ways of PES administration. Less frequent, were subcutaneous (8%) and dermal pathway (2%) administration.

Self-reported side-effects of PES use

Respondents were asked to respond to a symptoms checklist of side-effects they had experienced while taking PES. Thirty percent (n = 15) reported two or more side-effects, the majority of which were acne (53%), agitation and tremors (40%), insomnia and excitement (33.3%), aggressiveness (33.3%), humor and libido alteration (33.3%). Gynecomastia and liver problems were also reported by 13.3% of PES users.

Alcohol and smoking

Concerning tobacco smoking and alcohol habits the PES users were not more likely to drink alcohol (4.2% vs 43.1%) or smoke cigarettes (1.8% vs 11.7%) compared with nonusers. In fact, there was no statistically significant association between PES use and tobacco smoking ($\chi 2(1) = 0.319$, p =.992), neither in terms of alcohol consuming between users and nonusers of PES ($\chi 2(1) = 0.599$, p =.439).

Discussion

Firstly, it should be noted that this research is innovative, because this is one of the first efforts made in Portugal to gather data on such a controversial subject. The findings confirm the presence of PES use in the Portuguese gym/fitness centre user's population. It was observed that 11.1% of the gym users reported PES use and an additional 5.3% considered to use this kind of substances in the near future. The prevalence of PES users in this study is higher than what was reported in a similar study conducted in Portugal (4.2%) (EHFA, 2011), but it is according to that reported amongst gym/fitness centre users in other countries (Middle Eastern countries, Europe, Americas), where the vast majority of prevalence rates were between 11.1% to 58% (Tavares et al., 2019). On the other hand, this prevalence of PES use in our sample is probably underestimated, since the majority of the participants were females, contrasting with most of the studies published in this area, where the majority of participants are male. However, this difference in prevalence rates could be explained by some reasons. Firstly, the difference encoutered may be due to the fact that the study of the EHFA in Portugal was carried out in users of gymnasiums affiliated with AGAP

(Association of Portuguese Companies of Gymnasiums and Academies) and therefore those who are supposed to have better practices, not including for example the so-called "iron" gymnasia. Secondly, the method to evaluate doping prevalence and the definition of PES used and type of questions used to evaluate the consumption of these substances in both studies was slightly different (Lentillon-Kaestner & Ohl, 2011). Thirdly, in the meantime, the access to prohibited PES could be easier and even more spread, which could lead to an increase of its prevalence in Portuguese gym/fitness context. In this regard, in the present study, the main sources for acquiring PES were friends, pharmacy, internet order and gymnasia, which may reinforce this idea and is according to what was previously reported by other studies (Santos, Rocha, & Silva, 2011; Tahtamouni et al., 2008).

Turning to the social indicator patterns which influence the use of these substances in this sample of gym users, our results showed that there was a statistically significant association between use of PES and gender, and level of education: PES users were almost all men, and less educated. In fact, the majority of the studies pointed out that males tend to be more susceptible to doping behavior, being at greater risk of PES use than females (Backhouse, Whitaker, & Mckenna, 2015; Ntoumanis, Ng, Barkoukis, & Backhouse, 2013; Pedersen, 2010). According to Sekulic et al. (2016), such gender differences in PES use can be explained by factors, such as the self-perception of the presence of PES use in the gym (while female tend to be less convinced that PES use is present in these settings) and factors of hesitation in PES use behavior (i.e. concerned about the negative consequences of these behaviors: negative image in the public, health problems), while female tend to be more concerned/fearful about it, which contributes to their lower tendency to engage in PES use. Concerning the level of education, Al-Falasi et al. (2009) argued that individuals with lower levels of education only want to use the gym for bodybuilding purposes, while the better educated may utilize gyms for the purpose of fitness. This fact shows that more education allows individuals to be more conscious of the implications of PES use, leading to the refusal of such substances. This fact is aligned with our findings, since we concluded that individuals who reported bodybuilding and *Muay Thai* practice were more than eight and six times, respectively, likely to use PES compared to those practicing other activities. On the other hand, individuals who practice modalities such as Pilates were less likely to use PES. These findings are consistent with other studies (Al-Falasi et al., 2009; Nicos et al., 2008; Wazaify, Bdair, Al-Hadidi, & Scott, 2014),

since bodybuilding and *Muay Thai* (a combat modality) are frequently associated with the use of PES (especially AAS) (World Anti-Doping Agency, 2018). There was no statistically significant association between use of PES and age, although 32% of PES users were between 31 and 40 years, which is aligned with other studies (EHFA, 2011), showing that the group target for PES users (teenagers) has changed for more adult ones. One of the reasons for this fact, according to IP et al. (2015), could be that the physiological decline due to aging in combination with society´s body image pressures are contributing factors for PES use in older individuals.

Concerning the exercise profile which influences the use of these substances, results showed that the frequency of training and the time spent in training are risk factors for PES use, which is comparable to what has been reported previously (Nicos et al., 2008; Silva & Moreau, 2003; Striegel et al., 2006). This finding could be explained by the fact that indivuduals who have a more obsessive behavior towards body cult, tend to exercise more for better results, in addition to taking PES to optimize these results.

In line with other studies (Al-Falasi et al., 2009; Allahverdipour et al., 2012; Haerinejad, Ostovar, Farzaneh, & Keshavarz, 2016; Tavares et al., 2019), ours showed that peer effect and media appear to be strikingly important in the misuse of PES, stressing that the decision to use PES must be understood in relation to the "significant others" and to the "generalized others", considering that this behavior is not merely an individual question (Bergsgard, Tangen, Barland, & Breivik, 1996), which must be taken into account when planning educational strategies. Moreover, the sources mentioned of PES substances proof how increasingly easy it is to obtain these substances in the era of globalisation, raising additional concern about illicit supply networks and manufacturers with a questionable quality control (Mougios, 2002) and the role of pharmacies, which should be seen as a health stores, but that probably rather, sell the substances without a prescription, which places a public health concern.

The participants in our study reported the use of various prohibited PES, according to the WADA list of substances (2017), in where the most used were diuretics (46%), followed by AAS (44%). Gender was associated with the class of PES used, which in turn must be related to the main motivations that lead to the consumption of this type of substances. These findings show that whereas the main focus on the subject of PES use in gym/fitness centres tends to be on anabolic agents use, this is clearly not the only group of prohibited substances that is being misused, probably due to certain

social factors that promote focused stereotypes (e.g., muscular males, slim females), where the aims justify the means (Nicos et al., 2008; Pedersen, 2010).

It was revealed that polypharmacy was a common practice among gym users who used PES, which could increase the risk of side-effects among users (Pope et al., 2014). In fact, 30% of PES users reported various adverse effects, in particular, acne, agitation and tremors, insomnia, gynecomastia, which are likely to contribute to polipharmacy and higher frequency of PES (e.g. tamoxifen, clomiphene, chorionic gonadotrophin) taken by AAS users, which is supported by those of other studies (Ip, Barnett, Tenerowicz, & Perry, 2011; Parkinson & Evans, 2005). However, according to Parkinson and Evans (2005), although it is not possible to evaluate or confirm subjective PES-induced side effects reported during a self-administered survey, it is clear that these complications were a considerable discomfort recognized by users.

Most users take oral and injectable preparations, which entail various risks: oral AAS is associated with liver toxicity, while injection practices may contribute to several complications (e.g. contaminated syringes or potential multi-vials sharing which may transmit diseases, such as AIDS and hepatitis), which is of concern from a public health perpective (Korkia & Stimson, 1997; Mougios, 2002; Parkinson & Evans, 2005).

Our study demonstrated no differences in alcohol consumption and tobacco smoking between PES users and nonusers, which is in line with previous studies (Ip et al., 2011). These findings could be interpreted as contradicting health conscious lifestyle, since it seems that the concern with the body, which leads to PES use, protects – or at least reveals a tendency to reduction – concerning alcohol consumption and tobacco, so as not to attack the body. These paradoxal behaviors with the same goal to "treat" the body require further investigation, to examine what perceptions of health inform the taxonomy of beliefs "feeding" PES use (Brennan et al., 2017).

Limitations

The findings reported in this study have certain limitations. First, due to the non-probabilistic nature of sampling, results cannot be generalized to the wider population of gym users. Second, survey studies based on self-reporting lend to information bias, as participants must recall their experiences or under-report. This is particularly important when evaluating PES prevalence, the reason why Lentillon-Kaestner and Ohl (2011) suggested to use a combination of available techniques (e.g., questionnaires,

randomized response technique, observation, interviews and possible chemical analyses) to give a reliable picture of PES prevalence and reduce the risks on inaccurate estimation. However, we used several questions to evaluate PES prevalence, which give better indications of PES use (Lentillon-Kaestner & Ohl, 2011) and encouraged more honest responses, since participants received the questionnaires by mail and through a social network, which assured that they were not watched while completing the questionnaires and assuring anonymity. Third, this study involves a cross-sectional design which precluded the inference of causality. Finally, institutional e-mail and Facebook were the sources for recruitment and survey administration, which could bias the results, since individuals who do not have Internet access or do not access the e-mail would, by definition, be excluded. However, various sources have demonstrated the reliability and validity of online data collection for research, when compared with traditional methods (Krantz & Dalal, 2000; McCabe, 2004).

Conclusion

Though the magnitude of prohibited PES use is difficult to estimate, it is well established that the use of these substances is not anymore confined to elite sport. Taking into consideration that PES use behavior is not an individual problem or a general social issue, but rather a socio-cultural behavior anchored in specific context (Pedersen, 2010), our findings revealed that the reported use of PES, varies significantly according to gender, education, exercise profile and gym modality practice. In particular, when we analyse the responses of gym/fitness users, it appears that adult men who have a lower level of education, train frequently and have bodybuilding or other combat practice are more willing to experiment prohibited PES, than other categories of respondents. Another finding that must be taken into account is that 5.3% of nonusers considered to use these substances in the near future, which implies that prevention strategies should be drawn up taking into account this target population, in order to prevent the use of PES in the future. The information presented in this study highlights that gymnasia could provide an additional innovative setting for intervention and prevention efforts targeting PES use (Molero et al., 2017) and could be of great importance to relevant stakeholders, in guiding prevention strategies based on educational campaigns about side effects and the promotion of regular health checks among users. Additionally, as pointed out by Mougios (2002), legislators and law

enforcement agencies at national and European level should do whatever is whitin their power to impose a stricter control of the trade of PES, in order to improve the prevention of these substances in gym/fitness context.

References

AGAP. (2016). *Sumário executivo - Barómetro 2016* [Executive summary – Barometer 2016]. Retrieved from http://www.agap.pt/images/userfiles/files/BAROMETRO 2016_AF_SM.pdf

Al-Falasi, O., Al-Dahmani, K., Al-Eisaei, K., Al-Ameri, S., Al-Maskari, F., Nagelkerke, N., & Schneider, J. (2009). Knowledge, attitude and practice of anabolic steroids use among gym users in Al-Ain district, United Arab Emirates. *The Open Sports Medicine Journal, 2*(1), 75–81. doi.org/10.2174/1874387000802010075

Allahverdipour, H., Jalilian, F., & Shaghaghi, A. (2012). Vulnerability and the intention to anabolic steroids use among iranian gym users: an application of the theory of planned behavior. *Substance Use and Misuse, 47*(3), 309–317 doi.org/10.3109/10826084.2011.633296

Backhouse S, Collins C, Defoort Y, McNamee M, Parkinson A., & Sauer, M. (2014). *Study on Doping Prevention - a map of legal, regulatory and prevention practice provisions in EU 28*. Project report. European Commission. Luxembourg. doi.org/10.2766/86776

Backhouse, S., Whitaker, L., & Mckenna, J. (2015). *Social psychology of doping in sport : a mixed-studies narrative synthesis* (Vol. 1).

Baker, J. S., Graham, M. R., & Davies, B. (2006). Steroid and prescription medicine abuse in the health and fitness community: A regional study. *European Journal of Internal Medicine, 17*(7), 479–484. doi.org/10.1016/j.ejim.2006.04.010

Baron, D. A., Martin, D. M., & Magd, S. A. (2007). Doping in sports and its spread to at-risk populations: An international review. *World Psychiatry, 6*(June), 118–123.

Bergsgard, N. A., Tangen, J. O., Barland, B., & Breivik, G. (1996). Doping in Norwegian gyms - a big problem? *International Review for the Sociology of Sport, 31*(4), 351–364. doi.org/10.1177/101269029603100401

Brennan, R., Wells, J. S. G., & Van Hout, M. C. (2017). The injecting use of image and performance-enhancing drugs (IPED) in the general population: a systematic

review. *Health and Social Care in the Community, 25*(5), 1459–1531. doi.org/10.1111/hsc.12326

EHFA [The European Health and Fitness Association]. (2011). *Fitness against doping: Interim report.* Brussels: EHFA.

European Commission (2017). *Sport and physical activity: Special Eurobarometer 472* – Wave EB88.4. Brussels: European Commission. doi: 10.2766/483047

Glaziou, P. (2017). Sample size for a prevalence survey, with finite population correction. Sampsize.sourceforge.net. Retrieved from http://sampsize.sourceforge.net/iface/index.html#prev

Haerinejad, M. J., Ostovar, A., Farzaneh, M. R., & Keshavarz, M. (2016). The prevalence and characteristics of performance-enhancing drug use among bodybuilding athletes in the south of Iran, Bushehr. *Asian Journal of Sports Medicine, 7*(3). doi.org/10.5812/asjsm.35018

Ip, E. J., Barnett, M. J., Tenerowicz, M. J., & Perry, P. J. (2011). The anabolic 500 survey: characteristics of male users versus nonusers of anabolic-androgenic steroids for strength training. *Pharmacotherapy, 31*(8), 757–766. doi.org/10.1592/phco.31.8.757

Ip, E. J., Trinh, K., Tenerowicz, M. J., Pal, J., Lindfelt, T. A., & Perry, P. J. (2015). Characteristics and behaviors of older male anabolic steroid users. *Journal of Pharmacy Practice, 28*(5), 450.

Korkia, P. I., & Stimson, C. V. (1997). lndications of prevalence, practice and effects of anabolic steroid use in Great Britain. *Practice, 18*, 557–562.

Krantz, J. H., & Dalal, R. (2000). Validity of web-based psychological research. *Psychological Experiments on the Internet*, (December), 35–60. doi.org/10.1016/B978-012099980-4/50003-4

Lazuras, L. (2017, March 20). Doping in sport: Drug use 'fast becoming a crisis' [interview]. BBC.com. Retrieved from https://www.bbc.com/sport/38884801

Lee, I. M., Shiroma, E. J., Lobelo, F., Puska, P., Blair, S. N., Katzmarzyk, P. T., … Wells, J. C. (2012). Effect of physical inactivity on major non-communicable diseases worldwide: an analysis of burden of disease and life expectancy. *The Lancet, 380*(9838), 219–229. doi.org/10.1016/S0140-6736(12)61031-9

Lentillon-Kaestner, V., & Ohl, F. (2011). Can we measure accurately the prevalence of doping? *Scandinavian Journal of Medicine and Science in Sports, 21*(6), e132–e142. doi.org/10.1111/j.1600-0838.2010.01199.x

Massada, M., Ribeiro, S., & Ferreira, V. (2011). Consumo de substâncias dopantes no desporto recreativo português – um estudo em praticantes de musculação [Consumption of doping substances in Portuguese recreational sports – a study of bodybuilders]. *Rev. Medicina Desportiva Informa, 2*(4), 19–21.

McCabe, S. E. (2004). Comparison of web and mail surveys in collecting illicit drug use data: a randomized experiment. *Journal of Drug Education, 34*(1), 61–72. doi.org/10.2190/4HEY-VWXL-DVR3-HAKV

Molero, Y., Bakshi, A. S., & Gripenberg, J. (2017). Illicit drug use among gym-goers: a cross-sectional study of gym-goers in Sweden. *Sports Medicine - Open, 31*(3), 1–8. doi.org/10.1186/s40798-017-0098-8

Mougios, V. (2002). Doping abuse in recreational sports. In C. Peters, T. Schulz, & H. Michna (Eds.), *Biomedical Side Effects of Doping* (pp.101-104). Köln.

Nicos, K., Constantinos, P., Stavros, P., Michael, P., & Christina, L. (2008). The use of anabolic steroids and other prohibited substances by gym enthusiasts in Cyprus. *International Review for the Sociology of Sport, 43*(3), 271–287.

Ntoumanis, N., Ng, J., Barkoukis, V., & Backhouse, S. (2013). *A statistical synthesis of the literature on personal and situational variables that predict doping in physical activity settings*.

Parkinson, A. B., & Evans, N. A. (2005). Anabolic androgenic steroids: A survey of 500 users. *Medicine & Science in Sports & Exercise, 38*(4), 644-651. doi:10.1249/01.mss.0000210194.56834.5d

Pedersen, I. K. (2010). Doping and the perfect body expert: social and cultural indicators of performance-enhancing drug use in Danish gyms. *Sport in Society, 13*(3), 503–516. doi.org/10.1080/17430431003588184

Pope, H. G. J., Wood, R. I., Rogol, A., Nyberg, F., Bowers, L., & Bhasin, S. (2014). Adverse health consequences of performance-enhancing drugs: an endocrine society scientific statement. *Endocrine Reviews, 35*(3), 341–375. doi.org/10.1210/er.2013-1058

Sagoe, D., & Pallesen, S. (2018). Androgen abuse epidemiology. *Current Opinion in Endocrinology, Diabetes and Obesity, 25*(3), 185–194. doi.org/10.1097/MED.0000000000000403

Santos, A. M., Rocha, M. S. P. da, & Silva, M. F. da (2011). Illicit use and abuse of anabolic-androgenic steroids among Brazilian bodybuilders. *Substance Use & Misuse, 46*(6), 742–748.

Sekulic, D., Tahiraj, E., Zvan, M., Zenic, N., Uljevic, O., & Lesnik, B. (2016). Doping attitudes and covariates of potential doping behaviour in high-level team-sport athletes; gender specific analysis. *Journal of Sports Science and Medicine, 15*(4), 606–615.

Silva, L. S. M., & Moreau, R. L. (2003). Use of anabolic-androgenic steroids among body builders in major gym centers in São Paulo, Brazil. *Brazilian Journal of Pharmaceutical Sciences, 39*(3), 327–333.

Striegel, H., Simon, P., Frisch, S., Roecker, K., Dietz, K., Dickhuth, H.-H., & Ulrich, R. (2006). Anabolic ergogenic substance users in fitness-sports: a distinct group supported by the health care system. *Drug and Alcohol Dependence, 81*(1), 11–19. doi.org/10.1016/j.drugalcdep.2005.05.013

Tahtamouni, L. H., Mustafa, N. H., Alfaouri, A. A., Hassan, I. M., Abdalla, M. Y., & Yasin, S. R. (2008). Prevalence and risk factors for anabolic-androgenic steroid abuse among Jordanian collegiate students and athletes. *European Journal of Public Health, 18*(6), 661–665. doi.org/10.1093/eurpub/ckn062

Tavares, A. S., Serpa, S., Horta, L., & Rosado, A. (2019). Psychosocial factors and performance enhancing substances in gym users: a systematic review. *Revista de Psicologia Del Deporte / Journal of Sport Psychology, 28*(1), 131–142.

Wazaify, M., Bdair, A., Al-Hadidi, K., & Scott, J. (2014). Doping in gymnasiums in Amman: The other side of prescription and nonprescription drug abuse. *Substance Use & Misuse, 49*(10), 1296–1302. doi.org/10.3109/10826084.2014.891625

World Anti-Doping Agency (2018). *2016 Anti-doping rule violations (ADRVs) report*. Retrieved from WADA website: https://www.wadaama.org/sites/.../2016_adrvs_report_web_release_april_2018_0.pdf

Capítulo V

Estudo 4

Determinants of the intention to use performance-enhancing substances among Portuguese gym users

Determinants of the intention to use performance-enhancing substances among Portuguese gym users[4]

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Abstract

The present study examined the determinants of the intentions to use prohibited performance-enhancing substances (PES) and the hypothesis of gender and PES use influencing Theory of Planned Behavior (TPB) variables. A TPB approach was used. A convenience sample of Portuguese gym users (n = 453) completed an anonymous web-based survey. Variance-based structural equation modeling, multi-group analysis strategy, latent mean analysis approach and one-way ANOVA analysis were used. The findings showed that, at structural level, results support the TPB framework in terms of characterizing and predicting intentions to PES use in the gym users sample, and that subjective norms were the strongest predictor of PES use intentions. Female and male differed in intentions to use PES, subjective norms and beliefs. However, the predictive model in study remains invariant in both groups. Concerning PES use, results showed the existence of a significant difference, regarding all the TPB´s constructs of the PES users and nonusers' groups, and that the predictive capacity of each predictor was different for each group. Psychological strategies should be based on subjective norms, alongside beliefs and attitudes towards PES use, since these variables influence the intention to use PES in that particular population.

Keywords: Gym users; performance-enhancing substances; social-cognitive determinants, structural equation modeling, gender, psychological strategies.

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Introduction

Nowadays, the use of prohibited performance-enhancing substances (PES) to improve one´s ability - commonly known as doping - is widespread across all levels of sport and exercise participation (Goulet, Valois, Buist, & Côté, 2010; Ntoumanis, Ng, Barkoukis, & Backhouse, 2014). At professional and Olympic/Paralympic level, each athlete is responsible for the substances he/she consumes and for knowing if any of these substances is on the World Anti-Doping Agency (WADA) Prohibited List, which is published yearly by WADA. At recreational level, no regulation exists, although Denmark is one of the few countries with drug control in gyms and fitness centers (Thualagant & Pfister, 2012). According to WADA, doping behavior refers to the use of illegal performance enhancing drugs and methods to improve performance. Currently, two of the following three criteria must be met for a substance or method to be included on the WADA Prohibited List: (1) Medical or other scientific evidence, pharmacological effect or experience that the substance or method, alone or in combination with other substances or methods, has the potential to enhance or enhances sport performance; (2) Medical or other scientific evidence, pharmacological effect or experience that the use of the substance or method represents an actual or potential health risk to the athlete; (3) WADA's determination that the use of the substance or method violates the spirit of sport described in the introduction to the Code. However, this official definition of doping was developed in and for elite sport context and therefore entails substances or methods to improve performance that are not relevant for a gym user (Thualagant, 2012). In this sense, the illegal substances used in a fitness context – PES, are often for the enhancement of the individual´s bodily appearance (Thualagant, 2012), although anyone who use these kind of substances is exposed to potential health risk, being more dramatic at the recreational level, since there is no regulation in almost countries or medical supervision. At the same time, it was described that the long term use of these substances (PES: e.g., anabolic-androgenic steroids (AAS), stimulants, erythropoietin, human growth hormone, and diuretics) without proper control, can be associated with several physical disorders (e.g., wide variety of cardiovascular, psychiatric, metabolic, endocrine, neurologic, infectious, hepatic, renal, and musculoskeletal dis orders) and psychological symptoms (e.g., depressive symptoms, antisocial and violent behaviors, suicidality) and or even fatal

side effects (Baron, Martin, & Magd, 2007; Pope et al., 2014), which is a major problem, concerning this specif population. Therefore, while the term doping is mostly associated with competitive sports, the expression Performance-Enhancing Substances (PES) will be adopted in this article referring to the fitness context where there is no competitive performance goal.

In a recent systematic review, it was shown that among the gym/fitness center users the prevalence rates of PES use (especially AAS) reported across the 26 studies analysed, ranged between 4.7% and 70% (Tavares, Serpa, Horta, & Rosado, 2019). The same study concluded that the majority of the AAS users in fitness context had a general lack of knowledge or minimization of the potential harmful effects, with no proper attention to the side effects of this kind of substances, which could be interpreted as a public health concern.

Research in the doping field highlights the importance to promote the understanding of the psychosocial predictors of doping intentions and behavior (Ntoumanis et al., 2014), since belief systems concerning behavioral outcomes, social influences on behavior, and personal control factors affect behavioral choices (Lucidi et al., 2008).

According to Petroczi and Aidman (2009), doping in sport is deliberate and planned and pro-doping attitudes could predict doping use. Indeed, other studies on nonprofessional athletes comprise attitudes and additional variables as proxy measures of PES use behavior (eg., Lucidi et al., 2008; Wiefferink, Detmar, Coumans, Vogels, & Paulussen, 2008), which can be used effectivelly in the study of PES use intentions and behavior.

Therefore, in light of this situation, the first step to effectively succeed in terms of PES use prevention strategies in gym/fitness context, is taking into account theories of behavioral prediction, which provide a framework for identifying the determinants of this kind of behavior, with high impact in terms of health consequences (Lucidi, Grano, Leone, Lombardo, & Pesce, 2004).

To identify the influential factors on PES use intention and behavior, researchers typically guide their investigations based on social-cognitive and motivational models from social psychology (Chan et al., 2015). In this sense, different integrative models have been applied to the study of doping use, deriving from more general models of behavioral prediction, such as the Theory of Planned Behavior (TPB) (Lazuras, 2016). All these models (Life Cycle Model; Sports Drug Control Model; Theory of Triadic

Influence – integrative model in the context of doping and Trans-contextual Model) (Lazuras, 2016; Kavussanu & Ring, 2017) emphasized the role of decision-making, higlighting that doping use is a complex issue that is goal-directed, intentional, and a self-regulated behavior. However, none of these models incorporates measures of contextual influences (e.g., socio-cultural and or/socioeconomic), or ways of analysing the effects of these contexts on doping decisions, since these contexts can have a profound effect on PES-initiation (Lazuras, 2016).

Though the trend is increasingly the search for more ecological perspectives, dedicating greater attention to background variables (e.g., motivation, situational and environmental features, moral tendencies) (Lazuras, 2016), the TPB (Ajzen, 1991) is one of the most frequently used frameworks to explain individual´s doping intentions and behavior (Chan et al., 2015), since the use of doping seems to involve a series of essentially volitional behaviors (Goulet et al., 2010; Zelli, Mallia, & Lucidi, 2010). According to Lazuras, Barkoukis, Rodafinos, and Tzorbatzoudis (2010), in doping research, the TPB has been tested in samples of nonprofessional and adolescent athletes and gym users (e.g., Lucidi et al., 2008; Wiefferink et al., 2008), suggesting that the TPB can be effectively applied in research investigating the use of PES, also in these specific populations.

The Theory of Planned Behavior (TPB), an extension of the theory of reasoned action (Ajzen, & Fishbein, 1980), incorporates social influence and personality factors in order to predict behavioral intentions and behavior (Ntoumanis et al., 2013). The theory posits that the intention to perform a given behavior is the immediate antecedent of that behavior and is determined by three conceptually independent variables - individual's attitude towards the behavior (i.e., the favorable or unfavorable feeling of performing the behavior); subjective norms (i.e., the perceived social pressure to perform or not to perform the behavior) and perceived behavioral control (PBC; the perceived controllability of the behavior) (Ajzen, 2002). Generally, the more favorable the attitude and the subjective norms and the greater the PBC, the stronger would be the individual´s intention to perform a particular behavior (Ajzen, 2002).

The TPB´s constructs (attitudes, subjective norms and PBC) are thought to be sustained by corresponding salient beliefs – behavioral, normative and control beliefs (Ajzen, 1991). Attitudes towards behavior are specifically considered to be determined by behavioral beliefs which, in turn, reflect the perceived likely consequences of engaging in PES use behavior, weighted by an evaluation of these consequences.

