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Determinantes Psicológicos de la Práctica de Ejercicio en Clubes de Salud y Gimnasios: Una Revisión Sistemática en la Población Adulta

Psychological Determinants of Exercise Practice in Health Clubs and Gymnasiums: A Systematic Review in Adult Population

Determinantes Psicológicos e a Prática de Exercício em Clubes de Exercício e Ginásios: Uma Revisão Sistemática na População Adulta

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RESUMEN

En las últimas dos décadas, varios informes, estudios empíricos y construcciones teóricas han llamado la atención como relevantes para comprender las persistentes altas tasas de abandono y la baja participación en los health clubs y gimnasios (HCG). En este contexto, el objetivo principal de esta revisión sistemática de la literatura es identificar los determinantes psicológicos que tienden a influir en el compromiso sostenido con la práctica de ejercicios en los HCG. El proceso de revisión involucró la búsqueda en tres bases de datos (PubMed, SPORTDiscus y Web of Science), siguiendo las pautas PRISMA. Inicialmente, se identificaron 6362 registros potencialmente relevantes en las bases de datos electrónicas, de los cuales 380 artículos fueron validados por el título. Después de un análisis cuidadoso, fue posible seleccionar 49 estudios, de los cuales 16 cumplieron con los criterios de inclusión. Además, se incluyeron 2 estudios mediante el análisis de las referencias bibliográficas, totalizando 18 estudios que fueron sometidos a un análisis cualitativo. Los resultados sugieren que la motivación autónoma, especialmente la motivación intrínseca, estaba positivamente asociada con la adherencia y persistencia en programas de ejercicios. Además, se identificaron motivos individuales (intrínsecos vs. extrínsecos), hábito de ejercicio, intención, disfrute y la respuesta afectiva como determinantes psicológicos potencialmente relevantes que tienden a influir en la persistencia en el ejercicio. Dada la alta heterogeneidad de los estudios, métodos y variables estudiadas, se requiere precaución al interpretar estos resultados. Actualmente, hay evidencia insuficiente para proponer adecuadamente un enfoque sólido para futuras investigaciones sobre los determinantes detectados, y se necesitan enfoques más experimentales, operativos y basados en evidencia para comprender cómo promover la adherencia en HCG.

Palabras clave: determinantes psicológicos; adherencia al ejercicio; retiros del ejercicio; gimnasios y clubes de salud.

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ABSTRACT

Over the last two decades, several reports, empirical studies, and theoretical constructs have drawn attention as relevant to understanding the persistently high dropout rates and low participation in health clubs and gymnasiums (HCG). In this context, the primary objective of this systematic literature review is to identify psychological determinants that tend to influence engagement and sustained commitment to exercising in health clubs and gymnasiums. The review process involved searching three databases (PubMed, SPORTDiscus, and Web of Science), and following the PRISMA guidelines. Initially, 6362 potentially relevant records were identified in the electronic databases, of which 380 articles were validated by title. After careful analysis, it was possible to select 49 studies, 16 of which met the inclusion criteria. Additionally, 2 more studies were included through the analysis of bibliographic references, totaling 18 studies that underwent a qualitative analysis. Results suggest that autonomous motivation, particularly intrinsic motivation, was positively associated with adherence and persistence in exercise programs. Additionally, individual motives (intrinsic vs. extrinsic), exercise habit, intention, enjoyment, and affective response were detected as potentially relevant psychological determinants influencing exercise persistence. Given the high heterogeneity of the studies, methods, and variables studied, caution is warranted when interpreting these results. Currently, there is insufficient evidence to adequately propose a strong focus of future research on the detected determinants, and more experimental, operational, and evidence-based approaches are needed to understand how to promote adherence to HCG.

Key words: psychological determinants; adherence to exercise; dropout; gymnasium; health clubs.

RESUMO

Nas últimas duas décadas, diversos relatórios, estudos empíricos e construções teóricas têm chamado a atenção como relevantes para compreender as persistes altas taxas de abandono e a baixa participação nos health clubs e ginásios (HCG). Neste contexto, o principal objetivo desta revisão sistemática da literatura é identificar os determinantes psicológicos que tendem a influenciar o comprometimento sustentado com a prática de exercícios nos HCG. O processo de revisão envolveu a busca em três bases de dados (PubMed, SPORTDiscus e Web of Science), seguindo as diretrizes PRISMA. Inicialmente, foram identificados 6362 registos potencialmente relevantes nas bases de dados eletrónicas, dos quais 380 artigos foram validados pelo título. Após uma análise cuidadosa, foi possível selecionar 49 estudos, dos quais 16 atenderam aos critérios de inclusão. Adicionalmente, 2 estudos foram incluídos através da análise das referências bibliográficas, totalizando 18 estudos que foram submetidos a uma análise qualitativa. Os resultados sugerem que a motivação autónoma, especialmente a motivação intrínseca, estavam positivamente associados à adesão e persistência em programas de exercícios. Além disso, foram identificados motivos individuais (intrínsecos vs. extrínsecos), hábito de exercício, intenção, prazer e a resposta afetiva como determinantes psicológicos potencialmente relevantes que tendem a influenciar a persistência no exercício. Dada a alta heterogeneidade dos estudos, métodos e variáveis estudadas, é necessária cautela ao interpretar esses resultados. Atualmente, não há evidências suficientes para propor adequadamente um foco forte para pesquisas futuras sobre os determinantes detetados, e abordagens experimentais e operacionais baseadas em evidências são necessárias para entender como promover a adesão em HCG.

Palavras-chave: determinantes psicológicos; adesão ao exercício; desistências no exercício; ginásios e health clubs

Psychological Determinants of Exercise Practice in Health Clubs and Gymnasiums: A Systematic Review in Adult Population

INTRODUCTION

Regular physical activity (PA) has been associated with several positive effects on health and a reduction in chronic diseases (Rhodes et al., 2017; Warburton et al., 2017). Despite the evidence of health benefits from regular PA, most adults and young people in developed countries do not engage in recommended levels of PA (Guthold et al., 2018), and the proportion of Europeans who report never exercising continues to increase (Hallal et al., 2012; European Commission, 2022). Presently, only a small fraction of the global population adheres to the international PA guidelines of the World Health Organization (WHO, 2020), which impose a burden on societies in terms of physical inactivity and public health consequences. One of the most common contexts for exercise practice are health clubs and gymnasiums (HCG) (European Commission, 2022). However, over the last two decades, various reports, empirical studies, and theoretical constructs have highlighted the issue of high dropout rates and low participation levels in HCG, which ultimately restricts the potential health benefits of regular exercise practice in this context (Pedragosa et al., 2021; Sperandaei et al., 2016: IHRSA, 2020). This also indicates that there is still much to be learned about promoting and sustaining initial participation in exercise. Studies conducted by Rand et al. (2020) and Gjestvang et al. (2021) have shown that attendance at HCG tends to decrease significantly during the first year. Additionally, research has found that dropout rates in the first six months can be as high as 50% (Buckworth et al., 2013; Sperandei et al., 2016; Randel et al., 2017). For example, a large study involving 573,441 members across 267 fitness centers in seven European countries reported that 45.2% of members canceled their participation within one year. Moreover, only 10% of members reportedly achieve the maintenance stage as defined in the Transtheoretical Model (i.e., the phase where individuals sustained their behavior change for six months or longer, demonstrating consistence physical activity engagement without significant replacement) over a 12- to 24-month period (Middelkamp et al., 2016). Similarly, a study by Rand et al. (2020) showed that attendance frequency among new gym members decreased steadily over 12 months, dropping from 7.48 visits in the first month to just 0.92 in the twelfth month. These findings underscore the difficulty in sustaining engagement in HCG, particularly during the critical early months of membership, when attendance is most volatile. . Similarly, in a study with 1726 new members of a fitness club, there was a substantial reduction in attendance frequency over 12 months, with each month showing a decline when compared to the previous month. The mean frequency of attendance decreased from 7.48 in the first month to 2.44 in the sixth month and 0.92 in the 12 months, indicating a sharp decline in attendance over time (Rand et al., 2020).