Subjective norms are influenced by normative beliefs, which assess the expectations of significant others and the motivation to comply with such expectations. Finally, PBC is thought to be a function of control beliefs (i.e., factors that can enable or inhibit the target behavior and consequent behavior perceived impact) (Ajzen, 1991; Kirby, Guerin, Moran, & Matthews, 2016). Due to the fact that attitudes, subjective norms, and PBC may serve as proxy indices of behavior through their direct relationship with behavioral intention and their indirect relationship with behavior, assessing an individual´s behavioral intention to use PES may be sufficient to better understand PES use behavior and its antecedents (Kirby et al., 2016).

Furthermore, PES use has been associated with a wide range of other relevant variables in doping research, namely gender and the past/current use of PES, since it has been identified to predict PES use behavior. Although there is no consistency in reports about gender as an influence factor on doping or PES use susceptibility (Devcic et al., 2018), males tend to be more susceptible to doping or PES use intentions and behaviors, being at greater risk of PES use than females (Backhouse, Whitaker, & Mckenna, 2015; Ntoumanis, Ng, Barkoukis, & Backhouse, 2013; Pedersen, 2010). Concerning PES use, previous studies, using competitive athletes and gym users showed that past or current behavioral choices predict both intentions to use PES and future behavior (Ajzen, 2002; Armitage & Conner, 2001; Lazuras, et al., 2010; Wiefferink at al., 2008). Indeed, studies using samples of gym users, showed that individuals who are familiar and already users of PES, tend to have more favorable attitudes towards PES use and higher risk to do so again in the future (Dunn, Mazanov, & Sitharthan, 2009; Wiefferink et al., 2008).

The present study set out to explore the determinants of the intentions to use PES in a sample of gym/fitness center users in Portugal, using previous applications of TPB, since research based on PES use across this specific population is limited. Furthermore, this study might provide more comprehensive information about the attitudes towards PES use, allowing the development of knowledge in order to improve the prevention of PES use in Portuguese gym/fitness context, and the protection of gym users health (Backhouse et al., 2014; Molero, Bakshi, & Gripenberg, 2017). For this purpose, and since the use of PES seems to involve a set of essentially volitional behaviors, we adopted an approach based on TPB, taking into account that it has been the dominant framework in doping behavior research in the field of sport, to examine the psycho-social mechanisms that may lead to PES use behaviors (e.g., Goulet et al.,

2010; Lucidi et al., 2008; Ntoumanis et al., 2013). It also demonstrated to be effectively applied in research investigating the use of PES in gymnasium/fitness context (Wiefferink et al., 2008). Therefore, the aims of the present study were twofold: firstly, the study aimed to evaluate whether the intention to use PES in a sample of gym users could be predicted by the variables considered within the TPB. Secondly, the study also examined the hypothesis of gender and PES use influencing TPB variables. Based on previous research on doping in sport that may suggest elements for the study and understanding the determinants of the intentions to use PES in fitness context, and some studies on nonprofessional athletes, it was expected that (1) the TPB variables would significantly predict PES use intentions (Chan et al., 2015; Lentillon-Kaestner & Carstairs, 2010; Lucidi et al., 2004; Lucidi et al., 2008); (2) gender would not interact with any independent factor predicting intention, and that the predictive ability of each predictor was exactly the same for males and females (Lucidi et al., 2004); (3) the use of PES would interact with any independent factor predicting intention, and that the predictive ability of each predictor would be different for users and nonusers of PES (Dunn et al., 2009; Wiefferink et al., 2008); (4) males would show more favorable attitudes, subjective norms, beliefs and intention to use PES than females (Backhouse et al., 2015; Ntoumanis, 2013; Pedersen, 2010); and (5) PES users would show more favorable attitudes, subjective norms, beliefs and intention to PES use than nonusers (Dunn et al., 2009; Wiefferink et al., 2008).

As a criterion for the PES, the WADA Prohibited List was followed, and therefore vitamins and dietary supplements were not considered.

Method

Participants and procedure

After the approval of the study protocol by the University Ethics Board of the author´s institution, participants were recruited by Gyms and Fitness center clubs that were invited and accepted to participate (by institutional e-mail/Facebook) and through a social network (Facebook).

The sample size required for this study that uses a structural equation model (SEM) was calculated by A-priori sample size calculator for SEM (Soper, 2017). The

calculations indicated that 434 participants would be needed to rise above 0.9 power for an anticipated effect size of 0.2 with a probability level of 0.05. A convenience sample consisting of 453 Portuguese gym/fitness center users (mean age = 35.64; SD = 13.08; female = 61.3% (n = 277); male = 38.7% (n = 175)), participated in this research. Participants were involved in several gym activities (e.g., 57% cardio fitness, 56.5% bodybuilding, 27.8% stretching, 27.2% localized), and 11.1% of which (n = 50) used PES at the time.

Prior to data collection, the survey web link directed potential subjects to an informed consent page, providing additional information regarding the study and detailing methods used to maintain confidentiality and anonymity. Then, a web-based survey, administered via REDCap software (Version 5.11.4, Vanderbilt University), was utilized to assess various domains of gym/fitness center practitioners. Parameters assessed included (1) demographic data, (2) self-reported use of PES (doping behavior), and (3) attitudes, subjective norms, beliefs and PES use intention, as measured according to the TPB. The questionnaires took approximately 15 minutes to complete. No individually identifiable data were collected, Internet provider addresses were not logged, and data transfer was encrypted.

Measures

Self-reported use of PES

For this purpose, we assessed self-reported PES use and conducted separate analyses for each group: (a) those never having used PES and (b) those having already used PES at that time. The question "As part of your practice, have you ever taken performance-enhancing substances?" was used to assess self-reported PES use; and two different response options were offered (1 = No; and 2 = Yes). According to Barkoukis et al. (2013), the main reason for this categorization was to assess the risk of PES use among gym/fitness center users who never engaged in PES use before, and among gym/fitness center users who were already users of PES, and hence had higher risk to do so again in the future.

Questionnaire of attitudes towards doping in fitness (QAD-Fit)

The variables derived from the TPB (attitudes, subjective norms, beliefs and PES use intention) were measured through the Questionnaire of Attitudes towards Doping in Fitness" (QAD-Fit), which was psychometric validated for the Portuguese gym/fitness users' population (the total composite reliability (CR) was .85, with values of .74 for beliefs; .84 for attitudes; .86 for subjective norms; and .97 for intentions) (Tavares, Serpa, & Rosado, 2019). QAD-Fit contained 16 items, representing the original four factors (Serpa et al., 2001) and was based on the TPB. It included four dimensions to evaluate attitudes (assessed with the mean of five items – e.g., "Selling PES should be punished"), subjective norms (assessed with the mean of three items – e.g., "I would take PES, if most people I know approved of it"), beliefs (assessed with the mean of three items – e.g., "Performance enhancing substances help to improve physical abilities") and intention (assessed with the mean of five items – e.g., "I would take PES to achieve my goals in the practice of physical activity") and its 16 items were scored on a seven-point Likert-type scale ranging from (1) *totally disagree* to (7) *totally agree*. A higher score would indicate a more positive attitude towards PES use.

Results

Mean scores, standard deviations, intercorrelations, composite reliability (CR), average variance extracted (AVE) and discriminant validity among the variables examined in the study are shown in Table 1.

General results

Table 1 shows the descriptive statistics of the whole sample on the four dimensions to evaluate attitudes, subjective norms, beliefs and intention. Overall, it can be seen that all the values were bellow 4, showing that gym users expressed a negative tendency towards the use of PES, although beliefs show a tendency for higher values.

The measurement model

A confirmatory factor analysis was performed to estimate the measurement components of the constructs in the TPB. Data were analyzed by covariance-based

structural equation modeling (SEM) (Byrne, 2010), using AMOS 24.0 (SPSS Inc. Chicago IL). The maximum likelihood (ML) method was used as the method of estimation. A two-step approach was used to evaluate whether the hypothesized model fitted the data (Anderson & Gerbing, 1988; Byrne, 2010; Kline, 2011; Schumacker & Lomax, 1996). Assessment of model fit was based on multiple indicators (Hu & Bentler, 1999; Marsh, 2007), namely: chi-square (χ^2) statistical test, the ratio of chi-square to its degree of freedom (χ^2 /*df*), comparative-of-fit-index (CFI), parsimony comparative of-fit index (PCFI), parsimony goodness-of-fit index (PGFI), and root mean square error of approximation (RMSEA). Research practices using these indices state that values for the χ^2 / *df* should be less than 3, PCF and PGFI above .60, while values above .95 for the CFI, and below .06 for the RMSEA represent a good fit (Arbuckle, 2009; Bentler & Bonet, 1980; Blunch, 2008; Kline, 2011).

Results from the confirmatory analysis are presented in Figure 1. The model was statistically significant, (χ^2 (97) = 204.383, B-S $p < .001$) with a χ^2 /*df* = 2.107. Furthermore, the model achieved high fit: PCFI = .79, PGFI = .67, CFI = .98. The RMSEA was .049, with a 90% CI of .040 and .059. All items revealed to be statistically significant on its construct ($p < .001$). Considering that they are part of the same framework, the TPB´s constructs were found to be correlated, with the highest correlation between subjective norms and beliefs (r = .53, $p < .001$) and the weakest correlation between attitudes and subjective norms (r = .39, $p < .001$).

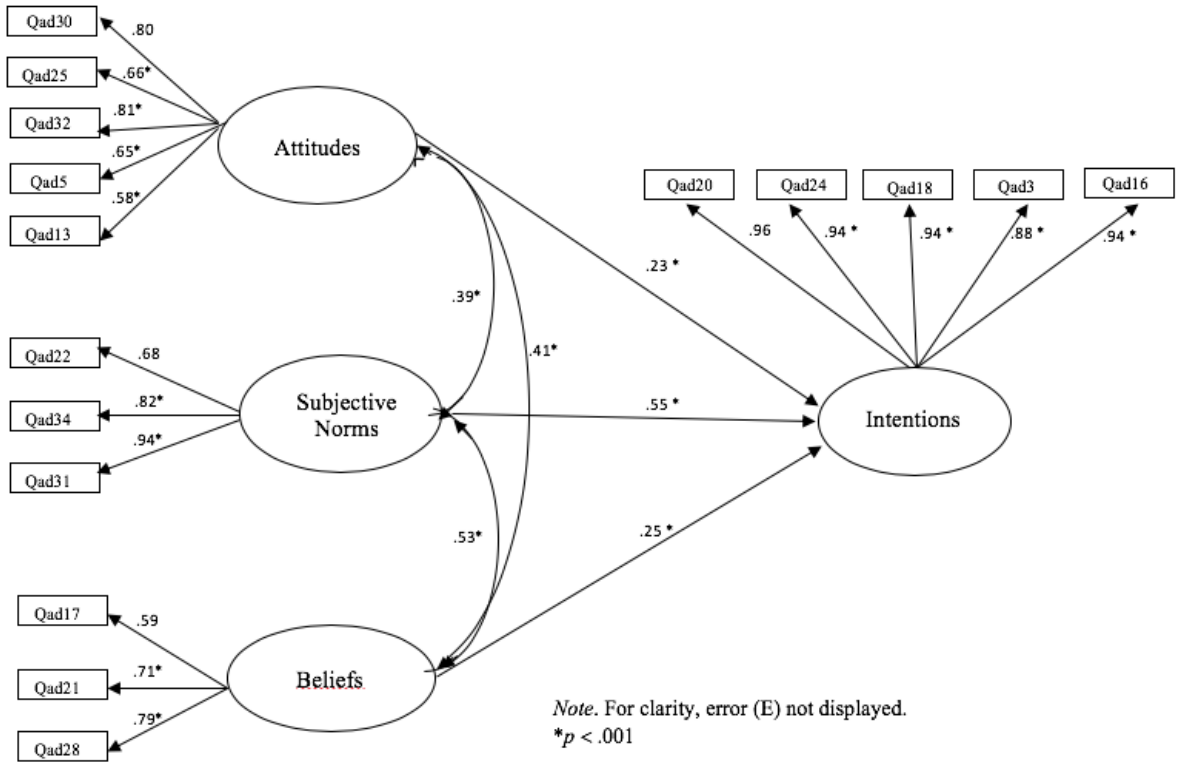

Figure 1. Hypothesized model on the Theory of Planned Behavior with a sample of gym users.

Within the measurement component, all indicators were found to be reliably associated ($p < .01$) with the latent factors. Overall, the measurement model was within the required criteria and showed good psychometric properties. Composite Reliability (CR) was used as measure of internal consistency of the factors, where values greater .70 indicate good reliability (Fornell & Larcker, 1981). Convergent and discriminant validity were assessed to test construct validity. The average variance extracted (AVE) was estimated to evaluate convergent validity with values greater than .50 indicating convergent validity (Fornell & Larcker, 1981). The criterion to assume discriminant validity was that the AVE for each construct was larger than the inter-construct squared correlation (Fornell & Larcker, 1981) (see Table 1).

Table 1
Intercorrelations, means, standard deviations, CR, AVE, and discriminant validity.

	1	2	3	4
1. Intentions	1			
2. Attitudes	.23**	1		
3. Subjective Norms	.55**	.39**	1	
4. Beliefs	.25**	.41**	.53**	1
Mean	2.18	2.99	1.66	3.43
Standard deviation	1.66	1.47	1.08	1.40
CR	.97	.84	.86	.74
AVE	.88	.51	.67	.50
MSV	.61	.30	.61	.41

Note. CR = Composite Reliability; AVE = Average variance extracted; MSV = Maximum shared squared variance
** *Bolen-Stine p* < .001 at 2-tailed.

The structural model

At structural level, results support the TPB framework in characterizing and predicting intentions to PES use in our gym users sample. The structural component revealed that subjective norms (β = .55, $p < .001$), beliefs (β = .25, $p < .001$) and attitudes (β = .23, $p < .001$) predicted intentions. It was reported that 71.8% of the variance associated with PES use intention was accounted for by its 3 predictors (attitudes, subjective norms and beliefs).

Once successfully ascertained that the structural model could predict intentions to use PES, the invariance across gender of the regression path hypothesized by the final model (from TPB constructs) was examined, through multi-group analysis strategy, using Gaskin (2016) procedures. The same strategy was used to examine the invariance across users and nonusers of PES of the regression path hypothesized by the final model.

Gender

The invariance across gender of the regression path hypothesized by the final structural model was examined. As shown by the non-significant *p* value associated at each path considered in the model (see Table 2), the hypothesis of invariance of prediction across gender could not be rejected ($p>.05$).

Table 2
Results of hypothesized model across gender.

Paths	Estimate	Lower	Upper	*p* value
Attitudes – Intentions	-.142	-.334	.055	.249
Subjective Norms – Intentions	-.022	-.658	.505	.892
Beliefs – Intentions	-.379	-.774	-.026	.075

Users and nonusers of PES

As it was done for cross gender generalizability, the invariance across the group of PES users and nonusers of the regression path hypothesized by the final structural model (from TPB constructs) was examined. As shown in Table 3, only one non-significant *p* value was associated at the path attitudes-intentions, the other two paths hypothesized in the model showed a significant *p* value. Among the group of PES users, beliefs were the strongest predictor ($\beta = .67$, $p < .05$). Among the group of nonusers, subjective norms were the strongest predictor ($\beta = .74$, $p < .001$).

Table 3
Results of hypothesized model across users and nonusers of PES.

Paths	Estimate	Lower	Upper	*p* value
Attitudes – Intentions	.204	- .558	.607	.459
Subjective Norms – Intentions	- 1.170	- 4.190	- .545	.016
Beliefs – Intentions	1.501	.612	4.862	.015

Comparison between Gender

The approach of latent mean analysis (Hong, Malik, & Lee, 2003) was used to compare the gender differences with respect to TPB variables (e.g., attitudes, beliefs, intentions and subjective norms) concerning PES use. To conduct the latent mean analysis, structural equation modeling (SEM) was performed using AMOS 24.0. Measurement invariance is the prerequisite for comparing the differences across groups with the latent mean approach (Chen, 2007; Hong et al., 2003; Kuhn & Holling, 2009). Measurement invariance reveals if the measure items and structural factors have the same meanings across groups (Kuhn & Holling, 2009). An examination of measurement invariance can reveal whether the instrumentation is a valid basis for comparison of group differences (Gregorich, 2006). Before testing the group differences in the means of latent variables, the configural invariance, metric invariance, and scalar invariance were examined to evaluate the equivalence of the groups (Hong et al., 2003; Jang, Lee, Puig, & Lee, 2012).

The first step was to execute multi-group SEM to assess configural invariance through analysis of the two groups, without constraining equality across the groups. As shown in Table 4, the results of the goodness-of-fit (χ^2 (216) = 421.210 (B-S $p < .001$); χ^2 / *df* = 1.95; PCFI = .87; CFI = .96; RMSEA = .046; 90% IC [.039 - .052]) in the configural invariance test indicate that the structural patterns are similar across groups. This implies that the configural model can be a baseline to compare with other restricted models in the invariance hierarchy. Second, metric invariance was performed by constraining the factor loadings to be equal across groups. The results of the metric invariance model (χ^2 (219) = 428.478, (B-S $p < .001$); χ^2 / *df* = 1.96; PCFI = .88; CFI = .96; RMSEA = .046; 90% IC [.039 - .052]) presented in Table 4, suggest a good model fit. The significant result of the chi-square difference test ($p = .064$) indicates that metric invariance is achieved (Byrne, 2010). Third, a scalar invariance test was performed by restricting the intercepts across groups to be invariant. In Table 4, the model fit indices of the scalar invariance model (χ^2 (235) = 475.585, (B-S $p < .001$); χ^2 / *df* = 2.02; PCFI = .94; CFI = .96; RMSEA = .048; 90% IC [.039 -.052]) were displayed. However, the chi-square difference between the metric model and the scalar model is significant ($p < .05$), the change value of CFI (ΔCFI = .006) is smaller than .01, suggesting that the scalar invariance hypothesis is supported (Cheung & Rensvold, 2002). Since the three

invariance tests were all satisfied, the latent mean analysis was possible to be conducted.

Table 4
Model fit indices for invariance tests (male/n = 175; female/n = 277).

Multi-Group models	χ^2	df	$\Delta\chi^2$	Δ *df*	B-S *p*	CFI	ΔCFI	RMSEA
Configural invariance	421.210	216	-	-	-	.963	-	.046
Metric invariance	428.478	219	4.268*	3	< .001	.962	.001	.046
Scalar invariance	475.585	235	54.375	19	< .001	.956	.006	.048

Note. χ^2 = chi-square; *df* = degrees of freedom; $\Delta\chi^2$ = chi-square difference; Δ *df* = degrees of freedom difference; B-S *p* = Bolen-Stine *p*-value; CFI = comparative fit index; Δ CFI = comparative fit index difference; RMSEA = root mean square error of approximation.
*p-value >.05.

After the invariance tests, the latent mean analysis (LMA) approach was conducted to estimate the differences regarding the TPB´s constructs of the male and female groups. For gender, the male group was regarded as the reference group while comparing the latent means with the female group. The latent mean estimates were displayed in Table 5, indicating that there exist significant differences with respect to intentions (z = -3.659, p < .001), subjective norms (z = -2.905, p = .004) and beliefs (z = -2.822, p = .005). There was no observed significant differences with respect to attitudes (z = -1.548, p = .122). The latent means of female gym users are lower than those of the male gym users by -.63, -.24 and -.33 for intention to use PES, subjective norms and beliefs, respectively.

To compute the effect size in a standardized way, it has been suggested that Cohen's *d* indices could be calculated (Hong et al., 2003). The results of difference comparison for gender are shown in Table 5, indicating that the values of effect size for intentions, subjective norms as well as beliefs are small (Cohen, 1988).

Table 5
Results of difference comparison for gender.

Construct	Differences of latent mean	*p* value	Effect Size (*d)*
Intentions	-.63	< .001	-.37
Subjective Norms	-.24	< .01	-.31
Beliefs	-.33	< .01	-.32
Attitudes	-.25	.12	-.17

Comparison between users and nonusers of PES

One-way analysis of variance (ANOVA) was performed to compare users and nonusers of PES with regard to the TPB variables (e.g., attitudes, beliefs, intentions and subjective norms), because the prerequisites to perform latent mean comparison were not verified (e.g., discrepancies in the size of groups and one group with less than 100 cases: PES users /*n* = 50; nonusers /*n* = 402) (Kline, 1991). The One-way ANOVA indicated a significant difference in the mean score of users and nonusers of PES with respect to all four constructs under analysis (beliefs (F (1; 450) = 96.943, p = .000, η^2 = .177); subjective norms (F (1; 450) = 70.138 , p = .000, η^2 = .135); attitudes (F (1; 450) = 46.236, p = .000, η^2 = .093), and intentions (F (1; 450) = 195.991, p = .000, η^2 = .303)) (See Table 6). In brief, PES users had stronger beliefs, and were more prone to the influence of significant others, had higher intentions to use PES, and had more favorable attitudes towards PES use, when compared to nonusers. According to Cohen (1988), the effects sizes presented in Table 6 indicate that the values for beliefs, subjective norms and attitudes, are small and for intention to use PES are medium.

Table 6.
Comparison of users and nonusers of PES on beliefs, subjective norms, attitudes and intention to use PES.

					Test Statistics			
Constructs	PES use	*N*	Mean	*SD*	df	*F*	*p*	Effect size (η^2)
Beliefs	No	402	1.923	.800	1	96.943	0.000*	.177
	Yes	50	**3.138**	.957				
Subjective Norms	No	402	.994	.638	1	70.138	0.000*	.135
	Yes	50	**1.862**	1.025				
Attitudes	No	402	2.429	1.267	1	46.236	0.000*	.093
	Yes	50	**3.760**	1.589				
Intentions	No	402	1.929	1.281	1	195.991	0.000*	.303
	Yes	50	**4.784**	1.887				

Note. *SD* = Standard deviation; df = degrees of freedom; *F* = Value of statistic test; η^2 = partial eta-squared.
*Statistical significant differences at a 5% significant level

Discussion

Taking in consideration that the use of PES in fitness context nowadays is a public health concern, the current study adopts an approach based on the TPB to explore the determinants of the intentions to use PES in a sample of gym/fitness center users in Portugal. In this sense, the study is partially based on previous research on doping in sport, because the research base on PES use among gym users is limited (Molero et al., 2017) and the two behaviors (doping vs PES use) have very close characteristics, although the context and motivation differs (e.g., performance enhancement in athletes vs enhancement of the individual´s bodily appearance in gym users).

The purpose was to evaluate whether the intention to use PES can be predicted by the variables considered within the TPB and the hypothesis of gender and PES use influencing TPB variables. Based on previous findings, it was expected that TPB variables would predict intentions to use PES (e.g., Chan et al., 2015; Lentillon-

Kaestner & Carstairs, 2010; Lucidi et al., 2004; Lucidi et al., 2008). The findings supported this hypothesis, as attitudes, subjective norms and beliefs significantly predicted PES use intentions, accounting for almost 72 % of variance. Although, in general, these gym users reject PES use, subjective norms were the strongest predictor of PES use intention, showing that the gym user psychosocial environment, namely the influence of significant others, seems to have a significant impact on the decision to use PES. This finding goes against the usual literature results, since this dimension frequently turns out to be the weakest predictor of intentions within the TPB (Armitage & Conner, 2001; Lucidi et al., 2004). Yet, identical results were obtained by Serpa, Faria, Marcolino, Reis, and Ramadas (2003), in their study with young athletes, stressing the crucial role played by social pressures and social norms in this behavioral domain, meaning that behaviors and opinion of significant others could help shape the individual´s intentions to use PES (Lucidi et al., 2004; Serpa et al, 2003). This result may be justified by the fact that we used a reliable multi-item scale to measure subjective norms (3 items), instead of one single item measures, which could explain the difference found and highlight that, in our study, individuals' actions are driven primarily by subjective norms. We also found a positive relationship between gym users' attitude towards PES use and their intention to use PES, although attitudes towards PES were the weakest predictor of PES use intention. However, in line with previous studies (e.g., Goulet et al, 2010; Lazuras et at., 2010; Lucidi et al, 2004), the present findings suggest that positive attitudes also play an important role in shaping PES use intentions, though subjective norms and beliefs were stronger predictors in this gym users' sample. These data, according to Jalleh, Donovan, and Jobling (2014), highlight the complexity of the attitude-behavior relationship and of predicting behavior *per se*, since there are a series of situational and environmental factors that may facilitate or inhibit PES use. In this way, our study establishes the TPB as an appropriate model for understanding determinants that may predict PES use intention in this specific population.

Furthermore, it was hypothesized that the predictive model would hold in the different groups, irrespective of how gender influences the average level of the intention to use PES (Lucidi et al., 2004). The findings from the multi-group analysis supported this hypothesis by providing evidence for the generalizability of the predictive model across gender groups, which is also one of the relevant variables in doping research. This is a powerful indicator of model validity and of its capability to coherently

represent the processes supporting behavioral decision-making. Concerning the generalizability of the predictive model across PES users and nonusers' groups, it was hypothesized that it would interact with any TPB variable predicting intention, and that the predictive ability of each predictor would be different for users and nonusers of PES (Dunn et al., 2009; Wiefferink et al., 2008). The findings partially supported this hypothesis, as beliefs and subjective norms predicted gym users to use PES, but not attitudes. A plausible explanation is that the users and nonusers of PES generally share the same behavioral beliefs which, in turn, reflect the perceived likely consequences of engaging in PES use behavior. This perception is weighed by an evaluation of the consequences concerning performance-enhancing drugs, translating into an equal attitude towards PES with regard to intentions to use PES. Nevertheless, this should not undermine the effects of behavioral beliefs influences on PES use intentions. On the other hand, findings showed that the use of PES interacts with beliefs and subjective norms in predicting intention, and that the predictive ability of each of these predictors was different for users and nonusers of PES. Among the group of PES users, beliefs predicted strongly the intentions to use PES, since they believe that the use of PES can improve their appearance or enhance their physical abilities. This is not surprising, since these kind of substances, especially anabolic-androgenic steroids provide considerable changes (e.g., enhanced appearance, strength, performance) (Bahrke, 2012). Among the group of nonusers, the significant others (e.g., friends, training colleagues, instructors) and social pressure (e.g., internet, fitness magazine and media) can influence them about PES use intention in a strong way. These findings are very important, since prevention strategies should consider this difference accordingly to reduce the future risk of PES use.

With respect to gender, the results of the LMA suggested the existence of significant differences regarding the TPB´s constructs of the male and female groups. Male and female gym users differed in intentions to use PES, subjective norms and beliefs, which is partially in accordance with the hypothesized, and in line with other studies (Backhouse et al. 2015; Ntoumanis et al., 2013; Pedersen, 2010; Serpa et al, 2003), showing that female believed less in the performance enhancing effects of substances and were also less prone to the influence of significant others and had less intentions to use PES than males. This gender effect was small but statistically significant, which means that these TPB´s constructs need to be considered differently in female versus male, in order to explore whether PES use interventions are effective

across this specific population (Ntoumanis et al., 2013). However, no gender gap in attitudes towards PES use was found, in contrast with some studies (Backhouse et al., 2015; Ntoumanis et al., 2013; Pederson, 2010) where male tend to have more favorable attitudes towards PES use than their female counterparts. It seems that although male and female gym users may have different beliefs regarding the effect of PES use in order to improve performance, and different perception of what people who are significant to them think about the consumption of PES and different intentions to PES use, both genders evaluate similarly the consequences of engaging in the target behavior (PES use). This finding may be due to a contextual specificity that separates doping in sport from PES use in fitness, concerning gender attitudes.