These studies' results tend to support the idea that an unstable exercise practice (e.g., intermittent frequency/attendance) may lead to the termination of behavior, particularly in the first months of practice (Rand et al., 2020). Although HCG holds promises for improving public health through the promotion of a supervised exercise practice, individuals frequently encounter difficulties in sustaining engagement and maintaining regular participation in these settings. This may be due to various factors such as lack of motivation, time constraints, competing priorities, and difficulty establishing and maintaining new habits, although not clearly understood with a systematic approach. As such, it is important to explore strategies and interventions that can help individuals sustain engagement and adherence to HCG programs over the long term, as for the factors (e.g., psychological determinants) behind them.

Several approaches have been proposed to better understand and promote active life choices, including exercise practice. These approaches can be categorized into individual, interpersonal, environmental, and policy dimensions, each with a unique set of factors influencing exercise behavior (Bauman et al., 2012; Ooms et al., 2015; Cortis et al., 2017; ACSM, 2021). While interventions across all dimensions may be effective in promoting exercise adherence, focusing on individual-level factors, particularly psychological variables, has been shown to be important for promoting exercise behavior in HCG (Lugones-Sanchez et al., 2021; Crutzen et al., 2017). Psychological variables can be considered outcomes, which may be influenced by multiple factors or processes, while psychological determinants can be considered predictors of behavior, as they tend to influence the direction of an action or behavior, such as self-determined motivation. However, both, are dynamic processes that interact bidirectionally. Understanding the psychological determinants and their causal relationships, including mediators, moderators, and covariates, is considered essential for promoting exercise adherence and maintenance and can

guide the selection and adjustment of behavior change techniques (BCTs) in HCG settings (Bauman et al., 2002; Hayes, 2013; Cortis et al., 2017; ACSM, 2021). However, for instance, a review by Rand et al. (2020) accentuates the complexity of human behavior and the inefficacy of some BCT's. While, in theory, these could be particularly relevant, the practical outcomes of the study suggest that the examined interventions had a small or trivial impact on attendance frequency in HCG. This emphasizes the challenges involved in developing effective interventions. Therefore, this review will focus on examining the psychological determinants associated with exercise behavior in health club and gym settings, which shows manifestations on usual terms/constructs for exercise adherence and persistence, such as attendance, exercise frequency, adherence, maintenance, persistence, and dropout. By identifying these determinants, this review aims to add to the current literature support for interventions aiming to promote exercise continuous adherence in HCG.

MATERIALS AND METHODS

The manuscript has been drafted following the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines (Page et al., 2021), which is a widely used protocol for conducting and reporting systematic reviews. To ensure transparency and accountability, the review was registered with the Prospective Register of Systematic Reviews (PROSPERO) under the record CRD42022295428. We were also guided by the Population, Intervention, Comparison, Outcomes, and Study (PICOS) strategy. Both the PRISMA guidelines and the PICOS tool are endorsed by the Cochrane Collaboration to assess the risk of bias (Higgins et al., 2011).

Eligibility Criteria

The inclusion criteria provide a detailed description of the types of studies that are eligible for inclusion: (1) experimental and non-experimental studies; (2) Searches were restricted by the English language (3) studies developed in an HCG (i.e., health clubs, gyms, gymnasiums, gyms, fitness center); (4) publication period from 1990 to the end of 2022; and (5) targeting apparently healthy individuals between the ages of 18 and 65 years old. The exclusion criteria were as follows: (1) systematic review studies; (2) grey literature; (3) populations with cancer, diabetes, hypertension, cardiovascular disease, or suffering some specific clinical condition diseases; and (4) programs similar to those developed in gyms but that were conducted in laboratories, companies, universities, or any other place that is not defined as an HCG.