Finally, the results of the one-way ANOVA test confirmed the existence of a significant difference, regarding all the TPB´s variables of the PES users and nonusers' groups, as in previous research (Dunn et al., 2009; Wiefferink et al., 2008). In fact, PES users had stronger beliefs, and were more prone to the influence of significant others, had higher intentions to use PES, and had more favorable attitudes towards PES use, when compared to nonusers. This effect was small for beliefs, subjective norms and attitudes, and medium for intention to use PES, which is substantial and should be accounted in terms of prevention strategies. It also reinforces the idea that the decision to use PES is based on personal beliefs, pointing out the volitional self-determined character of this behavior (Goulet et al., 2010). As stated by Lazuras et al. (2010), the use of PES leads to the development of more favorable attitudes towards PES use, as well as to a stronger wish to approve PES use under specific circumstances (e.g., beliefs about performance improvement and perceived use by others), which means that attitudinal belief and behavioral control should be considered differently in order to reduce the future risk of PES use. For example, clarifying gym users how to resist the influence to engage in PES use under risk-promoting circumstances, and highlighting the negative consequences of these substances for health, alongside the change of positive attitudes to PES use into negative ones, may lead to decrease intentions to engage in PES use, even among gym users with a history of past/current use (Lazuras et al., 2010).

While providing insightful findings about determinants of the intentions to PES use in gym users, this study should be considered within the context of its limitations. First, because a random-stratified sampling technique was not used, we cannot assume the Portuguese gym users are represented as a whole, which may affect the

generalizability of the results. Despite this, and according to Dunn et al. (2009), self-selected samples have been used in previous research and may be a viable alternative when targeting specific populations, such as gym users. Secondly, although the tested model is theoretically anchored, this study involves a cross-sectional design which precluded the inference of causality. It would be important to use experimental and longitudinal designs to make causal inferences and to have an accurate picture of the process underlying the formation of positive intentions to use PES, since attitudes tend to be malleable along time. Thirdly, PES use was assessed by self-report, which may be subject to response bias and estimate error, due to social desirability (Gucciardi, Jalleh, & Donovan, 2010). However, some factors may have worked against such bias and encouraged more honest responses: participants received the questionnaires by mail and through a social network (Facebook), which assured that they were not watched while completing the questionnaires and these included no identification data. Therefore, the anonymity was completely assured. Finally, future research may further address those limitations and provide further insights into the psychological determinants underlying PES use in gym/fitness context. For instance, Lazuras et al. (2010), concluded that different facets of normative conduct significantly predicted intentions, which can be extended to the study of PES use among gym users, in order to perceive normative beliefs and processes not accounted by subjective norms.

The present study provides information which can contribute to building multifaceted interventions for PES use in gym/fitness context prevention. One of our major conclusions is that subjective norms are the most important predictor of PES use intention. Thus, their importance can also play a positive function (Serpa et al. 2003). In this sense, future studies should identify which specific "others" and what kind of social pressure gym users are exposed to and consider them as relevant role models in shaping the subjects' intentions concerning PES use. Taking the most important reference groups into consideration, prevention strategies may focus more efficiently on the processes of social/normative influence, and in moral and ethical standards, relying on the credibility of these sources to promote behavior change (Donovan, Egger, Kapernick, & Mendoza, 2002; Lucidi et al., 2004; Wiefferink et al., 2008). For example, according to Bahrke (2012), strategies using the gym team and the instructor´s influence may be efficient, since they can capitalize on peer ties and format to dismiss the perceived peer tolerance. Strategies reinforcing the negative impact of such substances in user´s health and the promotion of the change of positive attitudes towards

PES use into negative ones, should be also taken into account. Attention should be paid to gender, personality factors and PES users/nonusers' expectancies (e.g., positive expectancies for PES use and identification with peers who advocate health risk behavior) in what concerns preventive measures. As others have pointed out (Wiefferink et al, 2008), since the participants in this study appeared to be consistent in their PES use, interventions of this sort would probably be more effective in preventing nonusers from starting, than in convincing existing users to stop. Therefore, interventions targeting persistent users should thus also provide social support and the opportunity for harm reduction (e.g., using health tests to monitor health status; create awareness about severity of ill-health effect), taking into consideration factors such as: the belief systems underlying PES use, personal morality and psychological characteristics of individuals, motivations, the process involved in initiating behavior, and the individual's vulnerability, providing the opportunity for changes in cognitions and intentions in favor of PES use prevention (Bahrke, 2012; Donovan et al., 2002; Wiefferink et al., 2008).

References

Ajzen, I. (1991). The Theory of Planned Behavior. *Organizational Behavior and Human Decision Processes, 50*, 179–211.

Ajzen, I. (2002). Residual Effects of Past on Later Behavior. *Personality and Social Psychology Review, 6*(2), 107–122.

Ajzen, I., & Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour: Attitudes, intentions and perceived behavioural control*. Englewood Cliffs, NJ: Prentice Hall.

Anderson, J. C. J., & Gerbing, D. D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin, 103*(3), 411–423. doi.org/10.1037/0033-2909.103.3.411

Arbuckle, J. L. (2009). *Amos 18 reference guide (version 18)*. Amos 18 User's Guide. Chicago, IL: Statistical Package for the Social Science.

Armitage, C. J., & Conner, M. (2001). Efficacy of the Theory of Planned Behaviour : A meta-analytic review. *British Journal of Social Psychology, 40*, 471–499.

Backhouse S, Collins C, Defoort Y, McNamee M, Parkinson A., & Sauer, M. (2014). *Study on Doping Prevention - a map of legal, regulatory and prevention practice provisions in EU 28*. Project report. European Commission. Luxembourg. doi.org/10.2766/86776

Backhouse, S., Whitaker, L., & Mckenna, J. (2015). *Social psychology of doping in sport : a mixed-studies narrative synthesis (Vol. 1)*. Institute for Sport Physical Activity and Leisure - World Anti-doping agency. Retrieved from World Anti-doping agency website: https://www.wada-ama.org/sites/default/.../literature_review_update_-_final_2016.pdf

Bahrke, M. S. (2012). Performance-enhancing substance misuse in sport: Risk factors and considerations for success and failure in intervention programs. *Substance Use & Misuse, 47*(13/14), 1505–1516.

Baron, D. A., Martin, D. M., & Magd, S. A. (2007). Doping in sports and its spread to at-risk populations: An international review. *World Psychiatry, 6*(June), 118–123.

Barkoukis, V., Lazuras, L., Tsorbatzoudis, H., & Rodafinos, A. (2013). Motivational and social cognitive predictors of doping intentions in elite sports: An integrated approach. *Scandinavian Journal of Medicine & Science in Sports, 23*(5), 330–340.

Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness of fit in the analysis of covariance structures. *Psychological Bulletin, 88*(3), 588–606. doi.org/10.1037/0033-2909.88.3.588

Blunch, N. J. (2008). *Introduction to structural equation modelling using SPSS and AMOS*. London, England: SAGE Publications Ltd. doi.org/10.4135/9781446249345

Byrne, B. M. (2010). *Structural equation modeling with amos: Basic concepts, applications, and programming*. New York, NY: Taylor & Francis Group. doi.org/10.4324/9781410600219

Chan, D. K. C., Hardcastle, S., Dimmock, J. A., Lentillon-Kaestner, V., Donovan, R. J., Burgin, M., & Hagger, M. S. (2015). Modal salient belief and social cognitive variables of anti-doping behaviors in sport: Examining an extended model of the theory of planned behavior. *Psychology of Sport and Exercise, 16*(P2), 164–174. doi.org/10.1016/j.psychsport.2014.03.002

Chen, F. F. (2007). Sensitivity of goodness of fit indexes to lack of measurement invariance. Structural Equation Modeling: *A Multidisciplinary Journal, 14*(3), 464-504. doi.org/10.1080/10705510701301834

Cheung, G. W., & Rensvold, R. B. (2002). Evaluating goodness-of-fit indexes for testing measurement invariance. *Structural Equation Modeling, 9*(2), 233–255. doi.org/10.1207/S15328007SEM0902

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences*. Hillsdale, NJ: Lawrence Erlbaum.

Devcic, S., Bednarik, J., Maric, D., Versic, S., Sekulic, D., Kutlesa, Z., … Liposek, S. (2018). Identification of factors associated with potential doping behavior in sports: A cross-sectional analysis in high-level competitive swimmers. *International Journal of Environmental Research and Public Health, 15*(8), 1-16. doi.org/10.3390/ijerph15081720

Donovan R. J., Egger, G., Kapernick, V. & Mendoza, J. (2002). A conceptual framework for achieving performance enhancing drug compliace in sport. *Sports Medicine, 32*(4), 269-284.

Dunn, M., Mazanov, J., & Sitharthan, G. (2009). Predicting future anabolic-androgenic steroid use intentions with current substance use: Findings from an internet-based survey. *Clinical Journal of Sport Medicine, 19*(3), 222–227. doi.org/10.1097/JSM.0b013e31819d65ad

Fornell, C., & Larcker, D. (1981). Evaluating structural equation models with unobservable variables and measurement error. *Journal of Marketing Research, 18*(1), 35–50. doi.org/10.2307/3151312

Gaskin, J. (2016). Name of plugin or estimand, Gaskination´s Statistics. Retrieved from http://statwiki.kolobkreations.com

Goulet, C., Valois, P., Buist, A., & Côté, M. (2010). Predictors of the use of performance-enhancing substances by young athletes. *Clinical Journal of Sport Medicine, 20*(4), 243–248. doi.org/10.1097/JSM.0b013e3181e0b935

Gregorich, S. E. (2006). Do self-report instruments allow meaningful comparisons across diverse population groups? Testing measurement invariance using the confirmatory factor analysis framework. *Medical Care, 44*(11), S78-S94. doi.org/10.1097/01.mlr.0000245454.12228.8f

Gucciardi, D. F., Jalleh, G., & Donovan, R. J. (2010). Does social desirability influence the relationship between doping attitudes and doping susceptibility in athletes?

Psychology of Sport and Exercise, 11(6), 479–486. doi.org/10.1016/j.psychsport.2010.06.002

Hong, S., Malik, M. L., & Lee, M. K. (2003). Testing configural, metric, scalar, and latent mean invariance across genders in sociotropy and autonomy using a non-western sample. *Educational and Psychological Measurement, 63*(4), 636–654. doi.org/10.1177/0013164403251332

Hu, L. T., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*(1), 1–55. doi: 10.1080/10705519909540118

Jang, Y. J., Lee, J., Puig, A., & Lee, S. M. (2012). Factorial invariance and latent mean differences for the five factor wellness inventory with Korean and American counselors. *Measurement and Evaluation in Counseling and Development, 45*(2), 71-83. doi.org/10.1177/0748175611427915

Jalleh, G., Donovan, R. J., & Jobling, I. (2014). Predicting attitude towards performance enhancing substance use: A comprehensive test of the sport drug control model with elite australian athletes. *Journal of Science and Medicine in Sport, 17*(6), 574–579. doi.org/10.1016/j.jsams.2013.10.249

Kavussanu, M., & Ring, C. (2017). Moral identity predicts doping likelihood via moral disengagement and anticipated guilt. *Journal of Sport and Exercise Psychology, 39*(4), 293–301. doi.org/10.1123/jsep.2016-0333

Kirby, K., Guerin, S., Moran, A., & Matthews, J. (2016). Doping in elite sport. In V. Barkoukis, L. Lazuras, & T. Haralambos (Eds.), *The Psychology of Doping in Sport* (pp. 3–17). New York, NY: Routledge.

Kline, R. B. (1991). Latent variable path analysis in clinical research: a beginner´s tour guide. *Journal of Clinical Psychology, 47*(4), 471-484.

Kline, R. B. (2011). *Principles and practice of structural equation modeling*. New York, NY: Guilford Press.

Kuhn, J. T., & Holling, H. (2009). Measurement invariance of divergent thinking across gender, age, and school forms. *European Journal of Psychological Assessment, 25*(1), 1-7. doi.org/10.1027/1015- 5759.25.1.1

Lazuras, L. (2016). Social-cognitive predictors of doping use. In V. Barkoukis, L. Lazuras, & T. Haralambos (Eds.), *The Psychology of Doping in Sport* (pp. 44–61). New York, NY: Routledge.

Lazuras, L., Barkoukis, V., Rodafinos, A., & Tzorbatzoudis, H. (2010). Predictors of doping intentions in elite-level athletes: A social cognition approach. *Journal of Sport and Exercise Psychology, 32*(5), 694–710.

Lentillon-Kaestner, V., & Carstairs, C. (2010). Doping use among young elite cyclists: a qualitative psychosociological approach. *Scandinavian Journal of Medicine & Science in Sports, 20*(2), 336–345.

Lucidi, F., Grano, C., Leone, L., Lombardo, C., & Pesce, C. (2004). Determinants of the intention to use doping substances: An empirical contribution in a sample of Italian adolescents. *International Journal of Sport Psychology, 35*(2), 133–148.

Lucidi, F., Zelli, A., Mallia, L., Grano, C., Russo, P. M., & Violani, C. (2008). The social-cognitive mechanisms regulating adolescents' use of doping substances. *Journal of Sports Sciences, 26*(5), 447–456. doi.org/10.1080/02640410701579370

Marsh, H. W. (2007). Application of confirmatory factor analysis and structural equation modeling in sport and exercise psychology. In G. Tenenbaum & R. C. Eklund (Eds.), *Handbook of sport psychology* (pp. 774–798). Hoboken, NJ, US: John Wiley & Sons Inc.

Molero, Y., Bakshi, A. S., & Gripenberg, J. (2017). Illicit drug use among gym-goers: a cross-sectional study of gym-goers in Sweden. *Sports Medicine - Open, 31*(3), 1–8. doi.org/10.1186/s40798-017-0098-8

Morgan, G. A., Leech, N. L., Gloeckner, G. W., & Barrett, K. C. (2010*). SPSS: For introductory statistics: Use and interpretation* (4th ed.). Mahwah, NJ: Lawrence Erlbaum Associates.

Ntoumanis, N., Ng, J., Barkoukis, V., & Backhouse, S. (2013). *A statistical synthesis of the literature on personal and situational variables that predict doping in physical activity settings*. Project Report. World Anti-Doping Agency. Retrieved from World Anti-doping agency website: https://www.wadaama.org/sites/default/files/resources/files/2012%20funded%20-%20Ntoumanis%20-%20final%20report%20%28Statistical%20synthesis%29.pdf

Ntoumanis, N., Ng, J., Barkoukis, V., & Backhouse, S. (2014). Personal and Psychosocial Predictors of Doping Use in Physical Activity Settings: A Meta-Analysis. *Sports Medicine, 44*(11), 1603.

Pedersen, I. K. (2010). Doping and the perfect body expert: Social and cultural indicators of performance-enhancing drug use in Danish gyms. *Sport in Society, 13*(3), 503–516. doi.org/10.1080/17430431003588184

Petroczi, A., & Aidman, E. (2009). Measuring explicit attitude toward doping: Review of the psychometric properties of the performance enhancement attitude scale. *Psychology of Sport an Exercise*, 10, 390-396.

Pope, H. G. J., Wood, R. I., Rogol, A., Nyberg, F., Bowers, L., & Bhasin, S. (2014). Adverse health consequences of performance-enhancing drugs: an endocrine society scientific statement. *Endocrine Reviews, 35*(3), 341–375. doi.org/10.1210/er.2013-1058

Schumacker, E. R., & Lomax, G. R. (1996). *A beginner's guide to structural equation modeling*. Mahwah, NJ: Erlbaum.

Serpa, S., Faria, N., Marcolino, P., Reis, C., & Ramadas, S. (2003). *Dopagem e psicologia* [Doping and psychology]. Lisboa: Centro de Estudos e Formação Desportiva.

Serpa, S., Leitão, J., Reis, C., Marcolino, N., Faria, N., & Ramadas, S. (2001). Psychological aspects of doping in sports: development of the "Questionnaire of attitudes towards doping." In A. Papaioannou, M. Goudas, & Y. Heodornakis (Eds.), 10th World Congress of Sport Psychology, Skiathos, Greece, June/July 2001. Proceedings Democritus University of Thrace. University of Thessaly & Hellenic Society of Sport Psychology.

Soper, D. S. (2017). A-priori sample size calculator for structural equation models [Software]. Retrieved from http://www.danielsoper.com/statcalc

Tavares, A. S., Serpa, S., Horta, L., & Rosado, A. (2019). Psychosocial factors and performance-enhancing substances in gym users: A systematic review. *Revista de Psicologia Del Deporte/Journal of Sport Psychology, 28*(1), 131–142.

Tavares, A. S., Serpa, S., & Rosado, A. (2019). Psychometric properties of the questionnaire of attitudes towards doping in fitness (QAD-Fit). *Motriz: Journal of Physical Education*, in press.

Thualagant, N. (2012). The conceptualization of fitness doping and its limitations. *Sport in Society, 15*(3), 409–419. http://dx.doi.org/10.1080/17430437.2012.653209

Thualagant, N., & Pfister, G. (2012). The fight against fitness doping in sports clubs – Political discourses and strategies in Denmark. *Performance Enhancement & Health, 1*(2), 86–93. doi.org/http://dx.doi.org/10.1016/j.peh.2012.08.003

WADA (2015). *World Anti-Doping Code*. Montreal, Quebec: World Anti-Dopping Agency. Available from: https://www.wada-ama.org/sites/default/files/resources/files/wada-2015-world-anti-doping-code.pdf

Wiefferink, C. H., Detmar, S. B., Coumans, B., Vogels, T., & Paulussen, T. G. W. (2008). Social psychological determinants of the use of performance-enhancing drugs by gym users. *Health Education Research, 23*(1), 70–80. doi.org/10.1093/her/cym004

Zelli, A., Mallia, L., & Lucidi, F. (2010). The contribution of interpersonal appraisals to a social-cognitive analysis of adolescents' doping use. *Psychology of Sport and Exercise, 11*(4), 304–311. doi.org/10.1016/j.psychsport.2010.02.008

Capítulo VI

Discussão Geral

Discussão dos estudos

O grande objetivo desta tese prendeu-se com a investigação da prevalência e a compreensão dos fatores determinantes do consumo das substâncias ilícitas que melhoram o desempenho, no contexto dos ginásios/centros de *fitness* portugueses, tendo por base o modelo do comportamento planeado. A sua pertinência deve-se ao facto de ser um trabalho pioneiro em Portugal, na área da Psicologia do Exercício e do Desporto, no que concerne ao contexto desportivo visado. Procurou-se, assim, (1) estabelecer o estado da arte em termos nacionais e internacionais, acerca da prevalência, atitudes, crenças e conhecimentos em praticantes de *fitness* em ginásios, de acordo com a TCP, com o intuito de compilar as evidências disponíveis acerca da conceptualização dos fatores psicossociais que podem influenciar o uso de substâncias ilícitas que melhoram o desempenho nesta população específica, (2) adaptar e validar para a população portuguesa praticante de *fitness* em ginásios, um instrumento, baseado no Modelo do Comportamento Planeado (Ajzen, 1991), que pudesse avaliar as atitudes, crenças, normas subjetivas e intenções face ao consumo de substâncias que melhoram o desempenho, (3) avaliar a prevalência do consumo deste tipo de substâncias e os fatores associados a este comportamento, nomeadamente, fatores sócio demográficos, características de treino e modalidades praticadas em ginásio, bem como o tipo de substâncias mais comummente utilizadas, de acordo com a lista de substâncias proibidas da AMA, frequência de utilização, efeitos adversos associados à toma, fontes de aquisição, vias de administração, motivos para a toma, influência dos pares e pressão social, e (4) identificar os preditores das intenções de consumo de substâncias ilícitas que melhoram o desempenho nesses praticantes, e em que medida o género e a toma de substâncias influenciam os constructos considerados na TCP (atitudes, crenças, normas subjetivas e intenções para a toma de substâncias).

Neste capítulo, apresenta-se e discute-se (1) uma síntese dos principais resultados derivados dos quatro estudos desenvolvidos, (2) propõe-se um conjunto de medidas para a prática de intervenção de acordo com os dados obtidos, e (3) determinam-se as limitações inerentes à investigação, propondo linhas de investigação futura.

A Tabela 1 apresenta uma síntese de todos os estudos realizados, tendo em consideração os participantes, os objetivos, os instrumentos, e os procedimentos de análise de dados utilizados.

Tabela 1
Resumo do Método utilizado em cada um dos estudos.

Estudo	Participantes	Objetivos	Instrumentos	Análise dos Dados
1	26 Artigos originais	Revisão sistemática sobre prevalência e atitudes, crenças e conhecimentos em praticantes de *fitness* em ginásios, de acordo com a TCP.	Revisão sistemática (PRISMA) (Moher, Liberati, Tetzlaff and Altman, 2009).	Identificação; Triagem; Elegibilidade; Inclusão; Extração e avaliação da qualidade dos dados.
2	453 praticantes de *fitness* em ginásios (277 mulheres e 175 homens)	Adaptação terminológica QADS ao contexto do *fitness* – QAD-*Fit* e respetivo estudo das suas propriedades psicométricas.	Adaptação terminológica do QADS (Serpa et al., 2001) para QAD-*Fit* (Tavares, Serpa, & Rosado, 2019); DRTPBM (Lucidi, Zelli, Mallia; Grano, Russo e Violani, 2008), para efeitos de validade concorrente.	QAD-*Fit*: AEE – AFC Fidelidade-Consistência interna Validade Convergente Validade Discriminante Validade Cruzada – invariância Validade Concorrente DRTPBM: Procedimentos de tradução Fidelidade – Consistência interna Validade Convergente Validade Discriminante Validade Cruzada – invariância Validade Concorrente
3	453 praticantes de *fitness* em ginásios (277 mulheres e 175 homens)	Estudo da prevalência do consumo de substâncias ilícitas que melhoram o desempenho e fatores associados.	Questionário on-line, adaptado a partir dos questionários utilizados anteriormente em atletas amadores (Lentillon-Kaestner & Ohl, 2011) e em praticantes de fitness em ginásios (EHFA, 2011).	Estatística descritiva Regressão Linear Múltipla Testes do Qui-Quadrado Teste de Qui-Quadrado por Simulação de Monte Carlo ou teste exato de Fisher quando os pressupostos não são verificados *Odds ratios* (OR) e seus respetivos intervalos de confiança de 95%.
4	453 praticantes de *fitness* em ginásios (277 mulheres e 175 homens)	Estudo dos preditores das intenções de consumo de substâncias ilícitas que melhoram o desempenho nos praticantes de *fitness* em ginásios e em que medida o género e a toma de substâncias influenciam os constructos considerados na TCP.	QAD-Fit (Tavares, Serpa, & Rosado, 2019); Autorrelato de consumo de substâncias ilícitas que melhoram o desempenho (Barkoukis, Lazuras, Tsorbatzoudis & Rodafinos, 2013).	AEE – AFC Invariância – Análise multigrupos Comparação Médias Variáveis latentes *One -way* ANOVA

Nota. QADS = Questionário de Atitudes face ao Doping no Desporto; QAD-*Fit* = Questionário de Atitudes face ao *Doping* no *Fitness;* DRTPBM = *Doping-related Theory of Planned Behavior Measures*; AEE = Análise de equações estruturais; AFC = Análise fatorial confirmatória.

Síntese e discussão dos principais resultados dos estudos

Estudo 1 - *Psychosocial Factors and Performance Enhancing Substances in Gym Users: A Systematic Review*

O estudo 1 consistiu numa revisão sistemática narrativa da literatura, onde se procurou sintetizar e descrever a prevalência do consumo de substâncias que melhoram o desempenho em praticantes de *fitness* em ginásios, bem como compilar as evidências disponíveis para conceptualizar os fatores psicossociais que influenciam este consumo, uma vez que se verificou uma escassez de dados referente a esta população específica, quer em termos nacionais, quer em termos internacionais. Esta conceptualização teve por base a Teoria do Comportamento Planeado (TCP), dado que é um dos modelos mais amplamente utilizados para explicar as intenções e o comportamento face ao *doping* (Chan et al., 2015), providenciando definições e descrições que são explícitas de acordo com os constructos considerados (validade discriminante sobejamente testada/comprovada) (Armitage & Conner, 2000). Em suma, dos 26 artigos originais analisados provenientes de países do médio oriente, europa (no entanto, não se encontrou nenhum estudo português) e américas, verificou-se que os esteróides anabolisantes são a classe de substâncias mais comummente utilizada pelos praticantes de *fitness* em ginásios, e a prevalência da sua utilização varia entre 4,7% e 70%, constatando-se que a maioria se situa entre os 11,1% e os 58%. Os valores de prevalência encontrados são preocupantemente altos, sinalizando a existência de um problema de saúde pública, em termos globais. A maioria dos estudos analisados indicam que o consumo destas substâncias tem nas razões estéticas o principal motivo, derivadas da insatisfação com a aparência física, levando a crer que a atitude inerente a este comportamento, deve-se à necessidade de obter os resultados desejados, mesmo correndo riscos. No que concerne às normas subjetivas, verificou-se que os praticantes de *fitness* em ginásios são influenciados para a toma deste tipo de substâncias, principalmente, pelos seus amigos, instrutores e colegas de ginásio, denotando uma elevada influência dos grupos e instrutores. Apurou-se, igualmente, que os padrões de beleza/estética promovidos pela comunicação social, internet e revistas de *fitness*, influenciam e favorecem o uso destas substâncias. Relativamente ao constructo do controlo comportamental percecionado, verificou-se que a maioria dos indivíduos

considera que o acesso a este tipo de substâncias é bastante fácil e não antevêem impedimentos ou obstáculos à sua utilização, o que favorece o comportamento de consumo. De um modo geral, este estudo apontou os fatores psicossociais (atitudes, normas subjetivas e controlo comportamental percecionado), como de primordial importância no que respeita à intenção e comportamento face ao consumo de substâncias que melhoram o desempenho em praticantes de *fitness*, salientando que a TCP se constitui como um modelo adequado para a compreensão deste fenómeno.

Estudo 2 - *Psychometric properties of the Questionnaire of Attitudes towards Doping in Fitness (QAD-Fit)*

No estudo 2 foi realizada uma validação psicométrica do "Questionário de Atitudes face ao Doping no Desporto" (QADS; Serpa et al., 2001; baseado no Modelo do Comportamento Planeado (Ajzen, 1991)), terminologicamente adaptado à população-alvo deste estudo – praticantes de *fitness* em ginásios portugueses, passando a designar-se como "Questionário de Atitudes face ao Doping no *Fitness*" (QAD-*Fit*; (Tavares, Serpa, & Rosado, 2019). Este estudo teve como principal objetivo criar um instrumento fiável e válido do ponto de vista psicométrico, ancorado conceptualmente na TCP, uma vez que este modelo, de acordo com o estudo 1, demonstrou ser adequado para a compreensão do fenómeno em análise. Desta forma, o presente estudo teve como intuito, fornecer um instrumento que possa ser aplicado na medição dos fatores que influenciam a formação das atitudes face ao consumo de substâncias que melhoram o desempenho em praticantes de *fitness*, por forma a melhor compreender este comportamento nesta população específica. Inicialmente, foi feita uma adaptação terminológica do QADS, uma vez que este foi criado para efeitos de utilização em contexto desportivo. Assim, foram alterados alguns itens, por forma a melhor descrever o contexto do *fitness*. Por exemplo, a palavra atleta foi substituída por praticante (itens 1, 2, 5) e foram reescritas frases, substituindo as expressões de caráter desportivo por expressões aplicadas ao contexto do *fitness*. Após estas adaptações, o instrumento foi designado como "Questionário de Atitudes face ao Doping no *Fitness*" (QAD-*Fit*). Seguidamente, o QAD-*Fit* foi submetido a um estudo piloto com 30 participantes, por forma a garantir que o instrumento era perfeitamente claro e compreensível, o que foi confirmado imediatamente através de uma entrevista com cada um dos 30 participantes.

A opção acerca da adaptação de um instrumento já existente, prendeu-se com o facto de ser a escolha mais correta, visto que ia ao encontro dos objetivos propostos e permitia evitar a proliferação desmedida de instrumentos sobre os mesmos constructos, tornando, desta forma, as medidas mais robustas e confiáveis.

Na fase subsequente, procurou-se avaliar, para além da qualidade global do ajustamento, a fiabilidade e a validade do instrumento, através de uma análise fatorial confirmatória (AFC), tendo por base a estrutura fatorial original proposta pelos autores do instrumento (Sidónio et al., 2001). Para o efeito, e de acordo com Marôco (2014), foi utilizada uma estratégia *two step*, por forma a garantir que o modelo era devidamente validado. Os resultados obtidos demonstraram boas propriedades psicométricas do instrumento, mantendo a estrutura fatorial original do mesmo [i.e., (1) atitudes; (2) crenças; (3) intenções; (4) normas subjetivas]. No entanto, verificaram-se algumas modificações face ao instrumento original, nomeadamente ao nível dos fatores (e.g., diminuição do número de itens por fator, garantindo que no mínimo cada fator era composto por 3 itens (O'Rourke & Hatcher, 2013) e correlação entre os erros dos itens (13 e 25), resultantes de um refinamento do modelo. Após este refinamento, o instrumento demostrou uma boa fiabilidade, nomeadamente, a fiabilidade compósita (indicando que os itens são, consistentemente, manifestação dos fatores latentes correspondentes) e indicou ser válido, uma vez que apresentou validade relacionada com o constructo (i.e., validade fatorial, convergente e discriminante) e também validade concorrente, tendo-se verificado uma correlação empírica com os constructos com os quais está relacionado teoricamente (e.g., atitudes, normas subjetivas, intenções face ao doping). Para efeitos de validade concorrente, utilizou-se a escala *Doping-related Theory of Planned Behavior Measures* (DRTPBM) que aplica os constructos conceptualizados na TCP (atitudes, normas subjetivas, intenções e controlo comportamental percecionado), criado por Lucidi et al. (2008), tendo por base os objetivos e motivos apontados pelos adolescentes para o uso de substâncias dopantes, cuja finalidade é melhorar o desempenho e a aparência física. Assim sendo, e após autorização por parte dos autores desta escala, realizou-se a tradução do DRTPBM para a língua portuguesa, seguindo as linhas condutoras definidas por Beaton, Bombardier, Guillemin, Ferraz e Bosi (2000), garantindo desta forma, os critérios semânticos, idiomáticos, experimentais e conceptuais entre questionários de diferentes culturas e línguas. Seguidamente, utilizou-se uma estratégia idêntica à utilizada no QAD-*Fit*, onde se efetuou uma AFC do instrumento. Após refinamento do modelo, a estrutura fatorial

original da escala não foi mantida (foi eliminado o fator controlo comportamental percecionado, uma vez que os itens considerados não cumpriam os critérios estipulados para a AFC), mantendo-se os outros 3 fatores originais - atitudes, normas subjetivas e intenções face ao *doping*. Após este refinamento do modelo, os resultados demonstraram que, de um modo geral, os valores dos indicadores globais de ajustamento do modelo resultantes da AFC expressam a sua qualidade e adequabilidade. Relativamente à fiabilidade do instrumento, foi verificada a sua fiabilidade compósita em todos os fatores latentes, validade fatorial, validade convergente e validade discriminante.

Por fim, foi realizada uma análise multigrupos, quer no instrumento QAD-*Fit*, quer no instrumento DRTPBM, em prol das modificações ocorridas face aos instrumentos originais, resultantes de um refinamento dos modelos. Este tipo de análise tem como finalidade, avaliar se a estrutura do modelo é equivalente ou invariante, em duas amostras diferentes. Os resultados obtidos demonstraram a confirmação da estrutura fatorial em ambos os instrumentos, permitindo a sua utilização em estudos posteriores para aceder às atitudes face ao consumo de substâncias que melhoram o desempenho no contexto em causa.

Estudo 3 - *Prevalence of performance-enhancing substance use and associated factors among Portuguese gym/fitness users*

No estudo 3 procurou-se investigar a prevalência do consumo de substâncias que melhoram o desempenho numa amostra de praticantes de *fitness* em ginásios portugueses, e a relação deste comportamento com indicadores socio demográficos, perfil de prática de atividade física, tipo de modalidades praticadas em ginásio e a prática de desporto federado. Tendo por base os resultados obtidos no estudo 1 e a escassez de investigações acerca desta problemática na população portuguesa utilizadora de ginásios, foram ainda analisadas outras variáveis consideradas essenciais, nomeadamente, a influência social e dos pares na utilização deste tipo de substâncias, assim como, os motivos desencadeadores deste comportamento, fontes de aquisição, formas de administração, efeitos adversos auto-relatados e hábitos tabágicos / consumo de álcool, uma vez que está descrito que existe uma tendência para os comportamentos aditivos, em indivíduos utilizadores de substâncias que melhoram o desempenho (Allahverdipour et al., 2012; Nicos et al., 2008). Os resultados obtidos demonstraram

que 11,1% (*n* = 50) dos praticantes utilizavam substâncias que melhoram o desempenho, sendo que destes, 69,4% pertenciam ao género masculino. Um outro dado inquietante, foi o facto de 5,3% dos praticantes que não usavam este tipo de substâncias, manifestarem o seu interesse em vir a fazê-lo no futuro, o que reforça a necessidade de aplicar estratégias de prevenção contra este tipo de comportamento, nesta população específica. Apesar da prevalência encontrada ser superior à encontrada num estudo efetuado pela EHFA (2011), em praticantes de *fitness* em ginásios portugueses (4,2%), estima-se que esta prevalência possa ainda estar subestimada, uma vez que a maioria dos praticantes no nosso estudo eram do género feminino, género que tendencialmente é menos suscetível a este tipo de comportamento, quando comparado com o género masculino (Backhouse, Whitaker, & Mckenna, 2015; Ntoumanis et al., 2013; Pedersen, 2010). Por outro lado, e indo ao encontro do reportado noutros estudos, no que concerne aos padrões sociais e ao próprio contexto da prática de *fitness* que influenciam a utilização deste tipo de substâncias, verificou-se que o género, as habilitações académicas, o perfil de prática e as modalidades praticadas, influenciam, de forma significativa, a utilização de substâncias que melhoram o desempenho. De facto, comprovou-se que os indivíduos do género masculino, com menores habilitações académicas, que treinam frequentemente e que praticam musculação ou modalidades de combate, estão mais expostos/suscetíveis a este tipo de comportamento. Quanto ao tipo de substâncias mais utilizadas, verificou-se que a classe de substâncias utilizada estava associada ao género, destacando-se que os diuréticos foram as substâncias mais reportadas pelas participantes do género feminino, seguida dos esteróides anabolisantes, pelo género masculino. De reforçar que a utilização destas substâncias estava igualmente relacionada com os principais motivos para o uso, o que mais uma vez estava em concordância com o género: as mulheres tomam diuréticos com o objetivo de perder água, para emagrecer, enquanto os homens tomam esteróides, por forma a obterem um corpo mais musculado. É ainda de salientar a prática de *polypharmacy*, isto é, a toma de várias classes de substâncias que melhoram o desempenho, por forma a potenciar os efeitos pretendidos e reduzir os efeitos secundários promovidos pela toma de esteróides anabolisantes. Esta prática tem consequências a nível dos efeitos secundários desencadeados pela toma destas substâncias (Pope et al., 2014), o que foi confirmado por 30% dos indivíduos que autodeclararam a utilização de PES e referiram a ocorrência desses efeitos. Quanto à forma de administração destas substâncias, verificou-se que a grande maioria dos participantes o faz por via oral ou injetável, o que

mais uma vez coloca preocupações em termos de saúde pública, quanto à propagação de doenças transmissíveis, tais como o HIV e hepatites. No que respeita à influência social e dos pares na utilização deste tipo de substâncias, constatou-se que estes fatores parecem ser de suma importância, o que reforça o facto deste tipo de comportamento não ser meramente uma questão individual (Bergsgard, Tangen, Barland, & Breivik, 1996), mas sim uma questão que deve ser entendida em relação aos "outros significativos", o que está de acordo com o apontado noutros estudos (Al-Falasi et al., 2009; Allahverdipour et al., 2012; Haerinejad, Ostovar, Farzaneh, & Keshavarz, 2016; Tavares, Serpa, Horta, & Rosado, 2019). As fontes de aquisição deste tipo de substâncias, mencionadas pelos participantes, deixam transparecer o fácil acesso à sua obtenção, levantando preocupações adicionais sobre redes de fornecimento ilícitas e fabricantes com um controle de qualidade questionável (Mougios, 2002), bem como o papel das farmácias, no que toca à venda deste tipo de substâncias sem prescrição médica, levantando a ponta do véu, em questões de impacto da saúde pública. Quanto aos hábitos tabágicos / consumo de álcool, os indivíduos que utilizam PES não demonstraram diferenças significativas em relação aos que não utilizam PES, o que, apesar de não ser um achado comum, vai ao encontro do reportado por Ip, Barnett, Tenerowicz e Perry (2011). Este comportamento paradoxal poderá ser interpretado como sendo uma contradição, no que respeita à consciência de estilos de vida saudáveis, uma vez que a preocupação com o culto do corpo perfeito, leva à utilização de substâncias que melhoram o desempenho, mas, por outro lado, evita o consumo de outro tipo de substâncias, tais como o tabaco e o álcool, por forma a não agredir e prejudicar o organismo, ainda mais, agindo como uma espécie de compensação. Este achado reveste-se de particular importância, na medida em que devem ser exploradas e examinadas as perceções acerca de "saúde" que revestem as crenças destes indivíduos, utilizadores de substâncias que melhoram o desempenho.

Estudo 4 - *Determinants of the intention to use performance-enhancing substances among Portuguese gym users*

No estudo 4, numa primeira fase, pretendeu-se identificar os preditores das intenções de consumo de substâncias ilícitas que melhoram o desempenho nos praticantes de *fitness* em ginásios, de acordo com o modelo preconizado na TCP e, numa segunda fase, determinar as diferenças existentes entre homens e mulheres e entre

os que declararam tomar PES e os que declararam não tomar, em relação aos constructos considerados no referido modelo (atitudes, crenças, normas subjetivas e intenções para a toma de substâncias), uma vez que estas variáveis são referenciadas na literatura, como sendo suscetíveis de influenciar as intenções para a toma de substâncias ou o comportamento propriamente dito (Ajzen, 2002; Armitage & Conner, 2001; Backhouse et al., 2015; Lazuras, Barkoukis, Rodafinos, & Tzorbatzoudis, 2010; Ntoumanis et al., 2013; Pedersen, 2010; Wiefferink, Detmar, Coumans, Vogels, & Paulussen, 2008). Para responder a estas questões, foram delineadas cinco hipóteses de acordo com estudos prévios, que são, (1) as dimensões conceptualizadas na TCP, predizem de forma significativa a intenção de consumo de substâncias ilícitas que melhoram o desempenho (Chan et al., 2015; Lentillon-Kaestner & Carstairs, 2010; Lucidi, Grano, Leone, Lombardo, & Pesce, 2004; Lucidi et al., 2008), (2) o género não interage com nenhum dos fatores preditores das intenções e a capacidade preditiva de cada um deles é exatamente a mesma para homens e mulheres (Lucidi et al., 2004), (3) O uso de substâncias ilícitas que melhoram o desempenho interage com qualquer um dos fatores preditores das intenções, e a capacidade preditiva de cada um deles é diferente entre os utilizadores e não utilizadores deste tipo de substâncias (Dunn, Mazanov, & Sitharthan, 2009; Wiefferink et al., 2008), (4) os homens demonstram atitudes, crenças, normas subjetivas e intenções mais favoráveis ao uso de substâncias ilícitas que melhoram o desempenho, do que as mulheres (Backhouse et al., 2015; Ntoumanis et al., 2013; Pedersen, 2010) e, (5) os utilizadores deste tipo de substâncias, demonstram atitudes, crenças, normas subjetivas e intenções mais favoráveis ao uso de substâncias ilícitas que melhoram o desempenho, do que os não utilizadores (Dunn et al., 2009; Wiefferink et al., 2008). Relativamente à primeira fase, procedeu-se à avaliação do modelo de medida, através de uma estratégia *two step*, integrando o instrumento de avaliação das atitudes face ao doping no *fitness* (viz., QAD-*Fit*) e, subsequentemente, o estudo do modelo estrutural, aplicando a proposta do modelo explicativo entre os 4 constructos (i.e., atitudes, crenças, normas subjetivas e intenções), baseados no modelo preconizado na TCP (Ajzen, 1991). Os resultados demonstraram que as atitudes, normas subjetivas e as crenças estão fortemente relacionados e que todos eles são preditores das intenções para o uso de substâncias ilícitas que melhoram o desempenho nos praticantes de *fitness* em ginásios. Estes resultados apresentam-se em linha com os estudos anteriormente realizados (e.g., Chan et al., 2015; Lentillon-Kaestner & Carstairs, 2010; Lucidi et al., 2004; Lucidi et al., 2008), onde as intenções

para o uso de substâncias podem ser determinadas através das (a) atitudes relativamente ao comportamento de consumir essas substâncias; (b) das crenças, ou seja, as convicções do sujeito quanto ao efeito destas substâncias no sentido de melhorar o desempenho; e (c) pelas normas subjetivas, ou seja, a perceção do sujeito quanto ao que as pessoas, que são para ele significativas, pensam sobre o consumo destas substâncias. Verificou-se também que as normas subjetivas eram o maior preditor da intenção para o uso de substâncias ilícitas que melhoram o desempenho, demonstrando que o ambiente psicossocial em que se inserem os praticantes de *fitness* em ginásios, nomeadamente, as pessoas que são para eles significativos (e.g., amigos, colegas de ginásio, instrutor) influencia/determina a intenção para a toma. Este resultado é, no entanto, contraditório face à literatura, uma vez que esta dimensão tende a ser o preditor mais fraco para as intenções, no âmbito da TCP. Contudo, é de realçar que o estudo realizado por Serpa et al. (2003), obteve resultados semelhantes, salientando o papel fundamental que as normas e pressões sociais desempenham no domínio das intenções/comportamentos, pelo que poderemos estar perante uma característica dos praticantes portugueses, que interessará confirmar.

No que concerne a hipótese do género não interagir com nenhum dos fatores preditores das intenções e a capacidade preditiva de cada um deles ser exatamente a mesma para homens e mulheres, verificou-se, mediante análise multigrupos, utilizando os procedimentos propostos por Gaskin (2016), que o modelo estrutural (preditivo) era invariante entre os dois géneros, indicando, desta forma, que o modelo era válido e capaz de suportar, de forma coerente, o processo de tomada de decisões comportamentais, independentemente do género.

Relativamente à hipótese do uso de substâncias ilícitas que melhoram o desempenho interagir com qualquer um dos fatores preditores das intenções, e a capacidade preditiva de cada um deles ser diferente entre os utilizadores e não utilizadores deste tipo de substâncias, os resultados obtidos foram parcialmente ao encontro do verificado noutros estudos. Apesar das crenças e as normas subjetivas serem fatores preditores das intenções para o consumo de substâncias e terem "cargas" diferentes entre utilizadores (em que as crenças predizem fortemente as intenções para a toma) e não utilizadores (em que as normas subjetivas predizem fortemente as intenções para a toma), as atitudes não demostraram ser um preditor das intenções em ambos os grupos. Uma explicação avançada para este achado foi o facto de tanto os utilizadores deste tipo de substâncias, como os não utilizadores, partilharem a mesma componente

avaliativa de tal comportamento, o que por sua vez reflete as possíveis consequências percebidas ao aderir a este tipo de comportamento, traduzindo-se numa atitude idêntica entre os dois grupos, no que respeita à intenção de usar estas substâncias.

Para responder à segunda fase do presente estudo, aplicou-se, para o efeito, um exame de equações estruturais e utilizou-se uma análise multigrupos, onde se incluiu o estudo da invariância do constructo das atitudes face ao uso de substâncias ilícitas que melhoram o desempenho e a análise de médias das variáveis latentes face ao género. Num primeiro passo, foi testada a invariância do modelo de medida, sendo considerado um pré-requisito de qualquer estudo que vise estudar diferenças entre grupos (Marôco, 2014). Os resultados obtidos demonstraram invariância no género, revelando que o instrumento de medida (i.e., QAD-*Fit*) estava a operar da mesma forma tanto para os homens como para as mulheres. Seguidamente, foram analisadas as médias das variáveis latentes do constructo das atitudes face ao uso de substâncias ilícitas que melhoram o desempenho. Os resultados referentes às diferenças entre género revelaram que as mulheres acreditam menos no efeito da melhoria do desempenho promovido pela utilização destas substâncias, são menos influenciáveis pelas pessoas que são para elas significativas e demonstram menores intenções de vir a usar este tipo de substâncias, do que os homens. Estes resultados são, no entanto, parcialmente consistentes com investigações anteriores realizadas, uma vez que as atitudes foram idênticas entre os dois géneros. Este achado pode dever-se ao facto de apesar de mulheres e homens terem crenças diferentes no que concerne ao efeito destas substâncias na melhoria do desempenho, diferentes perceções acerca do que as pessoas, que são para elas significativas, pensam acerca deste tipo de consumo, e diferentes intenções relativamente ao uso destas substâncias, ambos os géneros avaliam de forma idêntica, as consequências derivadas da adesão a este comportamento.

No que diz respeito às diferenças face ao autorrelato da toma ou não destas substâncias por parte dos praticantes de *fitness* em ginásios, utilizou-se a *one-way* Anova, usando o teste F, para comparar as médias dos grupos, uma vez que se verificou uma grande discrepância no tamanho dos grupos em análise, assim como a existência de um grupo com menos de 100 casos (toma substâncias / n = 50; não toma substâncias / n = 402), o que comprometeria a análise das médias das variáveis latentes (Kline, 1991). Os resultados obtidos revelaram que os utilizadores deste tipo de substâncias demonstram atitudes, crenças, normas subjetivas e intenções mais favoráveis ao uso de

substâncias ilícitas que melhoram o desempenho, do que os não utilizadores, sendo corroborado pela literatura.

Os resultados essenciais dos quatro estudos realizados são apresentados na Tabela 2.

Tabela 2
Principais resultados dos estudos realizados na tese

Estudos	**Principais resultados**
Estudo 1	. Os esteróides anabolisantes são a classe de substâncias mais comummente utilizada pelos praticantes de *fitness* em ginásios; . Prevalência situa-se, na sua maioria, entre os 11,1% e os 58%; . O consumo destas substâncias tem como principal motivo razões estéticas; . Atitudes positivas face a este comportamento, devem-se à necessidade de obter os resultados desejados; . Elevada influência dos grupos e instrutores, comunicação social, internet e revistas de *fitness*; . A maioria dos indivíduos considera que o acesso a este tipo de substâncias é bastante fácil; **.** Fatores psicossociais são de primordial importância no que concerne a intenção e comportamento face ao consumo de substâncias que melhoram o desempenho; . A TCP é um modelo adequado para a compreensão deste fenómeno.
Estudo 2	. O QAD-*Fit* é composto por 4 dimensões: atitudes; crenças; intenções; e normas subjetivas. O QAD-*Fit* evidenciou boas propriedades psicométricas, sendo um instrumento útil e válido para futuras pesquisas no contexto do *fitness*.
Estudo 3	. 11,1% dos praticantes utilizam substâncias que melhoram o desempenho, sendo as mais usuais, os diuréticos (principalmente no género feminino) e os esteróides anabolisantes (principalmente no género masculino); . 5,3% dos praticantes que não usavam este tipo de substâncias, manifestaram o seu interesse em vir a fazê-lo no futuro; . Indivíduos do género masculino, com menores habilitações académicas, que treinam frequentemente e que praticam musculação ou modalidades de combate, estão mais expostos/suscetíveis a este tipo de comportamento; . A utilização destas substâncias está relacionada com os principais motivos para a toma; . Prática de *polypharmacy;* . 30% dos utilizadores autodeclararam efeitos secundários; . Administração destas substâncias, por via oral ou injetável; . Influência social e dos pares na utilização deste tipo de substâncias; . Fácil acesso à sua obtenção; . Quanto aos hábitos tabágicos / consumo de álcool, os indivíduos que utilizam PES não demonstram diferenças significativas em relação aos que não utilizam PES.

Estudo 4	. As atitudes, normas subjetivas e as crenças estão fortemente relacionados e todos eles são preditores das intenções para o uso de substâncias ilícitas que melhoram o desempenho nos praticantes de *fitness* em ginásios; . As normas subjetivas são o maior preditor da intenção para o uso de substâncias ilícitas que melhoram o desempenho; . O modelo estrutural (preditivo) é invariante entre os dois géneros, indicando desta forma, que é capaz de suportar, de forma coerente, o processo de tomada de decisões comportamentais, independentemente do género. . As crenças e as normas subjetivas são fatores preditores das intenções para o consumo de substâncias e apresentam "cargas" diferentes entre utilizadores (em que as crenças predizem fortemente as intenções para a toma) e não utilizadores (em que as normas subjetivas predizem fortemente as intenções para a toma), no entanto, as atitudes não demostraram ser um preditor das intenções em ambos os grupos; . As mulheres acreditam menos no efeito da melhoria do desempenho promovido pela utilização destas substâncias, são menos influenciáveis pelas pessoas que são para elas significativas e demonstram menores intenções de vir a usar este tipo de substâncias do que os homens. No entanto, não se verificaram diferenças entre os dois géneros no que respeita as atitudes. . Os utilizadores deste tipo de substâncias, demonstram atitudes, crenças, normas subjetivas e intenções mais favoráveis ao uso de substâncias ilícitas que melhoram o desempenho, do que os não utilizadores.

Discussão e implicações para a prática de intervenção

Este conjunto de estudos teve como objetivo maior, fornecer informações acerca da prevalência e fatores determinantes do consumo das substâncias ilícitas que melhoram o desempenho no contexto dos ginásios/centros de *fitness* portugueses, podendo ser uma contribuição para o delineamento de estratégias de intervenção, em prol da redução deste tipo de comportamento.

A literatura existente é clara acerca das várias razões/motivos que levam os indivíduos a praticarem atividade física (Markland, & Ingledew, 2007). Para além do enfoque nos benefícios para a saúde, são igualmente apontadas razões tais como a obtenção de um corpo mais magro ou musculado. Tais desideratos são perfeitamente compatíveis com um programa de treino bem delineado e rigoroso, a par de uma dieta equilibrada. No entanto, vários estudos nesta área apontam que um em cada oito praticantes de *fitness* está interessado em utilizar substâncias ilícitas que melhoram o desempenho, precisamente por motivos de caráter estético (EHFA, 2011).

Estes dados foram confirmados através dos estudos realizados nesta tese, indicando que o problema existe efetivamente, visto que 11,1% (n = 50) dos

participantes praticantes de *fitness* em ginásios portugueses, declararam o uso deste tipo de substâncias. Esta situação deve ser encarada como um fenómeno problemático e atual, com potencial para aumentar, até porque de acordo com os dados encontrados num desses estudos, 5,3% dos participantes que não utilizavam este tipo de substâncias, manifestaram o seu interesse em vir a fazê-lo num futuro próximo, colocando questões sensíveis no que concerne a saúde pública e prevenção, no contexto social/desportivo em que os indivíduos se inserem. Neste sentido, fica patente a necessidade e importância de identificar os fatores determinantes do consumo das substâncias ilícitas que melhoram o desempenho nesta população específica, por forma a permitir conciliar uma abordagem integrada entre a perspetiva educativa e preventiva, apelando à informação e consciencialização, em prol da contenção deste flagelo, com implicações para os próprios e para a sociedade.

Em Portugal, as estratégias antidopagem foram ajustadas por forma a cumprir os princípios definidos no Código Mundial Antidopagem (publicação da Lei n.º 38/2012, de 28 de agosto), estando, sobretudo, vocacionadas para o desporto federado e sendo reguladas pela Autoridade Antidopagem de Portugal (ADoP). Em termos do desporto recreativo/amador, mais concretamente, no que concerne a prática de atividade física em ginásios/centros de *fitness*, o Decreto-Lei n.º 271/2009, artigo 16, restringe a comercialização deste tipo de substâncias e o artigo 23 do mesmo diploma define, ainda, contraordenações para eventuais incumprimentos. De acordo com Horta (2017), a criminalização do tráfico de substâncias dopantes levou a uma colaboração estreita entre a ADoP e diversas entidades públicas, nomeadamente a ASAE, a Polícia Judiciária, a Autoridade Tributária e Aduaneira e o INFARMED. Contudo, estas estratégias assentam no paradigma da proibição, em que o *modus operandi* baseia-se na deteção versus punição, revelando-se ineficaz (Backhouse, Patterson, & McKenna, 2012). A estratégia preventiva da ADoP tem sido transversal, apostando na formação dos técnicos que exercem funções nos ginásios (mediante a participação da ADoP nos cursos de pós-graduação dirigidos à direção técnica de ginásios e centros de fitness, organizados pela Manz Formação, em cooperação com a Universidade Lusófona de Humanidades e Tecnologias em Lisboa e no Porto) e dos inspetores da ASAE; promoção de sistemas de certificação da qualidade para os ginásios; campanhas de sensibilização (através da conceção e distribuição de um cartaz sobre os malefícios dos esteróides anabolisantes) e educação nutricional aos utentes de ginásios; proibição da venda de suplementos nutricionais nos ginásios e ações inspetivas preventivas pela ASAE e sua divulgação

(ADoP, 2013; Horta, 2012). No entanto, no que concerne abordagens de informação e educação, ancoradas em modelos teóricos, que permitam compreender as relações entre os fatores psicossociais que influenciam o consumo de substâncias ilícitas que melhoram o desempenho, dirigidas quer aos praticantes de *fitness* em ginásios, quer aos profissionais do exercício e gestores dos respetivos ginásios, pouco se tem feito no contexto do *fitness*.

Neste sentido, o QAD-*Fit* poderá ser aplicado como uma ferramenta de diagnóstico e prevenção das atitudes face ao *doping* (entenda-se consumo de substâncias ilícitas que melhoram o desempenho), em contexto *fitness*. A sua aplicação permite auxiliar a identificação dos fatores associados à intenção de usar este tipo de substâncias, facilitando, desta forma, a conceção de programas de intervenção baseadas na educação, adequados a esta população específica.

O estudo levado a cabo nesta tese, acerca dos fatores determinantes da utilização destas substâncias, mediante a aplicação do QAD-*Fit*, demonstrou que as normas subjetivas, crenças e atitudes são fatores preditores das intenções para o uso de PES nos praticantes de *fitness* em ginásios portugueses, indo ao encontro do preconizado no modelo da TCP (Ajzen, 1991). É ainda de salientar que, na população em estudo, as normas subjetivas foram o principal fator da predição das intenções face a este comportamento, salientando a importância fundamental que esta dimensão tem, aquando do desenho de estratégias de prevenção.