Information sources and search strategy

A wide search of scientific publications was conducted in relevant health, psychological, and exercise-related electronic databases: PubMed (host: MEDLINE), SportDISCUS (host: EBSCO), and Web of Science, (host: EBSCO). The search was conducted from December 2021 until July 2022. According to the PICOS strategy, the search was executed by searching for keywords separately and in various combinations through conjunctions such as "AND" and "OR". The search terms included "health club", "gymnasium", "gym" and "fitness center", "fitness" and "psychological determinants", "determinant", and "correlator", "mediator", "cofounder", "pattern", "predict", and "adherence", maintenance", "dropout", "persistence", "engagement". Searches were restricted to English language articles. An example of the PubMed query can be found in Appendix 1. Bibliographic references from several related studies were also examined to find potential studies that met the inclusion criteria. We also considered any psychological variables, as defined in the introduction, that had been reported in the studies as related to adherence, maintenance, and dropout.

Data collection process and data items

Based on the provided information, the data collection process was conducted by a team of three researchers, two authors (PM and DT), and one invited external researcher (JF), who were trained and familiarized with the procedures. A general description (Table 1) was created for this purpose to summarize all data of interest from the studies. The checklist included specific information: (1) bibliographic information (authors, year of publication,

country of research); (2) study design; (3) sample size; (4) sample features; (5) measures; (6) analysis; (7) general outcomes; (8) psychological determinants of exercise; (9) and quality. Based on the information provided, Table 2 summarizes the main characteristics of the included studies and samples. The data collected includes (1) sample size; (2) sex; (3) location; and (4) mean age.

Table 1

General descriptive characteristics of the studies and main outcomes.

Author(s)	Location	Design	Size (%F)	Features (age M±SD)	Measures	Analysis	Quality
Cid et al. (2007)	Portugal	Cross-Sectional	70 (95.7%)	M = 36.90; SD = 15.4	Exercise Motivations Inventory (EMI-2); Profile of Mood States (POMS); Depression Anxiety and Stress Scale (DASS).	Descriptive statistics.	Moderate
Louw et al. (2012)	South Africa	Cross-Sectional	154 (50%)	n.d.	Exercise Motivations Inventory 2 (EMI-2); Exercise Causality Orientations Scale (ECOS).	Descriptive statistics.	Weak
Tappe et al. (2013)	United States	Cross-Sectional	174 (56%)	M = 27.50; SD = 15.4	Self-Report Habit Inventory (SRHI); Self-reported Lifetime Exercise Duration.	Descriptive statistics; Pearson's r; t-tests; Fisher's Exact Test.	Moderate
Kaushal et al. (2014)	Canadian	Longitudinal	111 (70%)	M = 47.7; SD = 13.5	Godin Leisure Time Exercise Questionnaire (GLTEQ); Self-Report Behavioral Automaticity Index (SRBAI); Self-Report Habit Index (SRHI); Modified version of the Subjective Exercise Experience Scale (SEES); intention, environment, consistency.	Linear Mixed Model (LMM); Intraclass Correlation Coefficient (ICC).	Weak
Maclntosh et al. (2015)	Canada	Longitudinal	26 (73%)	M = 36.38; SD = 14.31	International Physical Activity Questionnaire short version (IPAQ 2002) IPAQ scoring guidelines (IPAQ Group, 2005); structured interviewing.	Descriptive statistic; qualitative analysis.	Weak
Jekauc et al. (2015)	Germany	Cross-Sectional	101 (52.4%)	M = 23.6; SD = 2.9	Physical activity frequency by electronic control. Self-report for: behavioral intention, perceived behavioral control, subjective norm, and attitude; (SCT) goals, self-efficacy, outcome expectancies, impediments, facilitators; (PAMT) goal-setting, self-motivation, self-efficacy, life-stress, and physical activity environment.	Zero-inflated Poisson model; Correlational.	Weak
Middelkamp et al. (2016)	Netherlands	Longitudinal	400 (64%)	M = 32.1; SD = 10.9	The software reported assess control.	Descriptive statistic.	Moderate
Sperandei et al. (2016)	Brazil	Longitudinal	5240 (41%)	M = 31.1; SD = 8.23	Self-report to level physical activity; software reported frequency.	Descriptive statistics; Kaplan-Meier; Harrington-Fleming series.	Moderate
Koop et al. (2020)	Germany	Longitudinal	255 (54%)	M = 32.14; SD = 12.36	Motivation (SRQ-E; Motives (UMS and PSE).	Paired t-tests; Linear multilevel growth models.	Moderate
Gjestvang et al. (2021)	Brazil	Cross-Sectional	250	M = 36.04; SD = 11.03	Questionnaire, Self-efficacy Survey; Social support for exercise; Satisfaction of Life Scale; Exercise Motivations Inventory-2.	T-test; chi-squared test; ANOVA; Cohen's D effect size; Pearson's correlation.	Weak
Karyn et al. (2013)	United States	Cross-sectional	174 (56%)	M = 27.50; SD = 15.4	Self-Report Habit Inventory (SRHI).	Descriptive (t-test; Person correlation).	Moderate

Table 1 (continuation)

General descriptive characteristics of the studies and main outcomes.

Author (s)	Location	Design	Size (%F)	Features (age M±SD)	Measures	Analysis	Quality
Rodrigues et al. (2020)	Portugal	Cross-Sectional	575 (40%)	M = 34.07; SD = 11,47	Interpersonal Behavior Questionnaire (IBQ); Basic Psychological Need Satisfaction and Frustration Scale, Portuguese version in exercise (BPNSFS-E); Physical Activity Enjoyment Scale (PACES) Portuguese version; Behavioral Regulation Exercise Questionnaire (BREQ-3), Portuguese version; Intention to continue exercising (Ajzen recommendations and created three items to evaluate intention to continue exercising after 6 months).	Descriptive statistics; maximum likelihood. Confirmatory factorial analysis; structural equation model; serial mediation analysis. Multigroup analysis was performed by comparing the unconstrained model with the constrained models.	Moderate
Rodrigues et al. (2019)	Portugal	Cross-Sectional	544 (54%)	M = 35.00; SD = 11.57	Interpersonal Behavior Questionnaire, Portuguese version; Basic Psychological Needs Satisfaction and Frustration Scale, Portuguese version; Behavioral Regulation in Exercise Questionnaire, Portuguese version three items were created to measure exercisers' intention to engage, Ajzen.	Confirmatory factor analysis (CFA); structural equation model (SEM). Multi-group analysis was performed, considering: the unconstrained model; measurement weights; structural weights; structural covariances; structural residuals; and measurement residuals.	Moderate
Rodrigues et al. (2020) – Study I	Portugal	Cross-Sectional	437 (53%)	M = 31.14; SD = 9.47	Interpersonal Behavior Questionnaire (IBQ); Basic Psychological Needs Satisfaction and Frustration Scale; software reported adherence.	Structural equation models; coefficient viability composite; bivariate correlation; chi-squared correction; comparative fit index; Tucker-Lewis Index; standardized root mean square residual; root mean error of Approximation (RMSEA).	Moderate
Rodrigues et al. (2020) – II			487 (48%)	M = 31.42; SD = 9.66	Perceived Motivational Climate in Exercise Questionnaire; Basic Psychological Needs in Exercise Scale; Software reported adherence.		Moderate
Weyland et al. (2020)	Germany	Longitudinal	226 (64%)	M = 36.90; SD = 5.25	Past Exercise Behavior, and Attendance; Self-Report, Feeling Scale, Felt Arousal Scale; Automaticity by Self-Report Habit Index.	Descriptive statistics: Means, standard deviations, covariance matrix; maximum likelihood.	Moderate
Beshears et al. (2021)	United States	RCT	2508	n.d.	Self-report; software reported attendance; routine (habit)	Descriptive statistics; Regression Analysis.	Moderate
Faria et al. (2021)	Portugal	Cross-Sectional	298 (61%)	M = 36.40; SD = 10.61	Questionnaire for Preference for and Tolerance of the Intensity of Exercise Questionnaire (PRETIE-Q-PT); Subjective Vitality Scale (SVS) Portuguese scale; Self-Report Behavioral Automaticity Index (SRBAI).	Descriptive statistics; Indirect effect analysis; bootstrap test.	Strong
Marques et al. (2022)	Portugal	Cross-Sectional	485 (56%)	M = 39.9; SD = 11.6	Preference for and Tolerance of the Intensity of Exercise Questionnaire (PRETIE-Q-PT); Subjective Vitality Scale (SVS) Portuguese version; Self-Report Behavioral Automaticity Index (SRBAI)- Portuguese version; Electronic assessment control frequency.	ANOVA, Tukey post-hoc; omega-square.	Strong