Apesar de muito pouco ter sido feito no contexto do *fitness*, no que respeita estratégias de prevenção do uso de substâncias (Barkoukis, 2016), os modelos teóricos podem guiar a implementação de técnicas de intervenção, nomeadamente, campanhas de promoção sobre como melhorar o desempenho e o aspeto físico, sem recorrer a substâncias ilícitas. Desta forma, teorias orientadoras da modificação de comportamentos para adoção de comportamentos de saúde (e.g., Teoria da Ação Racional (Ajzen & Fishbein, 1980); Teoria do Comportamento Planeado (Ajzen, 1985); e o Modelo de Crença na Saúde (Becker, 1977), baseiam-se num conjunto de fatores sociocognitivos para explicar os comportamentos de saúde, permitindo um planeamento e seleção de estratégias significativas para a prevenção do uso de substâncias dopantes. Neste sentido, evidências empíricas demostraram que a utilização de mensagens e informações positivas acerca de uma nutrição saudável, em vez da utilização de substâncias, aumenta o conhecimento acerca de uma dieta saudável e predispõe a atitudes mais positivas face a esta opção (James, Naughton, & Petróczi, 2010). No

mesmo sentido, uma outra estratégia promissora, assenta na focalização dos fatores psicossociais para o risco de usar substâncias, nomeadamente, as variáveis ambientais e intra/interpessoais que aumentam o risco de desenvolver este comportamento (e.g., o padrão estereotipado de corpos musculados, enquanto ideal atrativo, pode promover a utilização deste tipo de substâncias por parte dos praticantes de *fitness*, por forma a melhorar a sua aparência física).

Assim sendo, e tendo em consideração os dados obtidos nos estudos elaborados nesta tese, de acordo com o conceptualizado na TCP, para além das crenças e das atitudes, devem ser tidas particularmente em consideração as normas subjetivas, tais como o indivíduo as perceciona num determinado grupo social, bem como a apetência e necessidade do indivíduo se conformar ou não a estas normas. Em determinados grupos de pares (e.g., amigos, colegas de ginásio, instrutores), a pressão sentida por cada indivíduo pode ser de tal maneira forte, que pode levar à antecipação das escolhas, reduzindo as decisões ao estatuto de quase-rotinas. É ainda de salientar que as normas de um grupo de referência (grupo ao qual um indivíduo não pertence, mas aspira vir a pertencer), também podem ser muito influentes na determinação das atitudes e comportamentos (Lima, 1999). Verificou-se igualmente, que a influência da comunicação social, internet e revistas de musculação, enquanto fontes de "pressão", desencadeiam efeitos promotores e reforçadores nas atitudes e intenções face ao uso de substâncias, na medida em que exercem uma atração significativa sobre os indivíduos, divulgando imagens que identificam a toma deste tipo de substâncias, como sendo algo desejável, para atingir um determinado objetivo.

Por outro lado, quando se avaliam as normas subjetivas em relação à predisposição da intenção para o comportamento ou o comportamento propriamente dito, também é necessário ter em consideração, aspetos relacionados com as escolhas individuais e a motivação (Lima, 1999). Um facto muito interessante apontado em relação a outros comportamentos de risco (e.g., uso de tabaco), e que pode ser aplicado ao uso de substâncias que melhoram o desempenho em praticantes de *fitness*, é que todos estes processos também funcionam no sentido contrário, ou seja, se o grupo se pautar por um comportamento contrário à utilização de substâncias que melhoram o desempenho (e.g., prática de uma alimentação saudável e equilibrada e a manutenção de um programa de treino físico adequado), este também exerce um grande poder junto do indivíduo, relativamente a este permanecer um não utilizador de PES (Lima, 1999). Outra vertente a ter em consideração, aquando do delineamento de estratégias de

prevenção, são os traços e características de personalidade que podem influenciar o comportamento para a toma de substâncias, tais como: baixa autoestima, ter maior tendência para ter problemas comportamentais ou emocionais, complexo de super-homem e perfeccionismo.

Em resumo e tendo em consideração estas informações, as estratégias baseadas na educação devem pautar-se pelos seguintes aspetos (Barkoukis, 2016):

- Garantir a qualidade e rigor do conteúdo das mensagens que se pretende "passar", bem como a forma como a mesma é transmitida, reforçando informações acerca das consequências negativas do uso destas substâncias na saúde e o facto de estas surgirem, muitas vezes, vários anos após o início da sua utilização;

- Utilização de tecnologias emergentes de informação e comunicação, enquanto veículo disseminador dos conteúdos educacionais, uma vez que 79% dos agregados familiares em Portugal têm ligação à internet (INE, 2018) e utilizam aplicações *on-line* no seu dia-a-dia, destacando-se também o papel que as redes sociais (e.g., *Facebook, Instagram, Twitter*) representam atualmente, no que concerne à disseminação de informação, por vezes com um grande poder viral, apelando ao lado emocional do leitor, fazendo com que este consuma o material informativo, de forma fácil, apostando na utilização de montagens em vídeos e imagens esclarecedoras;

- Envolvimento de todos os interlocutores neste processo, nomeadamente, os instrutores/formadores que trabalham na "linha da frente" nos ginásios e centros de *fitness* e que devem ser alvo de formação, por forma a possuírem conhecimentos destas matérias, a fim de educar os praticantes acerca do impacto negativo da toma de substâncias (e.g., graves malefícios orgânicos que advêm dessa utilização) e sensibilizá-los de forma eficaz sobre as alternativas saudáveis, para que os praticantes obtenham os resultados pretendidos, sem recurso a substâncias ilícitas (Horta, 2017);

- Envolvimento do próprio praticante no desenvolvimento dos programas estratégicos de prevenção, por forma a desenvolver ferramentas e recursos personalizados, promovendo o empenhamento ativo de grupos-alvo, aumentando desta forma a probabilidade de sucesso da intervenção.

Especial atenção deve ser dada quando se verificam diferenças nos fatores determinantes da utilização destas substâncias, mediadas pelo género, ou pelo próprio comportamento da toma ou não destas substâncias, assim como a influência das características sociodemográficas dos praticantes, perfil de prática e modalidades praticadas em contexto *fitness*, visto que, nestes casos, as estratégias terão de ser

adaptadas aos grupos-alvo, de acordo com a influência desses fatores na predição da intenção de consumo.

Por fim, importa salientar que qualquer estratégia baseada em campanhas educacionais, deve ser alvo de avaliação recorrente, por forma a averiguar a eficácia da mesma, permitindo a sua reestruturação quando necessária, em prol da obtenção de resultados concretos na redução do comportamento ou intenção de usar substâncias ilícitas que melhoram o desempenho.

Limitações e sugestões para futuras investigações

A última secção da discussão geral é reservada às limitações inerentes aos estudos presentes na tese, complementando as recomendações já apresentadas nos diferentes artigos, propondo orientações para futuras investigações. Primeiro, a amostra foi selecionada com base na conveniência e acessibilidade dos contactos junto dos ginásios e centros de *fitness*, para aceder aos praticantes, bem como a criação de um evento no *Facebook*, como forma de recrutar participantes que cumprissem os critérios de inclusão propostos. Esta opção teve por base o facto de ser uma população de difícil acesso, devido às condicionantes de tempo e logística e da impossibilidade de obtenção de listagens de toda a população de ginásios existentes em Portugal. Por outro lado, o número de variáveis em estudo implicava a obtenção de um número relativamente elevado de participantes para cada amostra, condição fundamental para se poderem viabilizar as análises estruturais dos modelos (Kline, 2011). Esta estratégia amostral tem consequências resultantes para a inferência estatística, ou seja, os resultados obtidos não podem ser generalizados para a população portuguesa praticante de *fitness* em ginásios, o que futuramente deverá ser ultrapassado, mediante a tentativa de utilização de amostras representativas e estratificadas dos ginásios e centros de *fitness*, no contexto nacional. No entanto, deve-se salientar que, de acordo com Dunn et al. (2009), as amostras de conveniência têm sido frequentemente utilizadas em estudos anteriores e demonstraram ser uma alternativa viável, quando se pretende alcançar populações específicas, tais como os praticantes de *fitness* em ginásios.

Segundo, os estudos reportados nesta tese, foram desenvolvidos com uma amostra obtida num único momento (desenho transversal), o que impede a investigação sobre a sequência causal dos efeitos de regressão preconizados pelas relações entre as variáveis do modelo teórico. Deste modo, deverão ser realizados estudos com desenhos

longitudinais por forma a melhor compreender a sequência temporal dos fatores de risco e respetivos resultados, ou seja, se as variáveis consideradas preditoras, realmente predizem a intenção e comportamento de utilizar substâncias ilícitas que melhoram o desempenho, ao longo do tempo. Deve-se salientar ainda que os desenhos longitudinais têm várias vantagens para além do apontado, nomeadamente, permitir examinar os efeitos cruzados, relações recíprocas, trajetórias de mudança ou crescimento, o que se reveste de especial interesse no contexto da investigação em *doping* (Barkoukis et al., 2016). Investigações futuras nesta área, deverão ponderar igualmente sobre a utilização de desenhos experimentais, permitindo desta forma, obter conclusões acerca da causalidade e identificar as variáveis que têm efetivamente impacto direto sobre as intenções e o comportamento para a toma de substâncias, no contexto do *fitness*.

Terceiro, nos estudos realizados foram adotadas metodologias de cariz quantitativo, com implementação de instrumentos de autorrelato, sendo sobejamente conhecidas as diversas limitações e críticas apontadas a este tipo de instrumentos, na medida que predispõem a viés nas respostas, principalmente no que diz respeito às questões de desejabilidade social (Gucciardi, Jalleh, & Donovan, 2010). No entanto, as estratégias utilizadas (e.g., os participantes receberam o inquérito via e-mail ou através do *Facebook*, o que assegurou que não eram observados por terceiros enquanto preenchiam os questionários e o anonimato foi totalmente assegurado, não havendo forma de identificar os indivíduos participantes) intentaram minimizar os efeitos apontados. Estudos futuros deverão apostar em métodos mistos (i.e., quantitativos e qualitativos), por forma a ultrapassar as diferenças (limitações) epistemológicas e metodológicas entre os dois paradigmas, levando à obtenção de sinergias positivas entre ambos, promovendo o pluralismo e compreensão de forma mais lata, do fenómeno em estudo (Petróczi, 2013).

Quarto, embora o modelo teórico utilizado nos estudos assente na TCP - que está sobejamente estudado na área do *doping,* bem como no consumo de tabaco, álcool e outras substâncias e que permitiu um bom enquadramento, no que concerne à identificação dos fatores sociocognitivos que explicam as intenções para o uso de substâncias ilícitas que melhoram o desempenho na população em estudo - seria uma mais-valia seguir perspetivas mais ecológicas em estudos futuros, focando noutro tipo de variáveis, nomeadamente, valores morais, motivações e características de personalidade e ambientais, uma vez que uma abordagem integrativa pode beneficiar a compreensão, de forma mais abrangente, deste fenómeno, apoiando de forma mais

eficaz o delineamento de estratégias de intervenção junto desta população específica (Barkoukis et al., 2016).

Por último, um outro aspeto muito importante a ter em consideração em estudos futuros, de acordo com Barkoukis et al. (2016), é o estudo dos fatores protetores para a utilização de substâncias dopantes, uma vez que pode complementar a pesquisa atual sobre os fatores de risco para o uso deste tipo de substâncias. Os mesmos autores salientam ainda que o estudo dos fatores protetores não envolve apenas a correlação com as intenções de abstinência para o uso deste tipo de substâncias, mas também pode abranger um processo de proteção mais genérico que se pode aplicar tanto aos utilizadores como aos não utilizadores de substâncias ilícitas que melhoram o desempenho.

Capítulo VII

Conclusões Gerais

Conclusões

O objetivo desta tese visou a investigação da prevalência e compreensão dos fatores determinantes do consumo das substâncias ilícitas que melhoram o desempenho no contexto dos ginásios/centros de *fitness* portugueses, tendo por base o modelo do comportamento planeado, uma vez que se verificou que os estudos acerca desta temática e neste contexto são praticamente inexistentes em Portugal. Para o efeito, foram desenvolvidos quatro estudos independentes que visaram a compreensão deste fenómeno.

Neste sentido, constatou-se que o consumo de substâncias ilícitas que melhoram o desempenho por parte dos praticantes de *fitness* em ginásios portugueses é uma realidade com implicações em termos sociais e de saúde pública, uma vez que atinge uma percentagem considerável de praticantes, salientando-se o facto de 30% destes autodeclararem efeitos secundários em termos de saúde, como consequência do comportamento adotado. É de salientar que a substância mais utilizada pelos praticantes, ao contrário do reportado na maioria dos estudos, são os diuréticos, seguido dos esteróides anabolisantes, sobressaindo que a problemática do consumo não se esgota no consumo dos esteróides anabolisantes. Ficou ainda patente que o consumo deste tipo de substâncias está associado ao género e relacionado com os motivos enunciados para a toma (quase sempre de ordem estética), verificando-se que as mulheres tomam mais diuréticos em prol de obter corpos mais magros e os homens tomam esteróides, com o objetivo de obter corpos mais musculados. No que respeita ao perfil típico dos consumidores deste tipo de substâncias, os nossos dados apontam para indivíduos do género masculino, com menores habilitações académicas, que treinam frequentemente e que praticam musculação ou modalidades de combate, indo ao encontro do reportado na literatura. Os dados apontam ainda para a problemática da aquisição destes produtos, alertando para o fácil acesso e difícil controlo da sua venda, mediante o uso da internet, o que coloca, mais uma vez, problemas do ponto de vista da saúde pública, na era da globalização. Quando se procurou investigar acerca das influências dos outros significativos para a toma destas substâncias, verificou-se que os pares (e.g., amigos, colegas de ginásio, instrutores) e os meios de comunicação social (e.g., internet, revistas de *fitness* e media) exerciam um papel fundamental na tomada de decisão.

Por forma a investigar os fatores determinantes do consumo destas substâncias (e.g., atitudes, crenças, normas subjetivas e intenções) na população em estudo, procedeu-se à adaptação e validação psicométrica do QAD-*Fit*, cujo modelo conceptual assenta na TCP, e cujos resultados permitiram confirmar a sua validade e utilidade de aplicação no contexto do *fitness*. Da aplicação deste instrumento, foi possível verificar que as atitudes, normas subjetivas e as crenças estão fortemente relacionados, e todos estes fatores são preditores das intenções para o uso de substâncias ilícitas que melhoram o desempenho nos praticantes de *fitness* em ginásios. De todas as dimensões consideradas, as normas subjetivas demonstraram ser o maior preditor da intenção para o uso de substâncias ilícitas que melhoram o desempenho, indo ao encontro do que já se tinha verificado, no que respeita a influências dos outros significativos na toma destas substâncias. É ainda de referir que o modelo estrutural (preditivo) mostrou ser invariante entre os dois géneros, indicando, assim, que é capaz de suportar, de forma coerente, o processo de tomada de decisões comportamentais, independentemente do género do praticante. Quando analisado em relação ao grupo que declarou tomar substâncias, em comparação ao grupo de participantes que não tomavam substâncias, apurou-se que as crenças e as normas subjetivas eram fatores preditores das intenções para o consumo de substâncias e apresentavam "cargas" diferentes entre utilizadores (em que as crenças prediziam fortemente as intenções para a toma) e não utilizadores (em que as normas subjetivas prediziam fortemente as intenções para a toma). Contudo, as atitudes não demostraram ser um preditor das intenções em ambos os grupos.

Quando se analisou o género e a toma ou não de substâncias em relação aos determinantes para o comportamento, verificou-se que existiam diferenças significativas face ao género, no que concerne às normas subjetivas, crenças e intenções, destacando-se o facto de as mulheres acreditarem menos no efeito da melhoria do desempenho promovido pela utilização destas substâncias, serem menos influenciáveis pelas pessoas que são para elas significativas e demonstrarem menores intenções de vir a usar este tipo de substâncias, do que os homens. No entanto, não se detetaram diferenças entre os dois géneros no que respeita as atitudes. Finalmente, verificou-se que os utilizadores deste tipo de substâncias, demonstraram atitudes, crenças, normas subjetivas e intenções mais favoráveis ao uso de substâncias ilícitas que melhoram o desempenho, do que os não utilizadores, confirmando a influência destes determinantes no comportamento.

Em suma, esta investigação, que cremos ser pioneira em Portugal, pretendeu dar uma contribuição no domínio da psicologia do exercício e do desporto e do ponto de

vista da saúde pública, uma vez que procurou caracterizar a prevalência do uso de substâncias que melhoram o desempenho em praticantes de *fitness* em ginásios, de acordo com algumas das substâncias mais relevantes, incluídas na lista de substâncias proibidas da AMA. Por outro lado, permitiu também estabelecer a ligação dos constructos estudados no domínio do contexto do *fitness*, através do desenvolvimento e aprofundamento do conhecimento teórico e conceptual acerca das atitudes que levam ao consumo destas substâncias, nesta população específica. Os dados obtidos poderão alicerçar o desenvolvimento de estratégias de prevenção deste tipo de comportamento, no contexto do *fitness,* em prol da saúde do praticante.

Referências bibliográficas finais

ADOP [Autoridade Antidopagem de Portugal] (2013). Informação e Educação Antidopagem. Retrieved from http://www.adop.pt/informacao-educacao/informacao-antidopagem.aspx.

Ajzen. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50, 179–211.

Ajzen, & Fishbein. (1980). Understanding attitudes and predicting social behavior. Prentice-Hall, Englewood Cliffs.

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), Action control: From cognition to behavior. Berlin, Heidelber, New York: Springer-Verlag. (pp. 11-39).

Ajzen, I. (2002). Residual effects of past on later behavior. *Personality and Social Psychology Review*, 6(2), 107–122.

Ajzen, I., & Fishbein, M. (2000). Attitudes and the attitude-behavior relation: reasoned and automatic processes. *European Review of Social Psychology*, 11(1), 1–33. doi.org/10.1080/14792779943000116

Al-Falasi, O., Al-Dahmani, K., Al-Eisaei, K., Al-Ameri, S., Al-Maskari, F., Nagelkerke, N., & Schneider, J. (2009). Knowledge, attitude and practice of anabolic steroids use among gym users in Al-Ain district, United Arab Emirates. *The Open Sports Medicine Journal*, 2(1), 75–81. doi.org/10.2174/1874387000802010075

Allahverdipour, H., Jalilian, F., & Shaghaghi, A. (2012). Vulnerability and the intention to anabolic steroids use among iranian gym users: an application of the theory of planned behavior. *Substance Use and Misuse*, 47(3), 309–317. doi.org/10.3109/10826084.2011.633296

Armitage, C. J., Conner, M., Loach, J., & Willetts D. (1999). Different perceptions of control: Applying an extended theory of planned behavior to legal and iilegal drug use. *Basic and Applied Social Psychology, 21*(4), 301–316.

Armitage, C. J., & Conner, M. (2000). Social cognition models and health behaviour: A structured review. *Psychology & Health*, 15(2), 173–189. doi.org/10.1080/08870440008400299

Armitage, C. J., & Conner, M. (2001). Efficacy of the theory of planned behaviour : A meta-analytic review. *British Journal of Social Psychology*, 40, 471–499.

Backhouse, S., Collins, S., Defoort, C., McNamee, M., Parkinson, A., & Sauer, M. (2014). Study on Doping Prevention - a map of legal, regulatory and prevention

practice provisions in EU 28. Project report. European Commission. Luxembourg. doi.org/10.2766/86776

Backhouse, S. H., Patterson, L., & McKenna, J. (2012). Achieving the olympic ideal: Preventing doping in sport. *Performance Enhancement and Health*, 1(2), 83–85. doi.org/10.1016/j.peh.2012.08.001

Backhouse, S. H., Whitaker, L., Patterson, L., Erickson, K., & McKenna, J. (2016). Social psychology of doping in sport: a mixed-studies narrative synthesis. Leeds.

Backhouse, S., Kenna, J., Robinson, S., & Atkin, A. (2007). International literature review: Attitudes , behaviours , knowledge and education – drugs in sport : Past , present and future. Carnegie Research Institute Leeds Metropolitan - World Anti-doping agency.

Backhouse, S., Whitaker, L., & Mckenna, J. (2015). Social psychology of doping in sport : a mixed-studies narrative synthesis (Vol. 1).

Barkoukis, V. (2016). Moving away from penalization. In L. Barkoukis, Vassilis; Lazuras (Ed.), The psychology of doping in sport (pp. 215–229). London and New York: Routledge.

Barkoukis, V., Lazuras, L., Tsorbatzoudis, H., & Rodafinos, A. (2013). Motivational and social cognitive predictors of doping intentions in elite sports: An integrated approach. *Scandinavian Journal of Medicine & Science in Sports, 23*(5), 330–340.

Barkoukis, V., Lazuras, L., & Tsorbatzoudis, H. (2016). The Psychology of Doping in Sport. New York: Routledge.

Baron, D. A., Martin, D. M., & Magd, S. A. (2007). Doping in sports and its spread to at-risk populations: An international review. *World Psychiatry*, 6(June), 118–123.

Beaton, D. E., Bombardier, C., Guillemin, F., Ferraz, & Bosi, M. (2000). Guidelines for the process of cross cultural adaptation of self report measures. *Spine*, 25(24), 3186–3191.

Becker, M. (1977). Selected psychosocial models and correlates of individual health-related behaviors. *Medical Care*, 15(5), 1537–1948.

Bergsgard, N. A., Tangen, J. O., Barland, B., & Breivik, G. (1996). Doping in Norwegian gyms - a big problem? *International Review for the Sociology of Sport*, 31(4), 351–364. doi.org/10.1177/101269029603100401

Chan, D. K. C., Hardcastle, S., Dimmock, J. A., Lentillon-Kaestner, V., Donovan, R. J., Burgin, M., & Hagger, M. S. (2015). Modal salient belief and social cognitive variables of anti-doping behaviors in sport: Examining an extended model of the

theory of planned behavior. *Psychology of Sport and Exercise*, 16(P2), 164–174. doi.org/10.1016/j.psychsport.2014.03.002

Dunn, M., Mazanov, J., & Sitharthan, G. (2009). Predicting future anabolic-androgenic steroid use intentions with current substance use: Findings from an internet-based survey. *Clinical Journal of Sport Medicine*, 19(3), 222–227. doi.org/10.1097/JSM.0b013e31819d65ad

EHFA [The European Health and Fitness Association]. (2011). Fitness against doping: Interim report. Brussels: EHFA.

EHFA [The European Health and Fitness Association]. (2012). Executive summary of the final report for the Copenhagen Fitness Anti-Doping Conference. Bruxelles.

Gaskin, J. (2016). Name of plugin or estimand, Gaskination´s Statistics. Retrieved from http://statwiki.kolobkreations.com

Gatch, C. L., & Kendzierski, D. (1990). Predicting exercise intentions: the theory of planned behavior. *Research Quarterly for Exercise & Sport*, 61(1), 100–102.

Goulet, C., Valois, P., Buist, A., & Côté, M. (2010). Predictors of the use of performance-enhancing substances by young athletes. *Clinical Journal of Sport Medicine*, 20(4), 243–248. doi.org/10.1097/JSM.0b013e3181e0b935

Gucciardi, D. F., Jalleh, G., & Donovan, R. J. (2010). Does social desirability influence the relationship between doping attitudes and doping susceptibility in athletes? *Psychology of Sport and Exercise*, 11(6), 479–486. doi.org/10.1016/j.psychsport.2010.06.002

Hagger, M. S., Lonsdale, A. J., Hein, V., Koka, A., Lintunen, T., Pasi, H., … Chatzisarantis, N. (2012). Predicting alcohol consumption and binge drinking in company employees: An application of planned behaviour and self-determinantion theories. *British Journal of Health Psychology, 17*, 379-407.

Haerinejad, M. J., Ostovar, A., Farzaneh, M. R., & Keshavarz, M. (2016). The prevalence and characteristics of performance-enhancing drug use among bodybuilding athletes in the south of Iran, Bushehr. *Asian Journal of Sports Medicine*, 7(3). doi.org/10.5812/asjsm.35018

Hauw, D., Roten, F. C. Von, Mohamed, S., & Philippe, R. A. (2016). Psychometric properties of the French-language version of the Performance Enhancement Attitude Scale (PEAS). *Revue Europeenne de Psychologie Appliquee*, *66*(1), 15–21. doi.org/10.1016/j.erap.2015.09.003

Horta, L. (2012). *Luta contra a dopagem – o fenómeno da dopagem nos ginásios*. Pós-graduação em direção técnica de ginásios e health clubs. Manz formação, UHLT/ Faculdade de Educação Fisíca e Desporto. Lisboa.

Horta, L. (2017). Doping e treino da força: dois caminhos, uma opção. In P. Correia; P. Mil Homens; Mendonça G. (Ed.), *Treino da Força – volume 2, avaliação, planeamento e aplicações* (pp. 233–244). Lisboa: Edições FMH.

INE [Instituto Nacional Estatística](2018). Sociedade da informação e do conhecimento - inquérito à utilização de tecnologias da informação e da comunicação nas famílias. INE. doi.org/10.1016/j.jneumeth.2007.03.025

Ip, E. J., Barnett, M. J., Tenerowicz, M. J., & Perry, P. J. (2011). The anabolic 500 survey: characteristics of male users versus nonusers of anabolic-androgenic steroids for strength training. *Pharmacotherapy, 31*(8), 757–766. doi.org/10.1592/phco.31.8.757

James, R., Naughton, D. P., & Petróczi, A. (2010). Promoting functional foods as acceptable alternatives to doping: Potential for information-based social marketing approach. *Journal of the International Society of Sports Nutrition, 7*(1), 1–11. doi.org/10.1186/1550-2783-7-37

Kavussanu, M., & Ring, C. (2017). Moral identity predicts doping likelihood via moral disengagement and anticipated guilt. *Journal of Sport and Exercise Psychology, 39*(4), 293–301. doi.org/10.1123/jsep.2016-0333

Kirby, K., Guerin, S., Moran, A., & Matthews, J. (2016). Doping in elite sport. In V. Barkoukis, L. Lazuras, & T. Haralambos (Eds.), The Psychology of Doping in Sport (pp. 3–17). London and New York: Routledge.

Kline, R. B. (1991). Latent variable path analysis in clinical research: a beginner´s tour guide. *Journal of Clinical Psychology, 47*(4), 471-484.

Kline, R. B. (2011). Principles and practice of structural equation modeling. New York: Guilford Press.

Korkia, P. I., & Stimson, C. V. (1997). lndications of prevalence, practice and effects of anabolic steroid use in Great Britain. *Practice, 18*, 557–562.

Lazuras, L. (2016). Social-cognitive predictors of doping use. In V. Barkoukis, L. Lazuras, & T. Haralambos (Eds.), The Psychology of Doping in Sport (pp. 44–61). New York: Routledge.

Lazuras, L., Barkoukis, V., Rodafinos, A., & Tzorbatzoudis, H. (2010). Predictors of doping intentions in elite-level athletes: A social cognition approach. *Journal of Sport and Exercise Psychology, 32*(5), 694–710.

Lentillon-Kaestner, V., & Carstairs, C. (2010). Doping use among young elite cyclists: a qualitative psychosociological approach. *Scandinavian Journal of Medicine & Science in Sports, 20*(2), 336–345.