Study risk of bias assessment

We used the Effective Public Health Practice Panacea Project (EPHPP) Quality Assessment Tool for Quantitative Studies (QATQS) developed by Thomas et al. (2004), to assess the risk of bias in the included studies. The QATQS is a versatile instrument designed to evaluate both experimental and non-experimental studies. This tool comprises six methodological domains: (1) selection bias, (2) study design, (3) confounders, (4) blinding, (5) data collection methods, and (6) withdrawals and dropouts. Each domain is classified into three items, namely, strong (1), moderate (2), and weak (3). Two researchers (PM and JF) evaluated the studies using the QATQS. Any discrepancies in scoring were resolved among the reviewers, and if any disagreements remained unresolved, a third researcher was consulted for a final decision (DT). To ensure consistency, all researchers were debriefed and trained on the use of the QATQS before the assessment.

RESULTS

Study Selection

Figure 1 provides an overview of the literature research process, displaying the number of reviews excluded and included based on the pre-defined inclusion and exclusion criteria related to psychological determinants that can impact exercise behavior. The electronic database search initially yielded 6.362 potentially relevant records, out of which 5.982 records were excluded based on relevance and duplicates. The remaining 380 records underwent title and abstract screening, resulting in a selection of 49 articles. Upon a careful evaluation of the full-text articles, the selection was narrowed down to 16 articles that met the eligibility criteria. Additionally, we identified 9 potentially relevant articles by analyzing bibliographic references from other sources. After a thorough analysis, 7 articles were excluded for not meeting the eligibility criteria, resulting in a final sample of 18 articles for a detailed analysis.

Study characteristics

Table 1 and Table 2 summarize the descriptive data collected from the 18 studies included in this review. The total sample size of apparently healthy exercisers was 12.515. All the studies mentioned involved some form of intervention or experimental design: eleven studies used a cross-sectional design, six studies adopted a longitudinal design, and one study implemented a randomized controlled trial (RCT) design. Additionally, Figure 1 provides an overview of the literature search process and displays the number of excluded and included reviews based on the inclusion and exclusion criteria. The final sample underwent a detailed analysis to identify psychological determinants that can influence adherence to regular exercise practice.

Figure 1

Study Chart

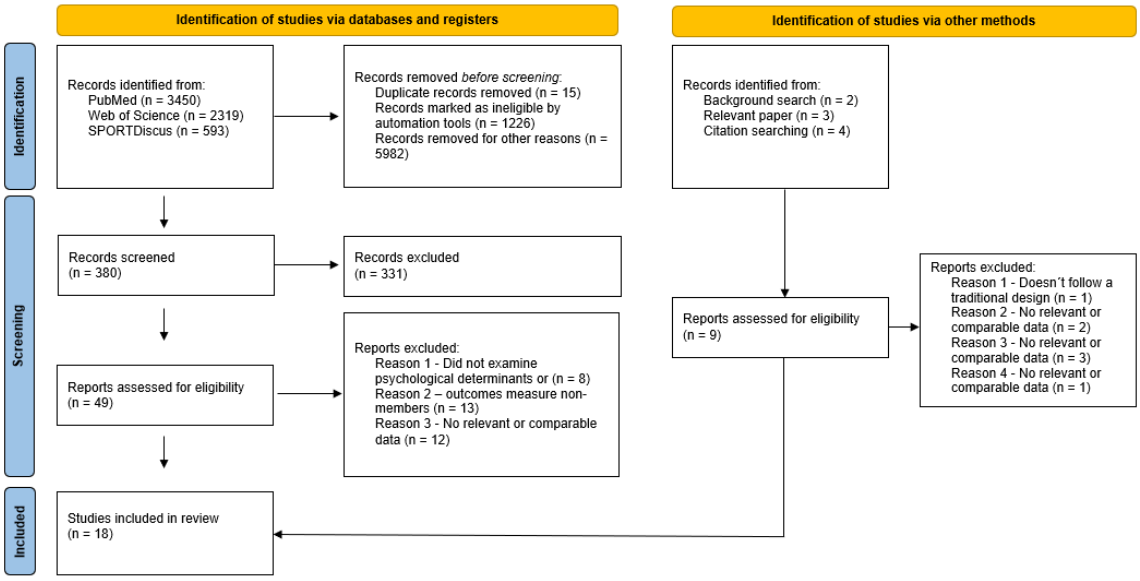

Table 2

Summary of studies' and samples' characteristics.

Characteristics	Studies (%)	Sample K (%)
SAMPLE SIZE	18 total*	19
<150	4 (21%)	308 (2%)
150-499	11 (58%)	3340 (27%)
500-999	2 (11%)	1119 (9%)
>1000	2 (19%)	7748 (62%)
SEX		
Mix Sexes	16	9757 (78%)
Female	n.d.	4617 (37%)
Male	n.d.	5140 (41%)
Undisclosed	2 (11%)	2758 (22%)
LOCATION		
North America	5 (28%)	5 (26%)
South America	2 (11%)	2 (11%)
Europe	10 (56%)	11 (58%)
South Africa	1 (6%)	1 (5%)
MEAN AGE (years)		
18-29	3 (16%)	449 (4%)
30-40	13 (68%)	9293 (74%)
>40	1 (5%)	111 (1%)
n.d.	2 (11%)	2662 (21%)

Note. *Although the authors consider the total of the studies to be 18, in this table the total is considered to be 19 according to the number of the actual sub-studies comprised and reviewed. The second column refers to all of the independent samples across studies; n.d. = no date

Risk of bias in studies

The methodological quality of a collection of studies was assessed using the framework provided by the Effective Public Health Practice Project (Thomas et al., 2004). To evaluate methodological quality, we employed six-dimensional tools, including selection bias, study design, confounders, blinding, data collection method, withdrawals, and dropouts. These tools were associated with specific quality levels which were used to classify the studies into three distinct categories: strong, moderate, and weak. Among all the studies, two earned a strong rating: Faria et al. (2021); and Marques et al. (2022). Eleven studies were rated as moderate: Cid et al. (2007); Louw et al. (2012); Tappe et al. (2013); Middelkamp et al. (2016); Sperandei et al. (2016); Rodrigues et al. (2019, 2020a,); Koop et al. (2020); Weyland et al. (2020); Beshears et al. (2021); and Tappe et al. (2013). Four studies were assessed as weak: Kaushal et al. (2014); Maclntosh et al. (2015); Jekauc et al. (2015); Gjestvang et al. (2021). Table 3 provides a summary of the quality classification of the studies.

Table 3
General descriptive of component ratings.

		STRONG	MODERATE	WEAK
A)	**SELECTION BIAS**	7	10	1
B)	**STUDY DESIGN**	2	9	7
C)	**CONFOUNDERS**	2	4	12
D)	**BLINDING**	6	11	2
E)	**DATA COLLECTION METHOD**	9	7	2
F)	**WITHDRAWALS AND DROPOUTS**	4	11	3

Results of individual studies

After reviewing 18 studies that met the inclusion criteria, it was found that various psychological determinants may play a role in exercise behavior and adherence to HCG. To better understand the impact of these determinants on exercise behaviors, this review categorized them in determinants with theoretical similitudes.