Lentillon-Kaestner, V., & Ohl, F. (2011). Can we measure accurately the prevalence of doping? *Scandinavian Journal of Medicine and Science in Sports, 21*(6), e132–e142. doi.org/10.1111/j.1600-0838.2010.01199.x

Lima, L. (1999). A prevenção do tabagismo na adolescência. In L. Sardinha, M. Matos, & I. Loureiro (Eds.). Promoção da saúde: Modelos e práticas de intervenção no âmbito da atividade física, nutrição e tabagismo (pp. 123-161). Lisboa: Edições FMH.

Lucidi, F., Grano, C., Leone, L., Lombardo, C., & Pesce, C. (2004). Determinants of the intention to use doping substances: An empirical contribution in a sample of Italian adolescents. *International Journal of Sport Psychology, 35*(2), 133–148.

Lucidi, F., Zelli, A., Mallia, L., Grano, C., Russo, P. M., & Violani, C. (2008). The social-cognitive mechanisms regulating adolescents' use of doping substances. *Journal of Sports Sciences, 26*(5), 447–456. doi.org/10.1080/02640410701579370

Marôco, J. (2014). Análise de equações estruturais:Fundamentos teóricos, software e aplicações (2a Ed.). Pêro Pinheiro, Portugal: Report Number.

Markland, D., & Ingledew, D. K. (2007). Exercise participation motives: A self-determination theory perspective. In M. S. Hagger & N. L. D. Chatzisarantis (Eds.), Intrinsic motivation and self-determination in exercise and sport (pp. 23-34, 302-305). Champaign, IL, US: Human Kinetics.

Mitić, P., & Radovanović, D. (2011). The motives for doping drug use in nonprofessional athletes and methods of prevention. *Education, 9*(2), 203–212.

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Medicine, 6*(7), e1000097. doi.org/10.1371/journal.pmed.1000097

Montaño, D, Kasprzyk, D. (2008). Theory of reasoned action, theory of planned behavior, and the integrated behavioral model. In K., Glanz, B., Rimer, & K., Viswanath (Eds.), Health behavior and health education: Theory, research, and practice (pp. 67-96). San Francisco: Jossey-Bass.

Mougios, V. (2002). Doping abuse in recreational sports. In C. Peters, T. Schulz, & H. Michna (Eds.), Biomedical Side Effects of Doping (pp.101-104). Köln.

Morente-Sánchez, J., & Zabala, M. (2013). Doping in sport: a review of elite athletes' attitudes, beliefs, and knowledge. *Sports Medicine, 43*(6), 395–411. doi.org/10.1007/s40279-013-0037-x

Moriano, G. (2010). Theory of planned behavior and smoking: meta-analysis and SEM model. Substance *Abuse and Rehabilitation, I*, 23-33. Doi:10.2147/SAR.S15168

Nicos, K., Constantinos, P., Stavros, P., Michael, P., & Christina, L. (2008). The use of anabolic steroids and other prohibited substances by gym enthusiasts in Cyprus. *International Review for the Sociology of Sport, 43*(3), 271–287. Retrieved from http://ejournals.ebsco.com/direct.asp?ArticleID=4A39B8DCBDFDAE288707

Ntoumanis, Ng, J., Barkoukis, V., & Backhouse, S. (2013). A statistical synthesis of the literature on personal and situational variables that predict doping in physical activity settings.

O'Rourke, & Hatcher, L. (2013). A step-by-step approach to using sas® for factor analysis and structural equation modeling (2nd Ed.). North Carolina: SAS Institute Inc., Cary. doi.org/10.1111/insr.12111_2

Pedersen, I. K. (2010). Doping and the perfect body expert: social and cultural indicators of performance-enhancing drug use in Danish gyms. *Sport in Society, 13*(3), 503–516.doi.org/10.1080/17430431003588184

Peters, C., Schulz, T., & Michna, H. (2002). Biomedical side effects of doping. Köln.

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*(33), 1–15. doi.org/10.1186/1747-597X-2-Received

Petróczi, A. (2013). The doping mindset — Part I : Implications of the functional use theory on mental representations of doping. *Performance Enhancement & Health, 2*(4), 153–163. doi.org/10.1016/j.peh.2014.06.001

Petróczi, A., & Aidman, E. (2009). Measuring explicit attitude toward doping : Review of the psychometric properties of the Performance Enhancement Attitude Scale. *Psychology of Sport & Exercise, 10*(3), 390–396. doi.org/10.1016/j.psychsport.2008.11.001

Pope, H. G. J., Wood, R. I., Rogol, A., Nyberg, F., Bowers, L., & Bhasin, S. (2014). Adverse health consequences of performance-enhancing drugs: an endocrine

society scientific statement. *Endocrine Reviews, 35*(3), 341–375. doi.org/10.1210/er.2013-1058

Proenca, I. (2011). " O Peso da Forma"- Uma reflexão sobre o culto do músculo: Saúde ou doença? Universidade do Porto. Retrieved from http://repositorio-aberto.up.pt/handle/10216/66109

Serpa, Leitão, J., Marcolino, P., Faria, N., Ramadas, S., & Reis, C. (2001). Psychological aspects of doping in sports: development of the "questionnaire of attitudes towards doping." In M. G. & Y. H. A. Papaioannou (Ed.), 10th World Congress of Sport Psychology, Skiathos, Greece, June/July 2001. University of Thessaly & Hellenic Society of Sport Psychology.

Serpa, S., Faria, N., Marcolino, P., Reis, C., & Ramadas, S. (2003). Dopagem e psicologia. Lisboa: Centro de Estudos e Formação Desportiva.

SICAD. (2015). Plano nacional para a redução dos comportamentos aditivos e das dependências 2013-2020 - Sumário executivo. Lisboa.

Tavares, A. S., Serpa, S., Horta, L., & Rosado, A. (2019). Psychosocial factors and performance enhancing substances in gym users: a systematic review. *Revista de Psicologia Del Deporte / Journal of Sport Psychology, 28*(1), 131–142.

Tavares, A. S., Serpa, S., & Rosado, A. (in press). Psychometric properties of the questionnaire of attitudes towards doping in fitness (QAD-Fit). *Motriz: Journal of Physical Education*, 2019.

Thualagant, N., & Pfister, G. (2012). The fight against fitness doping in sports clubs – political discourses and strategies in Denmark. *Performance Enhancement & Health, 1*(2), 86–93. doi.org/http://dx.doi.org/10.1016/j.peh.2012.08.003

WADA. (2015). World Anti-Doping Code 2015. Montreal, Quebec. Retrieved from https://www.wada-ama.org/en/resources/the-code/world-anti-doping-code

Wiefferink, C. H., Detmar, S. B., Coumans, B., Vogels, T., & Paulussen, T. G. W. (2008). Social psychological determinants of the use of performance-enhancing drugs by gym users. *Health Education Research, 23*(1), 70–80. doi.org/10.1093/her/cym004

Anexos

Anexo 1 – Autorização do Coautor dos artigos

De: Professor Doutor António Fernando Boleto Rosado

Professor Catedrático na Faculdade de Motricidade Humana da Universidade de Lisboa

Para: Faculdade de Motricidade Humana da Universidade de Lisboa

Autorização

Eu, António Fernando Boleto Rosado, Professor Catedrático na Faculdade de Motricidade Humana da Universidade de Lisboa, declaro que autorizo a doutoranda Ana Sofia Rodrigues Tavares, da Faculdade de Motricidade Humana da Universidade de Lisboa, a incluir na sua tese de doutoramento todos os estudos que foram realizados neste âmbito e dos quais sou coautor.

Cruz Quebrada, 30 de abril de 2019

António Rosado

De: Professora Doutora Elisabete Carolino

Professora Adjunta na Escola Superior de Tecnologia da Saúde de Lisboa do Instituto Politécnico de Lisboa

Para: Faculdade de Motricidade Humana da Universidade de Lisboa

Autorização

Eu, Elisabete Teresa da Mata Almeida Carolino, Professora Adjunta na Escola Superior de Tecnologia da Saúde de Lisboa do Instituto Politécnico de Lisboa, declaro que autorizo a doutoranda Ana Sofia Rodrigues Tavares, da Faculdade de Motricidade Humana da Universidade de Lisboa, a incluir na sua tese de doutoramento um dos estudos que foi realizado neste âmbito e do qual sou coautora.

Lisboa, 30 de abril de 2019

Elisabete Carolino

De: Prof. Doutor Luís Horta

Assistente Hospitalar de Medicina Física e de Reabilitação do Centro Hospitalar Universitário Lisboa Central, EPE

Para: Faculdade de Motricidade Humana da Universidade de Lisboa

Autorização

Eu, Luís Horta, Assistente Hospitalar de Medicina Física e de Reabilitação do Centro Hospitalar Universitário Lisboa Central, EPE, declaro que autorizo a doutoranda Ana Sofia Rodrigues Tavares, da Faculdade de Motricidade Humana da Universidade de Lisboa, a incluir na sua tese de doutoramento todos os estudos que foram realizados neste âmbito e dos quais sou coautor.

Lisboa, 30 de abril de 2019

Luís Horta

De: Professor Doutor Sidónio Olivério da Costa Serpa

Professor Catedrático na Faculdade de Motricidade Humana da Universidade de Lisboa

Para: Faculdade de Motricidade Humana da Universidade de Lisboa

Autorização

Eu, Sidónio Olivério da Costa Serpa, Professor Catedrático na Faculdade de Motricidade Humana da Universidade de Lisboa (aposentado), declaro que autorizo a doutoranda Ana Sofia Rodrigues Tavares, da Faculdade de Motricidade Humana da Universidade de Lisboa, a incluir na sua tese de doutoramento todos os estudos que foram realizados neste âmbito e dos quais sou co-autor.

Cruz Quebrada, 30 de Abril de 2019

Sidónio Serpa

Anexo 2 – Aprovação do Projeto no Conselho de Ética

FACULDADE DE MOTRICIDADE HUMANA

Conselho de Ética

Para:

Drª Ana Sofia Tavares
Faculdade de Motricidade Humana

Data: 23 de outubro de 2017

Projeto: "Prevalência e Fatores Determinantes do consumo das Substâncias que Melhoram o Desempenho em Praticantes de Fitness em Ginásios"

Estado CEFMH: Positivo
Parecer CEFMH N.º 38/2017

Este Conselho analisou o projeto em epígrafe. Confirma-se que o mesmo está em conformidade com as diretrizes nacionais e internacionais para a investigação científica que envolve seres humanos, incluindo a Declaração de Helsínquia sobre os Princípios Éticos para a Investigação Médica em Seres Humanos (2013) e a Convenção sobre os Direitos do Homem e a Biomedicina ("Convenção de Oviedo", 1997). As recomendações não envolvem alto risco e são deixadas ao critério do investigador.

O Vice-Presidente do Conselho de Ética da FMH

Paulo A. S. Armada da Silva

Conselho de Ética da Faculdade de Motricidade Humana, Universidade de Lisboa
Faculdade de Motricidade Humana
Estrada da Costa, 1495-688 Cruz Quebrada - Portugal
etica@fmh.ulisboa.pt

Anexo 3 – Consentimento Esclarecido, Livre e Informado

Termo de consentimento livre e informado

Título da pesquisa: "Prevalência e Fatores Determinantes do consumo das Substâncias que Melhoram o Desempenho em Praticantes de Fitness em Ginásios"

Investigadora: Ana Sofia Tavares

Informação Geral:
É convidado/a a participar nesta pesquisa, no âmbito de um Projeto de Doutoramento em Motricidade Humana, a decorrer na Faculdade de Motricidade Humana, da Universidade de Lisboa (FMH/UL), na especialidade de Psicologia do Exercício e do Desporto.

É importante que leia a informação seguinte, antes de concordar em participar nesta pesquisa. Este texto descreve, de forma sucinta, a pesquisa, os seus objetivos gerais e o que se espera da sua participação, incluindo a identificação dos procedimentos de recolha de dados, riscos previstos, os seus direitos e confidencialidade dos dados.

Porque é convidado a participar nesta pesquisa?
Este estudo pretende investigar a prevalência e as determinantes psicossociais da utilização de substâncias que melhoram o desempenho em pessoas que pratiquem qualquer modalidade de fitness em ginásios, independentemente do género e com idade superior ou igual a dezasseis anos, com a capacidade de comunicar na forma escrita, na língua Portuguesa.

Abandono da pesquisa sem qualquer penalização
A sua participação é voluntária e pode recusar-se a participar. Caso decida participar neste estudo, poderá desistir a qualquer momento, sem qualquer tipo de consequência. A recusa ou desistência não afetará a sua relação com a Faculdade de Motricidade Humana (FMH) nem com o ginásio onde foi recrutado.

Explicação do procedimento
Caso aceite fazer parte deste estudo, deverá clicar na caixa de resposta que diz "PRETENDO participar nesta investigação", por forma a respeitar os padrões éticos da pesquisa online e dar seu consentimento.

Procedimentos de recolha de dados
A recolha de dados será feita mediante o preenchimento de um questionário online, cuja duração estimada de preenchimento é cerca de 15 minutos.

Quais os possíveis benefícios da sua participação?
Ao fazer parte deste estudo, irá dar um contributo importante para o conhecimento das determinantes psicossociais da utilização de substâncias que melhoram o desempenho, fora do desporto de competição, participando no avanço do conhecimento nesta área.

Quais os possíveis riscos da sua participação?
Poderá sentir-se inibido em responder a algumas questões devido à sensibilidade do tipo de questões colocadas.

Confidencialidade dos dados e anonimato
Todos os dados recolhidos serão confidenciais e a sua participação anónima. Para isso, os participantes serão identificados apenas com um número, que serve para o investigador ter registo da sequência pela qual o questionário foi aplicado. É impossível identificar o IP do computador ou aparelho aquando o preenchimento do questionário.

O que acontecerá aos dados quando a investigação terminar?
O resultado da investigação será apresentado numa tese de doutoramento na Faculdade de Motricidade Humana, podendo, se desejar, contactar a sua autora para se inteirar dos resultados obtidos.

Como irão os resultados do estudo ser divulgados e com que finalidades?
Os resultados serão divulgados em revistas científicas da área de especialidade, cuja finalidade é aumentar o conhecimento na área.

Em caso de dúvidas quem devo contactar?
Para esclarecimentos adicionais ou questões relacionadas com esta pesquisa poderão contactar a investigadora por e-mail - substanciasmelhoramdesempenho@gmail.com

Depois de ler as explicações acima referidas, declaro que: Nota: Se és menor de 18 anos, fala primeiro com os teus pais sobre este questionário e responde amanhã.

☐ PRETENDO participar nesta investigação
☐ NÃO PRETENDO participar nesta investigação

Anexo 4 – Questionário Aplicado *on-line*

Questionário sobre o consumo de substâncias que melhoram o desempenho no Fitness

Nota: Neste questionário, consideram-se "substâncias que melhoram o desempenho" as substâncias tomadas em doses não farmacológicas (Ex.: esteróides anabolizantes, anfetaminas, diuréticos, Hormona do crescimento, etc), especificamente para fins de melhoria da aparência física e aumento do desempenho na prática da atividade física, excluíndo os suplementos nutricionais.

Obrigada pela sua participação e confiança!

1. Idade: _____

2. Sexo:
- ☐ Masculino
- ☐ Feminino

3. Nível de escolaridade:
- ☐ Sem escolaridade
- ☐ Até ao 4º ano
- ☐ Até ao 9º ano
- ☐ Até ao 12º ano
- ☐ Técnico-Profissional
- ☐ Frequência de Curso Superior
- ☐ Bacharelato/Licenciatura
- ☐ Mestrado/Doutoramento

4. Estado civil:
- ☐ Solteiro/a
- ☐ Casado/a ou em união de facto
- ☐ Divorciado/a
- ☐ Viúvo/a

5. Ocupação:
- ☐ Trabalhador/a
- ☐ Estudante
- ☐ Desempregado/a
- ☐ Reformado/a
- ☐ Outra situação

Especifique: _____

6. Em que concelho se situa o seu ginásio? _____

7. Há quanto tempo pratica atividade física (fitness) com regularidade?
- ☐ Menos de 6 meses
- ☐ 6-11 meses
- ☐ 1-3 anos
- ☐ 4-6 anos
- ☐ Mais de 6 anos

8. Em média, quantas vezes pratica por semana?
- ☐ 1 vez
- ☐ 2-3 vezes
- ☐ 4-6 vezes
- ☐ 7 vezes
- ☐ Mais de 7 vezes

9. Em média, quanto tempo demora a sua prática no ginásio?
- ☐ Menos de 1 hora
- ☐ 1-2 horas
- ☐ Mais de 2 horas

---

10. De seguida são apresentadas várias afirmações relacionadas com as razões que as pessoas normalmente apresentam para fazerem exercício físico. Por favor, leia cuidadosamente cada uma das afirmações e assinale TODAS, no número apropriado:
Se considerar que uma afirmação não é, de maneira nenhuma, verdadeira para si, deverá assinalar "0".
Se entender que a afirmação é completamente verdadeira para si, assinale "5".
Se entender que uma afirmação é parcialmente verdadeira para si, assinale "1", "2", "3" ou "4", de acordo com a intensidade com que essa mesma afirmação reflete a razão que o/a leva a praticar exercício físico.

	Nada verdadeiro para mim (0)	1	2	3	4	Completamente verdadeiro para mim (5)
Para ter um corpo saudável	☐	☐	☐	☐	☐	☐
Para prevenir problemas de saúde	☐	☐	☐	☐	☐	☐
Porque gosto de competir	☐	☐	☐	☐	☐	☐
Porque me proporciona situações desafiantes	☐	☐	☐	☐	☐	☐
Para me ajudar a controlar o peso	☐	☐	☐	☐	☐	☐
Para recarregar energias	☐	☐	☐	☐	☐	☐
Para melhorar a minha aparência	☐	☐	☐	☐	☐	☐
Para ser reconhecido pelas minhas prestações/realizações	☐	☐	☐	☐	☐	☐
Para me tornar mais forte	☐	☐	☐	☐	☐	☐
Por gostar da experiência de praticar exercício físico	☐	☐	☐	☐	☐	☐
Para me ajudar a recuperar de uma doença/lesão	☐	☐	☐	☐	☐	☐
Para me manter/tornar flexível	☐	☐	☐	☐	☐	☐

Para libertar a tensão	☐	☐	☐	☐	☐	☐
Para fazer novos amigos	☐	☐	☐	☐	☐	☐

11. Que modalidade(s) pratica no ginásio? (selecione todas as que se apliquem)

- ☐ Musculação
- ☐ Cardiofitness
- ☐ Localizada
- ☐ Power Jump
- ☐ TRX
- ☐ Muay Thai
- ☐ Zumba
- ☐ Yoga
- ☐ Treino Funcional
- ☐ RPM / Spinning / Indoor Cycling
- ☐ Pilates
- ☐ Alongamentos
- ☐ Aeróbica
- ☐ Condicionamento Total
- ☐ CrossFit
- ☐ GAP
- ☐ Stretching
- ☐ Body Combat
- ☐ Body Pump
- ☐ Krav Maga
- ☐ Judo
- ☐ Karaté
- ☐ Natação
- ☐ Outra(s)

Indique qual(ais): _____

12. Pratica algum desporto federado, para além da atividade física em ginásio?

- ☐ Não
- ☐ Sim

Qual? _____

13. Já alguém ou algo o levou a recorrer a substâncias que melhoram o desempenho, na sua atividade física?

- ☐ Não
- ☐ Sim

Especifique (Seleccione todas as opções que se apliquem):

- ☐ Instrutor
- ☐ Amigo
- ☐ Colega do ginásio
- ☐ Familiar /Parente
- ☐ Médico de família
- ☐ Internet
- ☐ Comunicação social
- ☐ Revistas de fitness
- ☐ Outros

Especifique: _____

14. Como parte da sua prática, já tomou substâncias que melhoram o desempenho?

- ☐ Não
- ☐ Sim. Indique, por favor, quais das substâncias descritas abaixo já utilizou na prática da sua atividade física.

	Nunca	1-2 vezes por semana	3-4 vezes por semana	Mais de 5 vezes por semana
Estimulantes (Excitam, melhoram os reflexos / capacidade de concentração e aumentam a agressividade. Ex.: Anfetaminas, efedrinas, cocaína)	☐	☐	☐	☐
Betabloqueantes (Relaxam e evitam os tremores das mãos. Ex.: Acebutolol, atenolol, bisoprolol)	☐	☐	☐	☐
Corticosteróides (Usados como anti-inflamatórios ou analgésicos, mas também por darem um certo efeito de euforia. Ex.: Dexametasona, prednisolona, triamcinolona)	☐	☐	☐	☐
Diuréticos (Aumentam a produção e excreção de urina, reduzem o peso. Ex.: Espironolactona, furosemida, tiazidas)	☐	☐	☐	☐
Eritropoietina (EPO) (aumenta produção de glóbulos vermelhos e transporte oxigénio aos músculos)	☐	☐	☐	☐
Hormona do crescimento (Aumenta a massa muscular sem aumentar a massa gorda. Ex.: Somatropin)	☐	☐	☐	☐

	Nunca	1-2 vezes por semana	3-4 vezes por semana	Mais de 5 vezes por semana
Insulinas (Para não diabéticos, acelera a queima de açúcares, a produção de energia e tem efeito anabolizante, resultando em ganho de desempenho)	☐	☐	☐	☐
Beta-2-Agonistas (Provocam broncodilatação e têm efeitos estimulantes e anabolizantes para o aumento dos músculos. Ex.: Medicamentos contra a asma, tais como o Salbutamol)	☐	☐	☐	☐
Esteróides anabolizantes (Têm efeito anabolizante. Tornam os músculos mais volumosos e dão mais força. Ex.: Testosterona, nandrolona, estanozolol)	☐	☐	☐	☐
Substâncias que reduzem efeitos Colaterais (Ex.: Tamoxifeno, clomifeno)	☐	☐	☐	☐
Narcóticos (Mascaram a sensação de dor. Ex.: Heroína, metadona, morfina)	☐	☐	☐	☐
Canabinóides (Relaxam e melhoram o estado de prontidão. Ex.: Canábis, haxixe e marijuana)	☐	☐	☐	☐
Gonadotrofina Coriónica (HCG) (Estimula a produção de testosterona pelos testículos. Aumenta o volume e a potência muscular)	☐	☐	☐	☐
Outra(s)	☐	☐	☐	☐

Indique qual(ais): _____

15. Como é que fez para as adquirir ? (Pode escolher mais que uma opção):

- ☐ Via Internet
- ☐ Farmácia
- ☐ Parafarmácia
- ☐ No meu ginásio
- ☐ Através de amigos
- ☐ Outros

Especifique: _____

16. Qual o motivo que o levou a utilizar essas substâncias? (Pode escolher mais que uma opção)

- ☐ Para perder peso;
- ☐ Para melhorar a condição física;
- ☐ Para aumentar o crescimento muscular e forma do corpo;
- ☐ Para alcançar um objetivo específico (como ser capaz de participar numa competição);
- ☐ Para recuperar mais rapidamente de uma lesão;
- ☐ Para aumentar o período de prática de atividade física (tais como aumentando a força, eliminar a dor, etc)
- ☐ Outros

Especifique: _____

17. De que forma é/são administrada(s)? (Pode escolher mais que uma opção)

- ☐ Oral
- ☐ Intramuscular
- ☐ Subcutânea
- ☐ Endovenosa (na veia)
- ☐ Via dérmica (gel, adesivos)

18. Durante a utilização das referidas substâncias, observou ou observa atualmente algum/alguns efeito(s) colateral(ais)?

- ☐ Não
- ☐ Sim

Qual(is)?

- ☐ Pressão arterial alta
- ☐ Náuseas e vómitos
- ☐ Acne (aparecimento de "espinhas")
- ☐ Depressão
- ☐ Dependência física e/ou psíquica
- ☐ Aumento / diminuição da libido
- ☐ Agressividade / alteração no humor
- ☐ Agitação / tremores
- ☐ Retenção de líquidos
- ☐ Insónia e excitação
- ☐ Ginecomastia (aparecimento de seios no homem)
- ☐ Diminuição do tamanho dos seios (nas mulheres)
- ☐ Engrossamento da voz (nas mulheres)
- ☐ Queda do cabelo
- ☐ Alterações do ciclo menstrual
- ☐ Atrofia testicular
- ☐ Impotência sexual
- ☐ Esterilidade
- ☐ Alterações do perfil lipídico (colesterol HDL baixo, colesterol LDL alto)
- ☐ Aumento dos níveis de glicose (açúcar) no sangue
- ☐ Problemas no fígado
- ☐ Problemas na próstata
- ☐ Problemas gástricos (no estômago)
- ☐ Problemas nos tendões
- ☐ Doenças cardiovasculares (Ex. AVC, enfarto do miocárdio, flebotromboses)
- ☐ Infeções respiratórias mais frequentes
- ☐ Tumores malignos (cancros)
- ☐ Prognatismo (queixo muito proeminente)
- ☐ Acromegalia (doença endocrinológica que provoca o desenvolvimento exagerado das mãos e dos pés)

Acha que era capaz de tomar essas substâncias?

- ☐ Não
- ☐ Sim

Quais: _____

19. Atualmente fuma cigarros?

- ☐ Não
- ☐ Sim

Em média, quantos cigarros por dia? _____

20. Atualmente ingere bebidas alcoólicas?

- ☐ Não
- ☐ Sim

21. Em baixo estão afirmações que se referem ao consumo de substâncias que melhoram o desempenho no fitness. Por favor, leia cada afirmação com atenção e assinale o seu nível de concordância com cada uma delas, segundo a escala abaixo mencionada.
Consideram-se "substâncias que melhoram o desempenho" as substâncias tomadas especificamente para fins de melhoraria da aparência física e aumento do desempenho na prática da atividade física, excluindo os suplementos nutricionais.

	Discordo totalmente (-3)	Discordo (-2)	Discordo em parte (-1)	Sem opinião (0)	Concordo em parte (+1)	Concordo (+2)	Concordo totalmente (+3)
21.1. A toma de substâncias que melhoram o desempenho, melhora a aparência física dos praticantes.	☐	☐	☐	☐	☐	☐	☐
21.2. O praticante que toma substâncias que melhoram o desempenho deveria ser expulso do ginásio.	☐	☐	☐	☐	☐	☐	☐
21.3. Tomaria substâncias que melhoram o desempenho para conseguir concretizar os meus objetivos de prática da atividade física.	☐	☐	☐	☐	☐	☐	☐
21.4. As pessoas mais importantes para mim nunca me apoiariam na utilização de substâncias que melhoram o desempenho.	☐	☐	☐	☐	☐	☐	☐
21.5. Quando o praticante se classifica em competições, devido à ingestão de substâncias que melhoram o desempenho, deveria ser desclassificado.	☐	☐	☐	☐	☐	☐	☐
21.6. Para ser capaz de realizar a prática da atividade física lesionado, eu tomaria substâncias que melhoram o desempenho.	☐	☐	☐	☐	☐	☐	☐
21.7. Nem todas as substâncias que melhoram o desempenho são prejudiciais para a saúde.	☐	☐	☐	☐	☐	☐	☐

	Discordo totalmente (-3)	Discordo (-2)	Discordo em parte (-1)	Sem opinião (0)	Concordo em parte (+1)	Concordo (+2)	Concordo totalmente (+3)
21.8. Voltaria a tomar substâncias que melhoram o desempenho se isso já me tivesse levado a atingir um objetivo.	☐	☐	☐	☐	☐	☐	☐
21.9. A decisão dos colegas de ginásio em tomar substâncias que melhoram o desempenho deve ser respeitada por todos.	☐	☐	☐	☐	☐	☐	☐
21.10. Tomaria substâncias que melhoram o desempenho para experimentar o efeito.	☐	☐	☐	☐	☐	☐	☐
21.11. Os meus colegas de ginásio não iriam aprovar que eu usasse substâncias que melhoram o desempenho.	☐	☐	☐	☐	☐	☐	☐
21.12. Se os meus colegas de ginásio tomassem substâncias que melhoram o desempenho, eu também tomaria.	☐	☐	☐	☐	☐	☐	☐
21.13. Deveria ser punida a venda de substâncias que melhoram o desempenho.	☐	☐	☐	☐	☐	☐	☐
21.14. Se estivesse muito cansado(a), tomaria substâncias que melhoram o desempenho para conseguir realizar a prática da atividade física.	☐	☐	☐	☐	☐	☐	☐
21.15. Se o meu instrutor me aconselhasse, eu tomaria substâncias que melhoram o desempenho.	☐	☐	☐	☐	☐	☐	☐
21.16. Para obter a aparência física que desejo, eu tomaria substâncias que melhoram o desempenho.	☐	☐	☐	☐	☐	☐	☐

	Discordo totalmente (-3)	Discordo (-2)	Discordo em parte (-1)	Sem opinião (0)	Concordo em parte (+1)	Concordo (+2)	Concordo totalmente (+3)
21.17. As substâncias que melhoram o desempenho ajudam a melhorar as capacidades físicas.	☐	☐	☐	☐	☐	☐	☐
21.18. Para aumentar as minhas capacidades físicas, eu tomaria substâncias que melhoram o desempenho.	☐	☐	☐	☐	☐	☐	☐
21.19. Um praticante nunca deveria consumir substâncias que melhoram o desempenho mesmo que o seu uso estivesse legalizado e fosse fácil de obter.	☐	☐	☐	☐	☐	☐	☐
21.20. Para ter um físico mais perfeito, eu tomaria substâncias que melhoram o desempenho.	☐	☐	☐	☐	☐	☐	☐
21.21. O consumo de substâncias que melhoram o desempenho, ajuda a desenvolver a autoconfiança.	☐	☐	☐	☐	☐	☐	☐
21.22. Eu tomaria substâncias que melhoram o desempenho, se a maioria das pessoas que conheço aprovassem.	☐	☐	☐	☐	☐	☐	☐
21.23. Se os meus familiares me vissem extremamente cansado/a, achariam que eu deveria tomar substâncias que melhoram o desempenho para me ajudar a recuperar mais facilmente.	☐	☐	☐	☐	☐	☐	☐
21.24. Para conseguir atingir um objectivo que desejo muito, eu tomaria substâncias que melhoram o desempenho.	☐	☐	☐	☐	☐	☐	☐
21.25. Os instrutores que dão substâncias que melhoram o desempenho aos seus praticantes deveriam ser punidos.	☐	☐	☐	☐	☐	☐	☐
21.26. Para conseguir um bom resultado numa prova, eu tomaria substâncias que melhoram o desempenho.	☐	☐	☐	☐	☐	☐	☐

	Discordo totalmente (-3)	Discordo (-2)	Discordo em parte (-1)	Sem opinião (0)	Concordo em parte (+1)	Concordo (+2)	Concordo totalmente (+3)
21.27. Os meus amigos acham que eu deveria tomar substâncias proibidas, se estas me ajudarem a melhorar o desempenho na prática de atividade física.	☐	☐	☐	☐	☐	☐	☐
21.28. O consumo de substâncias que melhoram o desempenho ajuda o bem-estar dos praticantes.	☐	☐	☐	☐	☐	☐	☐
21.29. Para conseguir evoluir na minha forma física, eu tomaria substâncias que melhoram o desempenho.	☐	☐	☐	☐	☐	☐	☐
21.30. O consumo substâncias que melhoram o desempenho é uma forma de batota.	☐	☐	☐	☐	☐	☐	☐
21.31. Para ser admirado/a fisicamente, eu tomaria substâncias que melhoram o desempenho.	☐	☐	☐	☐	☐	☐	☐
21.32. Um praticante deve atingir os seus objetivos por si próprio e não com a ajuda de substâncias que melhoram o desempenho.	☐	☐	☐	☐	☐	☐	☐
21.33. O meu instrutor concordaria que eu tomasse substâncias que melhoram o desempenho para conseguir um rendimento elevado.	☐	☐	☐	☐	☐	☐	☐
21.34. Para agradar fisicamente aos outros, eu tomaria substâncias que melhoram o desempenho.	☐	☐	☐	☐	☐	☐	☐

22. Todas as questões abaixo referem-se ao consumo de substâncias tomadas especificamente para fins de melhoria da aparência física e aumento do desempenho na prática da atividade física. Por favor, leia cada questão com atenção e assinale o seu nível de concordância com cada uma delas, segundo as escalas abaixo mencionadas.

22.1. A utilização dessas substâncias com o objetivo de melhorar o seu desempenho na prática da atividade física ou a sua aparência física nos próximos três meses seria:

	1	2	3	4	5
(1-Inútil; 5-Útil)	☐	☐	☐	☐	☐
(1-Desvantajoso; 5-Vantajoso)	☐	☐	☐	☐	☐
(1-Indesejável; 5-Desejável)	☐	☐	☐	☐	☐
(1-Negativo; 5-Positivo)	☐	☐	☐	☐	☐

(1-Prejudicial; 5-Benéfico)	☐	☐	☐	☐	☐
(1-Insensato; 5-Sensato)	☐	☐	☐	☐	☐
	1-De modo nenhum	2	3	4	5-Completamente
22.2. Pense, por favor, em pessoas que são importantes para si. Na sua opinião, até que ponto aprovariam que utilizasse substâncias para melhorar o seu desempenho na prática da atividade física ou aparência física?	☐	☐	☐	☐	☐
	De modo nenhum	2	3	4	Completamente
22.3. Em que medida, essas pessoas o encorajariam a usar substâncias para melhorar o seu desempenho na prática da atividade física ou aparência física?	☐	☐	☐	☐	☐
	Nada fácil	2	3	4	Muito fácil
22.4. Até que ponto acha que seria fácil obter substâncias para melhorar o seu desempenho na prática da atividade física ou aparência física?	☐	☐	☐	☐	☐
	Não depende de mim de modo nenhum	2	3	4	Depende de mim totalmente
22.5. Em que medida, acha que o uso de substâncias para melhorar o seu desempenho na prática da atividade física ou aparência física depende de si?	☐	☐	☐	☐	☐
	Não depende de modo nenhum	2	3	4	Depende totalmente
22.6. Até que ponto acha que o uso de substâncias para melhorar o seu desempenho na prática da atividade física ou aparência física depende de outras circunstâncias, eventos ou pessoas?	☐	☐	☐	☐	☐
	Nada forte	2	3	4	Muito forte
22.7. Quão forte é a sua intenção em usar substâncias para melhorar o seu desempenho na prática da atividade física ou a sua aparência física nos próximos três meses?	☐	☐	☐	☐	☐

	Nada provável	2	3	4	Muito provável
22.8. Em que medida, pensa vir a usar substâncias para melhorar o seu desempenho na prática da atividade física ou a sua aparência física nos próximos três meses?	☐	☐	☐	☐	☐
22.9. Qual é a probabilidade de vir a decidir usar substâncias para melhorar o seu desempenho na prática da atividade física ou a sua aparência física nos próximos três meses?	☐	☐	☐	☐	☐

Anexo 5 – Capítulo II

Título: Psychosocial Factors and Performance Enhancing Substances in Gym Users: A Systematic Review

Autores: (**Ana Tavares**, Sidónio Serpa, Luís Horta, & António Rosado)

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Psychosocial Factors and Performance Enhancing Substances in Gym Users: A Systematic Review

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Abstract

The use of performance-enhancing substances (PES) occurs among gym/fitness center users. This systematic review aimed to analyze studies describing prevalence, attitudes, beliefs, and knowledge, as conceptualized in the Theory of Planned Behavior (TPB), influenced by the use of PES by this population. Twenty-six articles were identified from a systematic approach following the PRISMA statement via electronic databases (SPORTDiscus™, PubMed, Scopus, Web of Science, B-On and Psychology and Behavioral Science Collection) and hand-searching bibliographies of reference lists. Only peer-reviewed primary research published in English, Portuguese and Spanish (1997-2016), focusing on gym/fitness center users and providing information on psychosocial factors (e.g., attitudes, beliefs, intention, social influence/ peer pressure) towards using PES, were included. It was concluded that the most prevalent substance used were anabolic-androgenic steroids (AAS). Attitudes of male bodybuilders using AAS as the prevalent drug are mainly related to aesthetic issues. Important influences come from groups (e.g., friends, training colleagues) and instructors. Although some AAS users indicated a general lack of knowledge of the potentially harmful effects of these drugs, others were aware of the side effects. The TPB illustrated a relationship between psychosocial factors influencing gym users to use PES.

Keywords: gym users, performance enhancing substances, anabolic-androgenic steroids, theory of planned behavior

According to the American Academy of Pediatrics (2005), "A performance enhancing substance (PES) is any substance taken in non-pharmacologic doses specifically for the purposes of improving physical and sports performance. A substance should be considered performance enhancing if it benefits sports performance / physical activity by increasing strength, power, speed, or endurance (ergogenic) or by altering body weight or body composition. Furthermore, substances that improve performance (e.g., stimulants, anabolic-androgenic steroids (AAS), erythropoietin, human growth hormone, and diuretics) by causing changes in behavior, arousal level, and/or perception of pain should be considered as PES".

The use of PES, legal or illegal, can occur at all levels of sports (Lollies, 2014; Ntoumanis, Ng, Barkoukis and Backhouse, 2014). A recent systematic review showed that global high prevalence of AAS use is no longer confined to elite competitive bodybuilders and athletes (Brennan, Wells, and Van Hout, 2017).

The very first meta-analysis of the global lifetime prevalence rate of AAS use was conducted by Sagoe, Molde, Andreassen, Torsheim and Pallesen (2014a). They concluded that the overall lifetime prevalence rate across all studies on AAS use was 3.3%, with the prevalence rate for males significantly higher than for females (6.4% and 1.6%, respectively). In another systematic review and synthesis of qualitative research, it was shown that the majority of AAS users-initiated use before age 30, and negative body image, sports participation and psychological disorders preceded initiation of AAS use for most users. The paramount motives for AAS initiation were appearance, muscle/strength and enhanced sport performance (Sagoe, Andreassen and Pallesen, 2014b). AAS users tend to use a wide range of other licit and illicit substances – polypharmacy, which have potentially serious harmful effects for those engaging in such behaviors (Sagoe, Torsheim, Molde, Andreassen and Pallesen, 2015). Drugs such AAS, stimulants, erythropoietin, human growth hormone, and diuretics have the capacity to impart significant performance enhancing effects, that in the long term use can be associated with several physical disorders, psychological symptoms or even fatal side effects (Baron, Martin and Magd, 2007; Sagoe et al., 2014a).

In spite of numerous studies in the field of doping in sport, there have only been a few attempts of models which could on a theoretical basis explain the factors and the extent of their relevance for reaching the decision to use PES in sport. Furthermore, most of the studies were carried out on samples of professional athletes, whereas recreational athletes were used quite rarely (Mitić and Radovanović,

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2011). In addition to physiological and chemical approaches, anti-doping research should also include sociological, behavioral and ethical studies of athletes' attitudes and beliefs towards the use of banned substances in sport (Morente-Sánchez and Zabala, 2013).

Researchers in this field used social-cognitive and motivational models towards identifying the influential factors on PES use intentions and behavior (Chan et al., 2015). According to Armitage and Conner (2001), the most extensively researched models are the Theory of Reasoned Action (TRA) and the Theory of Planned Behavior (TPB). TPB is an extension of the TRA aiming at anticipating volitional and non-volitional behaviors by considering the measures of perceived behavioral control (Armitage and Conner, 2001; Armitage, Conner, Loach, and Willetts, 1999; Goulet, Valois, Buist and Côté, 2010). The model suggested that the behavioral intention (which is the precursor and predictor) of the actions to assume or refuse a healthy behavior (Ajzen, 1991) is determined by the individual's attitude toward the behavior, which reflects (i) "the degree to which a person has a favorable or unfavorable evaluation or appraisal of the behavior in question; (ii) subjective norm, it refers to the perceived social pressure to perform or not to perform the behavior; and (iii) perceived behavior control, it refers to the perceived ease or difficulty of performing the behavior and it is assumed to reflect past experience as well as anticipated impediments and obstacles" (Ajzen, 1991, p.188). The TPB has been largely used in doping research to explain athletes´ PES use intention and behavior (Chan et al., 2015; Goulet et al., 2010; Ntoumanis, Ng, Barkoukis and Backhouse, 2013; Wiefferink, Detmar, Coumans, Vogels and Paulussen, 2008; Serpa, Faria, Marcelino, Reis, Ramadas, 2003), since the use of PES seems to be largely determined by personal choice (Goulet et al., 2010).

However, according to Barkoukis, Lazuras and Tsorbatzoudis (2016) and Kavussanu and Ring (2017), a number of specific psychological integrative models (Life Cycle Model; Sports Drug Control Model; Theory of Triadic Influence – integrative model in the context of doping and Trans-contextual Model) have been proposed to explain the use of PES in sport, since this is considered, a "multifaceted phenomenon that requires different levels of explanation and understanding of psychosocial processes" (Barkoukis et al., 2016, p.44). According to Lazuras (2016), though different integrative models of doping use include general models of behavioral prediction, such as the TPB (Ajzen, 1991), none of the empirical studies of these models have incorporated measures or analyzed the effects of contextual influence (i.e., sports socioeconomic context and the broader sociocultural context), since it can have a profound effect on action-initiation to PES consumption.

Based on previous research adopting the TPB, specifically a recent meta-analysis by Ntoumanis et al. (2014), that compared and summarized all known psychological predictors of doping behavior at all performance levels and in all physical settings (Blank, Kopp, Niedermeier, Schnitzer and Schobersberger, 2016), the present systematic narrative literature review has two major objectives. First, to synthesize recent studies that describe the prevalence of PES consumption in gym/fitness center users. Second, to summarize and analyze the psychosocial factors towards using PES in this specific population, according to those conceptualized in the TPB. In this sense, the TPB may contribute to the comprehension of these behaviors and improve the effectiveness of practical interventions, to reduce them among this specific population.

The rationale for this review was to compile the available evidence to conceptualize the psychosocial factors that may influence PES use by gym/fitness center users, since there is a scarcity of existing evidence on this kind of specific population. The TPB (Ajzen, 1991) was adopted, because it is one of the most frequently used models to explain athletes doping intentions and behavior (Chan et al., 2015), it provides definitions and descriptions that are more explicit regarding the specified construct and includes a discriminate validity of the constructs (Armitage and Conner, 2000). In this study and according to the TPB, attitudes, subjective norms and perceived behavior control concern to using PES.

Method

A literature search followed the guidelines from the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Moher, Liberati, Tetzlaff and Altman, 2009). Following testing of preliminary search terms, a search strategy was developed (see Figure 1). Searches were conducted in databases of health sciences and electronic platforms including (1997-2016): SPORTDiscus™, PubMed, Scopus, Web of Science, B-On and Psychology and Behavioral Science Collection. In Google Scholar, additional relevant papers were searched. In addition, the reference lists of the included articles that passed the eligibility criteria were hand-searched.

Eligibility Criteria

Only peer-reviewed primary research was included, published in English, Portuguese and Spanish with publication date from the year 1997. Only gym/fitness center users, regardless of age and gender, were included. Studies were required to provide data on psychosocial factors (e.g., attitudes, beliefs, intention, social influence/ peer pressure) towards using PES (see Figure 1).

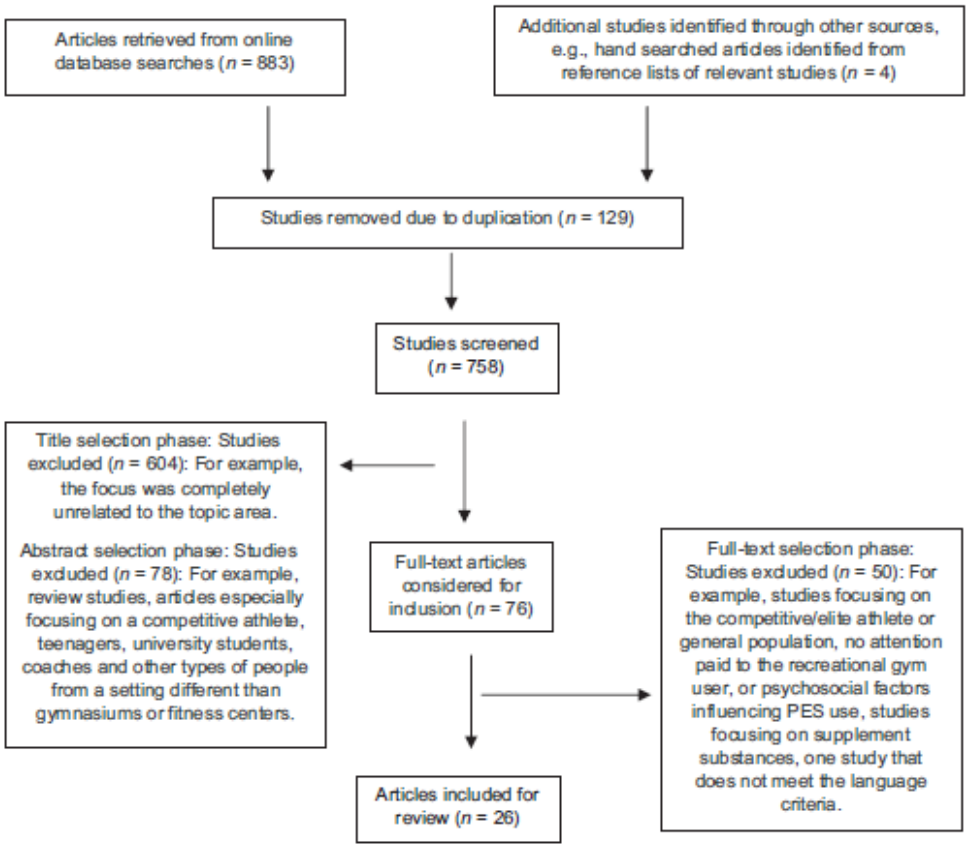

Figure 1. PRISMA diagram outlining the selection process

Data Extraction and Quality Assessment

Important features of each study ("i.e." year, country, study design, participant, sample size, age group, methodology, risk of bias, key findings and psychosocial factors conceptualized with the TPB – attitudes, subjective norm and perceived behavioral control) were extracted and recorded in Microsoft Excel, which are charted in Tables 1 and 2. The assessment tool developed by Higgins and Altman (2008) was used to evaluate the risk of bias for the majority of individual studies. However, this tool was designed for studies using an experimental design only, so Ntoumanis et al. (2013) created other criteria for cross-sectional studies, which were adopted to evaluate the overall quality of the evidence from this systematic review, since the majority of the analyzed studies were descriptive/cross-sectional. For the qualitative study, the CASP tool (Critical Appraisal Skills Programmer, 2006) was used to evaluate the bias risk. The assessment of all studies was then conducted by two of the authors independently, ratings were compared, and disagreements were resolved by having a third author review the article under question and then coming to a consensus.

Results and Discussion

Summary of the analyzed studies

The main findings are summarized in Table 1 and Table 2. All 26 studies were conducted over a 19-year period (1997-2016), and most of them in Middle Eastern countries (38.46%), followed by Europe (34.61%) and the Americas (26.92%). The sample size ranges from 37 to 7 039, with a total of 21 083 participants across the 26 studies. All the studies compared the gym/fitness center users over a range of different ages. In terms of research design, only Petrocelli, Oberweis, and Petrocelli (2008) used a qualitative approach (grounded theory) and the other 25 were cross-sectional surveys. Methodologies were mainly structured questionnaire, web-based survey, interview (se-

mi-structured, face-to-face, telephone) and observational (with mix interview/questionnaire; observation/questionnaire). The bias risk in the majority of the studies was *Low* (57.4%), according to all assessed criteria used. From the 26 studies included for review, which provided data on psychosocial factors (according to the 3 constructs from the TPB) towards using PES, 24 measured the attitudes; 16 subjective norms and 18 perceived behavioral control.

Key Findings

Prevalence of PES consumption

The most prevalent PES was AAS. The exception was in the study of Stubbe, Chorus, Frank, de Hon, and van der Heijden (2014), in which stimulants to lose weight had the highest prevalence. The prevalence rates of PES use (especially AAS) reported across all of the studies, ranged from the lowest at 4.7% (Pedersen, 2010) and the highest at 70% (Baker, Graham, and Davies, 2006), with the vast majority reporting between 11.1% to 58%. The age of AAS initiation was predominantly adolescence (as low as 16 years) and young adult (under 30 years old). However, in Ip et al. (2015), AAS abuse is prevalent among older males (over 40 years old), showing that although AAS abuse is prevalent in young adults, it is also prevalent in middle aged men, probably due to the motivation to slow the aging process. Findings suggest that the prevalence of AAS is relatively high and a motive for public health concern. It is widespread among the individual countries represented in this study, showing that AAS use initiation occurred predominantly during adolescence and young adulthood.

Gym / Fitness center users' profile

AAS users were mostly young men, with a low level of education; most were weight trainers, training frequently and along more years (Al-Falasi et al., 2009; Leifman et al., 2011; Pedersen, 2010; Silva and Moreau, 2003; Striegel et al., 2006). Usman et al. (2015) found that misuse of AAS was significantly higher among those with a high level of education, in contrast to the findings of other studies.

Use of other substances, not PES

Some authors suggested that the use of AAS was linked to other substances. For example, in Allahverdipour et al. (2012) consumption of alcoholic drinks and smoking was related to AAS abuse. Silva and Moreau (2003), Nogueira et al. (2014) and Leifman et al. (2011) showed the association with dietary supplements and AAS use. Korkia and Stimson (1997) reported the concomitant use of social drugs. However, Striegel et al. (2006) found that AAS users more often abstain from alcohol in contrast to general illicit drug users (Brennan et al., 2017).

Table 1
General characteristics and summary points

Authors	Year	Country	Study design	Participant	Sample Size	Age Group	Method	Risk of Bias	Prevalence (PES, %)	Key findings
Al-Falasi et al.	2009	United Arab Emirates	Cross-sectional	Males / Females	154	Range: >20; 21-29; 30-39; 33-39; >40	Questionnaire	Low	AAS use (22%)	Misuse was significantly higher among body builders, weight lifters and commercial club users.
Allahverdipour et al.	2012	Iran	Cross-sectional	Males	253	Range: 15-28; Mean=22.2	Questionnaire	Low	AAS use (24.5%)	AAS use related to the consumption of smoking and alcohol drinks.
Alsaeed, I. and Alabkal, J.R.	2015	Kuwait	Cross-sectional	Males	194	Range: 14-19; 20-29; 30-40 ; >40	Questionnaire	Low	AAS use (22.7%)	AAS use was linked with the use of other substances.
Baker et al.	2006	UK	Cross-sectional	Predominantly males	146	Range: 15-72; Mean=33.6	Questionnaire	Potential	AAS use (70%)	The main drugs used by AAS users were Ephedrine (44%), Growth Hormone (24%), Tamoxifen (22%), Clenbuterol (21%), Insulin (14%), Human chorionic gonadotrophin (11%), Diuretics and Thyroid hormone (10% each).
Bojsen-Moller	2010	Denmark	Cross-sectional	Predominantly males	1,398	Range: 11-74; Mean=25	Inquiries submitted by an Internet and telephone-based system	Low	PES use (15%)	While users and those who considered use of WADA-banned substances more often expressed concerns about the health risks associated with their use, users of legal substances did not express it to the same degree.

Authors	Year	Country	Study design	Participant	Sample Size	Age Group	Method	Risk of Bias	Prevalence (PES, %)	Key findings
Grace and Davies	2001	UK	Cross-sectional	Gym users	106	Range: 15-58; Mean=32.4	Questionnaire	Potential	AAS use (58%)	Polypharmacy was evident.
Habeeb et al.	2012	Iraq	Cross-sectional	Bodybuilders	172	Range: <19; 24; 25-29; 30-34; 35-39; 40-44	Questionnaire	Potential	AAS use (44.8%)	Two fifths of AAS users were 19 years old or younger.
Haerinejad et al.	2016	Iran	Cross-sectional	Bodybuilders	453	Range: 16-59; Mean=27.0	Face-to-face interview using a survey	Low	PES use (51.7%)	The most prevalent agents abused PES were AAS (79.4% of participants).
Ip. et al.	2015	USA	Cross-sectional	Strength-trained men	143	Men > / = 40	Web-based survey	Potential	AAS use (46.9%)	AAS abuse is prevalent among the older males which spend more time training and practicing polypharmacy. AAS users were more likely to binge drink and to report a diagnosis of an anxiety disorder.
Ip. et al.	2010	USA	Cross-sectional	Strength-trained subjects	1,519	Range: 16-73; Mean women=32.3; men=29.3	Web-based survey	Potential	AAS use (34.1%)	The majority of male AAS users were recreational exercisers and female AAS users were more likely to have been a competitive bodybuilder. AAS users practiced polypharmacy.
Khullar et al.	2016	Kuwait	Cross-sectional	Males / Females	200	Range: 18-55; Mean=29.1	Questionnaire	Low	AAS use (35%)	Lower age, smoking, and high importance on muscle tone were significant predictors of AAS use.
Korkia and Stimson	1997	Britain	Cross-sectional	Males / Females	1667	Mean women=27.1 men=29.1	Questionnaire / Interviews	Low	AAS use (7.4%)	AAS use was reported in all areas studied. Use of «cocktails» of drugs, blended with the use of social drugs and alcohol.
Leifman et al.	2011	Sweden	Cross-sectional / Observational	Males / Females	2,368	Range: 16-50 +	Questionnaire / Observation study	Potential	AAS use (5.3%)	AAS users were young men, frequent weight trainers and more often drug users. Observation studies could be an alternative to questionnaire in estimating prevalence of AAS use at gyms.
Mohammad H.	2014	Kuwait	Cross-sectional	Males	1,708	Range: 17-35; Mean=19	Questionnaire	Low	AAS use (11.8%)	-
Nogueira et al.	2014	Brazil	Cross-sectional	Bodybuilders	510	Range: 18-57	Questionnaire	Potential	AAS use (20.6%)	Use of AAS was related to the use of dietary supplements.
Pederson	2010	Denmark	Cross-sectional	Danish population / different training milieus	7,039	Range: 15-50	Survey (telephone interviews) and questionnaire	Low	PES use (4.7%)	AAS was the PES most used, except among cyclists (amphetamines).
Petrocelli	2008	USA	Grounded theory	Man weightlifters	37	Range: 19-43	Semi-structured interview	Low	-	Respondents did not demonstrate any anxiety over the possible side-effects.
Razavi et al.	2014	Iran	Cross-sectional	Man bodybuilders	250	Range: 15-45; Mean=25.5	Questionnaire	Low	AAS use (28.8%)	Mainly in adolescent and young adult bodybuilders.
Santos et al.	2011	Brazil	Cross-sectional	Man bodybuilders	123	Range: 18-50	Questionnaire	Potential	AAS use (33.3%)	Bodybuilding practitioners' use and misuse AAS although are aware of the health problems related to the misuse of these drugs.
Silva et al.	2003	Brazil	Cross-sectional	Bodybuilders	209	Range: <20; >40	Questionnaire	Potential	AAS use (19%)	Dietary supplements, as well as other associated drugs, were used.

Authors	Year	Country	Study design	Participant	Sample Size	Age Group	Method	Risk of Bias	Prevalence (PES, %)	Key findings
Silva et al.	2007	Brazil	Cross-sectional	Males / Females	288	Range:13-74; Mean=28.5	Questionnaire applied by interviewers	Low	AAS use (11.1%)	Use of AAS and other hormones and medicines.
Striegel et al.	2006	Germany	Cross-sectional	Males / Females	621	Average age = 33.7	Questionnaire	Low	AAS use (13.5%)	AAS users are physical-achievement-oriented and trained for more years and more frequently than general fitness center members.
Stubbe et al.	2013	Netherlands	Cross-sectional	Males / Females	718	Average age = 43.4	Web-based surveys	Low	PES use (8.2%)	Randomized response technique (RRT) resulted in prevalence differences for the different types of PED. Stimulants to lose weight had the highest prevalence.
Usman et al.	2015	Pakistan	Cross-sectional	Male bodybuilders	310	Range: 15-35	Questionnaire	Potential	AAS use (64%)	Misuse of AAS was significantly higher among those with high level of education.
Wazaify et al.	2014	Jordan	Cross-sectional	Males / Females	353	Range: 12-; >47	Questionnaire	Low	PES use (8.8%)	Use of AAS and other hormones.
Wieffe-rink et al.	2008	Netherlands	Cross-sectional	Males / Females	144	Range: 14-65; Mean = 32	Questionnaire	Potential	PES use (15%)	Users attribute advantages to PED and are inclined to overlook the risks of using them.

Emergent Themes conceptualized from a Theory of Planned Behavior Perspective

Attitudes towards PES

Most studies concluded that gym/fitness practioners use PES, especially AAS, for aesthetic reasons, generally driven by their dissatisfaction with physical appearance (53.8%), low self–esteem (3.8%), and the wish to become more attractive and desirable (23.1%). The main motivation for AAS use was to increase muscle mass and strength (46.2%), to improve physical performance (23.1%), to recover faster from previous training sessions (7.7%), to prevent injuries (3.8%) and to manage body size/weight (15.4%) (see Table 2). Thirteen studies (50%) investigated the knowledge of associated risks of AAS use and concluded on a general lack of knowledge or minimization of the potential harmful effects, with no proper attention to the side effects. Based on these findings, it could be argued that this population uses PES, especially AAS, due to a positive attitude towards these substances, in the sense of obtaining the desired results.

Subjective Norms

Gym/fitness center practitioners were influenced to use PES, mainly by their friends (46%), coaches (34.6%) and training colleagues (15.4%) (see Table 2), revealing the high influence of groups and coaches. The standard of beauty explored by the media (19.2%), aggressive marketing by the industry (3.8%), internet (19.2%), TV advertisement (7.7%), muscle magazines (15.4%) and peer pressure (11.5%) seem to influence and support the use of PES. In this way, perceived social pressure and peers influence on subjective norms should be taken into account when planning preventive strategies, since it may be related with the intention to use PES (Armitage and Conner, 2001).

Perceived Behavioral Control

Most of subjects perceived access to these substances as being easy and bought it from their gym instructors (15.4%), friends (19.2%), internet order/online shopping (23.1%), pharmacy/drugstores (34.6%) or physician/veterinarians (11.5%), without medical prescription, "black market" (19.2%), and clubs/fitness centers (3.8%). Users sought advice and information about the substances from their fitness center instructors (3.8%), physicians (3.8%), training colleagues (7.7%); they studied pertinent literature or received oral information from other users, who described the results from personal experience (7.7%). Santos et al. (2011) concluded that media, magazines and newspapers had an important role in the information about AAS too. The perceived ease of access to this kind of substances and the apparent absence of impediments and obstacle to use it, may favor the PES consumption behavior.

Table 2
Psychosocial factors associated with PES users conceptualized with the Theory of Planned Behavior

Author	Attitude	Subjective norm	Perceived behavioral control
Al-Falasi et al.	Be a stronger athlete and more masculine Have bigger muscles; help win competitions Look physically better	Influenced by friends, media, trainer, health care professional, internet and the fitness magazines	Users obtained AAS from fitness stores, trainers, friends, veterinarians and online shopping
Allahverdipour et al.	Increase muscle mass strength Boost performance athletically; look better No proper attention to the side effects of PES consumption	Influenced by their friends and coaches Media and peer pressure	*
Alsaeed, I and Alabkal, JR	Have a muscular body AAS usage is not harmful to health if used correctly	Influenced by friends and coaches	Users obtained AAS from gym coach, individual supplier, pharmacy or physician, internet order and friends
Baker et al.	Predominantly used for cosmetic reasons	Influenced by friends and training colleagues	Users obtained growth hormone particularly by internet order
Bojsen-Moller	Enhanced physical appearance	Aggressive marketing by the industry	*
Grace and Davies	Improve muscle size strength; decrease recovery time from the previous training session Familiar with the medical terms for side effects with AAS use	Influenced by friends and training colleagues	No problem in obtaining AAS; users would stop using AAS if they were shown to cause serious side effects
Habeeb et al.	Enhance athletic performance; increase body size Not aware of the side effects of AAS use	Influenced by coaches, teammates, and friends	Users obtained AAS from retail stores
Haerinejad et al.	Increase muscle mass, endurance and strength; weight gain or loss Improve sport performance and physical appearance Not complete knowledge about the effects of PES before initiation.	Influenced by friends, athlete trainers, Internet and TV advertisements	Users obtained AAS from friends, training partners, gym members, dealers and drugstores
Ip et al.	Increase muscle mass strength; improve physical appearance "Slow the aging process"	*	*
Ip et al.	Increase muscle mass / strength; improve physical appearance Plans to continue future AAS use despite the experience of some side effects	*	*
Khullar et al.	Ideal muscle tone and definition	*	*
Korkia and Stimson	Increase muscle mass, size and strength; allow harder training Improve bodybuilding, sport performance, recovery from injury	*	Illicit supply networks and manufacture

Author	Attitude	Subjective norm	Perceived behavioral control
Moham-mad H.	Improve physical appearance; muscle strength Only for attraction AAS consumption had limited negative impact on health, and a positive effect on physical appearance.	Encouraged by friends and coaches Clubs	«Products available and easy to obtain»
Nogueira et al.	Improve physical appearance AAS use even knowing its side effects	*	Easy access to AAS in veterinary pharmacies or on the "black market"
Pederson	Improve physical performance; to increase/ reduce body size	*	Trafficked on the 'black market'»
Petrocelli et al.	Improve competitive bodybuilder appear-ance «Get huge «; «get ripped» Motivate by competitive obsession; frustra-tion Be more attractive; more desirable; Not believe that «AAS will hurt them»	Influenced by friends Muscle magazines and TV series	Users obtained AAS from friends, dealers or internet sites
Razavi et al.	*	Recommended by peers, friends, and coaches; Influenced by mag-azine and internet	Users obtained AAS from phar-macist, black market, supermar-kets or by vendors
Santos et al.	Elevate physical development, enhance aesthetics and for personal satisfaction Dissatisfaction with physical appearance; low self-esteem Ignore the side effects	Influenced by training col-leagues	Users obtained AAS from drug-stores, fitness center, internet or illegal markets; Information obtained from me-dia and fitness center instructors
Silva et al.	Improve physical appearance Adverse effects can be prevented by using other products; medical follow-up helps prevent future illnesses	Standard of beauty, promoted by the media; Lack of control in the marketing of AAS in phar-macies	Users obtained AAS through colleagues or in pharmacies No scientific culture about a better way to use AAS for the intended purpose; Information obtained in documents or by download or orally by other users
Silva et al.	Improve physical appearance and Increase performance; Use of AAS despite the first-hand experience of some side effects	Media and peer pressure	Users obtained veterinary prod-ucts from veterinary pharmacies or «black market»
Striegel et al.	Body styling Increase strength	*	Users obtained AAS from phar-macist, physicians and dealers; Information about AAS was obtained from physicians, training colleagues and study of pertinent literature
Stubbe et al.	Lose weight Short-term side-effects play a minor role	*	*
Usman et al.	Increase muscle mass/ strength	Influenced by trainers, friends, internet, media, magazines	Users obtained AAS from train-ers, friends and online shopping
Wazaify et al.	Increase muscular power	Influenced by friends, internet, and coach	Users obtained medications from pharmacies without a prescription

Author	Attitude	Subjective norm	Perceived behavioral control
Wiefferink et al.	Become more powerful, muscled, better shaped Outcomes would be achieved in a shorter period of time than if they used no drugs at all	*	*

*Note. *Not reported*

Strengths and limitations

The dominance of research from English speaking countries has skewed findings in the field. Thus, an important contribution of the current study is the multi-lingual approach. Our findings also complement available evidence from quantitative studies in this area, taking into account the target population. However, some limitations must be considered when interpreting our findings. The methodology used within all of the studies – questionnaires – could include people not willing to tell the truth (Peters Schulz and Michna, 2002), even if confidentiality is guaranteed through self-administered and anonymous surveys. Although the TPB provides a framework to understand how psychosocial factors such as attitudes, subjective norms and perceived behavioral control can predict PES use in gym practitioners, caution must be taken, since the studies adopted generalized direct measures of TPB constructs. Chan et al. (2015), stress the importance of indirectly measuring individual´s modal salient beliefs in conjunction with direct measures of TPB constructs.

Final remark

Our findings denote the importance of psychosocial factors influencing gym users to take AAS and other types of PES. The TPB provides a good framework to better understand these behaviors. This theory could be used in future research to provide a template when developing prevention programs to reduce PES use, taking into account interactions between individual factors, performance enhancement motivation, vulnerability to peer pressure, expectations from PES use and behavioral tendencies. In fact, the three main predictive factors for AAS abuse seem to be participant´s attitude toward PES use, perceived behavior control and subjective norms (Allahverdipour et al., 2012). The same theory could be used to promote new research trends regarding other groups of gym users besides bodybuilders, as well as different types of PES than AAS, and to expand further the current knowledge to all cultural and geographical areas, in order to deeper understanding this problem. Although TPB provides a good framework, empirical studies and theoretical positions must follow more ecological perspectives, focusing on background variables, such as moral tendencies, motivations and environmental features, since an integrative approach can greatly benefit intervention designers and policymakers on understanding the PES abuse in gym users (Barkoukis et al., 2016).

Factores psicosociales y sustancias que mejoran el rendimiento en usuarios de gimnasios: Una revisión sistemática

Resumen

El uso de sustancias que mejoran el rendimiento (PES) ocurre entre los practicantes de gimnasio / *fitness*. Esta revisión sistemática tuvo como objetivo analizar estudios que describen la prevalecía, las actitudes, las creencias y el conocimiento, de acuerdo con el conceptualizado en la Teoría del Comportamiento Planeado (TPB), influenciado por el uso de PES en esta población. Veintiséis artículos fueron identificados a partir de un enfoque sistemático, utilizando el PRISMA a través de bases de datos electrónicas (*SPORTDiscus™, PubMed, Scopus, Web of Science, B-On and Psychology and Behavioral Science Collection*) e búsquedas manuales de bibliografías a partir de listas de referencia. Sólo los estudios primarios revisados por pares, publicado en inglés, portugués y español (1997-2016), cuya población de estudio fueron la práctica de gimnasia / fitness y proporcionar información sobre los factores psicosociales (e.g., actitudes, creencias, intención, influencia social / presión de grupo) para el uso de PES, se incluyeron. Se concluyó que la PES más prevalente eran los esteroides anabolizantes (AAS). Las actitudes positivas ante el consumo de AAS, por parte de los culturistas están relacionadas principalmente con cuestiones estéticas. Importantes influencias provienen de grupos (e.g., amigos, compañeros de entrenamiento) e instructores. Aunque algunos consumidores de AAS indicaban una falta general de conocimiento sobre los efectos potencialmente nocivos de estas drogas, otros estaban conscientes de los efectos colaterales. La TPB demostró una relación entre los factores psicosociales que influencian a los practicantes de gimnasio / *fitness* para usar PES.

Palabras clave: usuarios de gimnasio, sustancias que mejoran el rendimiento, esteroides anabolizantes, teoría del comportamiento planeado

Fatores Psicossociais e Substâncias que Melhoram o Desempenho em Usuários de Ginásio: Uma Revisão Sistemática

Resumo

A utilização de substâncias que melhoram o desempenho (PES) ocorre entre os utilizadores de ginásios e centros de fitness. Esta revisão sistemática teve como objetivo analisar estudos que descrevem prevalências, atitudes, crenças e conhecimentos, conforme o preconizado na Teoria do Comportamento Planeado (TPB), influenciados pela utilização de PES nesta população específica. Vinte e seis artigos foram identificados a partir de uma abordagem sistemática seguindo o método PRISMA através de bases de dados eletrónicas (*SPORTDiscus™, PubMed, Scopus, Web of Science, B-On* e Psicologia e *Behavioral Science Collection*) e pesquisa manual de bibliografia nas listas de referências. Foram apenas incluídos artigos de pesquisa primária revistos por pares e publicados em inglês, português e espanhol (1997-2016), cuja população em estudo fossem utilizadores de ginásios e centros de fitness e fornecessem informações acerca de fatores psicossociais (ex., atitudes, crenças, intenções, influência social / pressão dos colegas) para a utilização de PES. Concluiu-se que as substâncias mais utilizadas foram os esteroides anabólicos androgénicos (EAA). As atitudes dos praticantes de musculação masculinos que utilizam EAA como droga prevalente estão relacionadas principalmente com questões estéticas. Os grupos (ex., amigos, colegas de treino) e instrutores têm uma influência importante na utilização deste tipo de substâncias. Embora alguns utilizadores de EAA indiquem uma falta geral de conhecimento dos efeitos potencialmente prejudiciais dessas substâncias, outros estão cientes dos efeitos colaterais. A TPB permitiu demostrar que existe uma relação entre os fatores psicossociais que influenciam os utilizadores de ginásios a usar PES.

Palavras-chave: utilizadores de ginásios, substâncias que melhoram o desempenho, esteroides anabólicos androgénicos, teoria do comportamento planeado

References

American Academy of Pediatrics (2005). Use of performance-enhancing substances. *Pediatrics*,115(4),1103-6. Retrieved from http://pediatrics.aappublications.org/content/pediatrics/115/4/1103.full.pdf

Ajzen, I. (1991). The theory of planned behavior. *Organizational behavior and human decision processes*, *50*, 179–211.

Al-Falasi, O., Al-Dahmani, K., Al-Eisaei, K., Al-Ameri, S., Al-Maskari, F., Nagelkerke, N. and Schneider, J. (2009). Knowledge, attitude and practice of anabolic steroids use among gym users in Al-Ain district, United Arab Emirates. *The Open Sports Medicine Journal*, *2*(1), 75–81. http://doi.org/10.2174/1874387000802010075

Allahverdipour, H., Jalilian, F. and Shaghaghi, A. (2012). Vulnerability and the intention to anabolic steroids use among iranian gym users: an application of the theory of planned behavior. *Substance Use and Misuse*, *47*(3), 309–317. http://doi.org/10.0.12.37/10826084.2011.633296

Alsaeed, I. and Alabkal, J. (2015). Usage and perceptions of anabolic-androgenic steroids among male fitness centre attendees in Kuwait - a cross-sectional study. *Substance Abuse Treatment, Prevention, and Policy*, *10*(1), 33. http://doi.org/10.1186/s13011-015-0030-5

Armitage, C. and Conner, M. (2000). Social cognition models and health behaviour: a structured review. *Psychology y Health*, *15*(2), 173–189. http://doi.org/10.1080/08870440008400299

Armitage, C. and Conner, M. (2001). Efficacy of the theory of planned behaviour: a meta-analytic review. *British Journal of Social Psychology*, *40*, 471–499.

Armitage, C., Conner, M., Loach, J. and Willetts, D. (1999). Different perceptions of control : applying an extended theory of planned behavior to legal and illegal drug use. *Basic and Applied Social Psychology*, *2*(4), 301–316. http://doi.org/10.1207/S15324834BASP2104

Baker, J., Graham, M. and Davies, B. (2006). Steroid and prescription medicine abuse in the health and fitness community: A regional study. *European Journal of Internal Medicine*, *17*(7). http://doi.org/10.1016/j.ejim.2006.04.010

Barkoukis, V., Lazuras, L. and Tsorbatzoudis, H. (2016). *The psychology of doping in sport*. New York: Routledge.

Baron, D., Martin, D. and Magd, S (2007). Doping in sports and its spread to at-risk populations: An international review.pdf. *World Psychiatry*, *6*(June), 118–123.

Blank, C., Kopp, M., Niedermeier, M., Schnitzer, M. and Schobersberger, W. (2016). Predictors of doping intentions, susceptibility, and behaviour of elite athletes: A meta-analytic review. *SpringerPlus*, *5*(1333), 1–14. http://doi.org/10.1186/s40064-016-3000-0

Bojsen-Møller, J. and Christiansen, A. (2010). Use of performance- and image-enhancing substances among recreational athletes: a quantitative analysis of inquiries submitted to the Danish anti-doping authorities. *Scandinavian Journal of Medicine and Science in Sports*, *20*(6), 861–867. http://doi.org/10.1111/j.1600-0838.2009.01023.x

Brennan, R., Wells, J. and Van Hout, M. (2017). The injecting use of image and performance-enhancing drugs (IPED) in the general population: a systematic review. *Health and Social Care in the Community*, *25*(5), 1459–1531. http://doi.org/10.1111/hsc.12326

Chan, D., Hardcastle, S., Dimmock, J., Lentillon-Kaestner, V., Donovan, R., Burgin, M. and Hagger, M. (2015). Modal salient belief and social cognitive variables of anti-doping behaviors in sport: Examining an extended model of the theory of planned behavior. *Psychology of Sport and Exercise*, *16*(P2), 164–174. http://doi.org/10.1016/j.psychsport.2014.03.002

Critical Appraisal Skills Programme. (2006). *10 questions to help you make sense of qualitative research*. Oxford: CASP.

Goulet, C., Valois, P., Buist, A. and Côté, M. (2010). Predictors of the use of performance-enhancing substances by young athletes. *Clinical Journal of Sport Medicine*, *20*(4), 243–248. http://doi.org/10.1097/JSM.0b013e3181e0b935

Grace, F., Baker, J. and Davies, B. (2001). Anabolic androgenic steroid use in recreational gym users: A regional sample of the Mid-Glamorgan area. *Journal of Substance Use*, *6*(3). http://doi.org/10.1080/14659890152558804

Habeeb, M., Kasim, W., Khamees, L., Hawi, M. and Khashoom, Q. (2012). Athletes' perceptions toward substance use in Baghdad City. *American Journal of Men's Health*, *6*(6), 462–471. http://doi.org/10.1177/1557988312446508

Haerinejad, M., Ostovar, A., Farzaneh, M. and Keshavarz, M. (2016). The prevalence and characteristics of performance-enhancing drug use among bodybuilding athletes in the South of Iran, Bushehr. *Asian Journal of Sports Medicine*, *7*(3), e35018. http://doi.org/10.5812/asjsm.35018

Higgins, J. and Altman, D. (2008). *Assessing risk of bias in included studies. Cochrane handbook for systematic reviews of interventions: Cochrane book series*. http://doi.org/10.1002/9780470712184.ch8

Ip, E., Barnett, M., Tenerowicz, M., Kim, J., Wei, H. and Perry, P. (2010). Women and anabolic steroids: An analysis of a dozen users. *Clinical Journal of Sport Medicine*, *20*(6), 475–481. http://doi.org/10.1097/JSM.0b013e3181fb5370

Ip, E., Trinh, K., Tenerowicz, M., Pal, J., Lindfelt, T. and Perry, P. (2015). Characteristics and behaviors of older male anabolic steroid users. *Journal of Pharmacy Practice*, *28*(5), 450.

Kavussanu, M. and Ring, C. (2017). Moral identity predicts doping likelihood via moral disengagement and anticipated guilt. *Journal of Sport and Exercise Psychology*, *39*(4), 293–301. http://doi.org/10.1123/jsep.2016-0333

Khullar, N., Scull, N., Deeny, M. and Hamdan, E. (2016). Prevalence and predictors of anabolic-androgenic steroid use among gym users in Kuwait: A preliminary study. *International Journal of Men's Health*, *15*(2), 144–156. http://doi.org/10.3149/jmh.1502.144

Korkia, P. and Stimson, G. (1997). Indications of prevalence, practice and effects of anabolic steroid use in Great Britain. *International Journal of Sports Medicine*, *18*(7), 557–562. http://doi.org/10.1055/s-2007-972681

Lazuras, L. (2016). Social-cognitive predictors of doping use. In L. Barkoukis, Vassilis; Lazuras (Ed.), *The psychology of doping in sport* (pp. 44–61). London and New York: Routledge.

Leifman, H., Rehnman, C., Sjöblom, E. and Holgersson, S. (2011). Anabolic androgenic steroids-use and correlates among gym users-an assessment study using questionnaires and observations at gyms in the Stockholm Region. *International Journal of Environmental Research and Public Health*, *8*(12), 2656–2674. http://doi.org/10.3390/ijerph8072656

Lollies, F. (2014). *Prevalence and determinants of doping in recreative triathlon*. Retrieved from http://essay.utwente.nl/66860/

Mitić, P. and Radovanović, D. (2011). The motives for doping drug use in nonprofessional athletes and methods of prevention. *Education*, *9*(2), 203–212.

Mohammad, H. (2014). Anabolic-androgenic steroids amongst Kuwaiti males. *College Student Journal*, *48*(1), 120–129.

Moher, D., Liberati, A., Tetzlaff, J. and Altman, D. G. (2009). Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. *PLoS Medicine*, *6*(7), e1000097. http://doi.org/10.1371/journal.pmed.1000097

Morente-Sánchez, J. and Zabala, M. (2013). Doping in sport: a review of elite athletes' attitudes, beliefs, and knowledge. *Sports Medicine*, *43*(6), 395–411. http://doi.org/10.1007/s40279-013-0037-x

Nogueira, F., Brito, A., Oliveira, C., Vieira, T. and Gouveia, R. (2014). Anabolic-androgenic steroid use among Brazilian bodybuilders. *Substance Use and Misuse*, *49*(9), 1138–1145. http://doi.org/10.3109/10826084.2014.912062

Ntoumanis, N., Ng, J., Barkoukis, V. and Backhouse, S. (2013). *A statistical synthesis of the literature on personal and situational variables that predict doping in physical activity settings.*

Ntoumanis, N., Ng, J., Barkoukis, V. and Backhouse, S. (2014). Personal and psychosocial predictors of doping use in physical activity settings: a meta-analysis. *Sports Medicine*, *44*(11), 1603.

Pedersen, I. (2010). Doping and the perfect body expert: social and cultural indicators of performance-enhancing drug use in Danish gyms. *Sport in Society*, *13*(3), 503.

Peters, C., Schulz, T. and Michna, H. (2002). *Biomedical side effects of doping*. Köln.

Petrocelli, M., Oberweis, T. and Petrocelli, J. (2008). Getting huge, getting ripped: A qualitative exploration of recreational steroid use. *Journal of Drug Issues*, *38*(4), 1187–1205. http://doi.org/10.1177/002204260803800412

Pope, H., Wood, R., Rogol, A., Nyberg, F., Bowers, L. and Bhasin, S. (2014). Adverse health consequences of performance-enhancing drugs: an endocrine society scientific statement. *Endocrine Reviews*, *35*(3), 341–375. http://doi.org/10.1210/er.2013-1058

Razavi, Z., Moeini, B., Shafiei, Y. and Bazmamoun, H. (2014). Prevalence of anabolic steroid use and associated factors among body-builders in Hamadan, West province of Iran. *Journal of Research in Health Sciences*, *14*(2), 163–166.

Sagoe, D., Andreassen, C. S. and Pallesen, S. (2014). The aetiology and trajectory of anabolic-androgenic steroid use initiation: a systematic review and synthesis of qualitative research. *Substance Abuse Treatment, Prevention and Policy*, *9*(1), 24.

Sagoe, D., McVeigh, J., Bjørnebekk, A., Essilfie, M.-S., Andreassen, C. and Pallesen, S. (2015). Polypharmacy among anabolic-androgenic steroid users: A descriptive metasynthesis. *Substance Abuse: Treatment, Prevention, and Policy*, *10*(12), 1–19. http://doi.org/10.1186/s13011-015-0006-5

Sagoe, D., Molde, H., Andreassen, C., Torsheim, T. and Pallesen, S. (2014). The global epidemiology of anabolic-androgenic steroid use: a meta-analysis and meta-regression analysis. *Annals of Epidemiology*, *24*(5), 383–398. http://dx.doi.org/10.1016/j.annepidem.2014.01.009

Santos, A., Rocha, M. and Silva, M. (2011). Illicit use and abuse of anabolic-androgenic steroids among Brazilian bodybuilders. *Substance Use and Misuse*, *46*(6), 742–748. http://doi.org/10.0.12.37/10826084.2010.534123

Serpa, S., Faria, N., Marcelino, P., Reis, C., Ramadas, S. Dopagem e psicologia [Doping and psychologie]. Lisboa: Centro de Estudos e Formação Desportiva; 2003.

Silva, L. and Moreau, R. (2003). Uso de esteróides anabólicos androgênicos por praticantes de musculação de grandes academias da cidade de São Paulo [Use of anabolic-androgenic steroids among body builders in major gym centers in São Paulo]. *Revista Brasileira de Ciências Farmacêuticas*, *39*(3), 327–333. http://doi.org/10.1590/S1516-93322003000300012

Silva, P., Machado Júnior, L., Figueiredo, V., Cioffi, A., Prestes, M. and Czepielewski, M. (2007). Prevalência do uso de agentes anabólicos em praticantes de musculação de Porto Alegre [Prevalence of the use of anabolic agents among strength training practitioners in Porto Alegre]. *Arquivos Brasileiros de Endocrinologia and Metabologia*, *51*(1), 104–110. http://doi.org/10.1590/S0004-27302007000100017

Striegel, H., Simon, P., Frisch, S., Roecker, K., Dietz, K., Dickhuth, H.-H. and Ulrich, R. (2006). Anabolic ergogenic substance users in fitness-sports: A distinct group supported by the health care system. *Drug and Alcohol Dependence*, *81*(1), 11–19. http://doi.org/10.1016/j.drugalcdep.2005.05.013

Stubbe, J., Chorus, A., Frank, L., de Hon, O. and van der Heijden, P. (2014). Prevalence of use of performance enhancing drugs by fitness centre members. *Drug Testing and Analysis*, *6*(5), 434–438. http://doi.org/10.1002/dta.1525

Usman, H., Rashid, F., Ayub, H., Ayub, A., Akram, N., Walter, S. and Matin, S. (2015). Knowledge, awareness and practices of harmful effects of anabolic steroids among body builder in Rawalpindi and Islamabad. *Pakistan Armed Forces Medical Journal*, *65*(2), 282–285.

Wazaify, M., Bdair, A., Al-Hadidi, K. and Scott, J. (2014). Doping in gymnasiums in Amman: The other side of prescription and nonprescription drug abuse. *Substance Use and Misuse*, *49*(10), 1296–1302. http://doi.org/10.3109/10826084.2014.891625

Wiefferink, C., Detmar, S., Coumans, B., Vogels, T. and Paulussen, T. (2008). Social psychological determinants of the use of performance-enhancing drugs by gym users. *Health Education Research*, *23*(1), 70–80. http://doi.org/10.1093/her/cym004