The research suggests that certain psychological determinants are closely associated with maintaining a regular exercise routine. In particular, motivation emerges as an important role in exercise behavior, with more autonomous forms of motivation being linked to sustained adherence to exercise routines (Louw et al., 2012; Maclntosh et al., 2015; Cid et al., 2007; Sperandei et al., 2016; Rodrigues et al., 2020a, 2020b, 2020c; Gjestvang et al., 2021). In the same context of personal dispositions, five studies explored intrinsic and extrinsic motives using varied constructs and theoretical approaches (Cid et al., 2007; Tappe et al., 2013; Beshears et al., 2021; Koop et al., 2020; Gjestvang et al., 2021). Research indicates that people who find pleasure in exercising, enjoy social support, and engage in exercise for personal enjoyment are more likely to have autonomous motivation and develop a habit of exercising regularly. Conversely, providing incentives based solely on individual preferences had a weaker association with sustained exercise adherence (Beshears et al., 2021).

Six studies have focused on the formation of habits and their association with exercise. They have found that reinforcing exercise habits can lead positive association between automatic and persistent behavior. As individuals develop exercise habits, these behaviors tend to become more automatic and consistent behavior (Tappe et al., 2013; Kaushal et al., 2014; Weyland et al., 2020; Beshears et al., 2021; Faria et al., 2021; Marques et al., 2022). These studies suggest that several factors can help individuals develop exercise habits and that as these behaviors become more automatic, they also tend to be less reliant on conscious decision-making.

The importance of maximizing enjoyment and pleasure while engaging in physical activities has been emphasized in ten studies, albeit with different instruments and theoretical backgrounds (e.g., enjoyment as a motive

characteristic; enjoyment as an independent outcome by itself; enjoyment as an indirect product of individual traits). These studies highlight the necessity of deriving satisfaction and pleasure from exercise, as it consistently leads to increased commitment and regularity in physical activity Kaushal et al. (2014); Gjestvang et al. (2021).

More sparingly, some studies show that i) individuals who perceive greater behavioral control exhibit heightened dedication to physical activity (Sperandei et al., 2016; Koop et.al., 2020); ii) social support and interpersonal relationships play a pivotal role in reinforcing this correlation, as evidenced by various studies (Rodrigues et al., 2019, 2020a; Weyland et al., 2020; Beshears et al., 2021.; Faria et al., 2021; Marques et al., 2022); iii) self-efficacy (Sperandei et al., 2016; Maclntosh et al., 2015; Koop et al., 2020) and iv) intention (Rodrigues et al., 2019, 2020a) consistently emerge as contributors to enhancing positive emotional states, acting facilitators for maintaining exercise behavior. In particular, these studies underscore how self-efficacy and intention, among all psychological determinants studied, tend to positively impact emotions, consequently encouraging the consistent adoption and repetition of exercise behaviors.

DISCUSSION

This review analyzed the psychological determinants that could influence exercise behavior within the HCG context. The goal was to structure and systematize data that could help support future interventions targeting engagement and sustained commitment to exercise in these settings. Results show that research on this topic is still very scarce. The included studies encompass a wide range of variables, mainly focused on individual motivation, motives, enjoyment, intention, and exercise habit, and grounded in subjective and indirect observations. Given the high heterogeneity of context, method, and variables, the present results will be discussed herein structured in common findings that could be considered relevant to support exercise practice in HCG.

Regarding motivation, autonomous forms of motivation emerged as relevant for exercise behavior, showing a positive correlation with sustained adherence to exercise routines. In particular, individuals who are intrinsically motivated to exercise tend to exhibit positive associations with exercise adherence and maintenance. These results are in line with the vast literature grounded on the SDT (Self-Determination Theory) and should be considered in future efforts in this context. An additional outcome results from this work relates to the nature of individual motives for exercising. Intrinsic and extrinsic motives have been explored and tested in several studies through various constructs and theoretical approaches, with a particular focus on intrinsic and extrinsic motives. Motives often precede motivation and recognizing and understanding the individual motives for exercise can have a positive impact on motivation and adherence. These findings suggest a positive association between intrinsic motives and exercise outcomes, including exercise frequency and adherence. Additionally, Louw et al. (2012) and Rodrigues et al. (2020c) suggest that extrinsic motives have a negative association with exercise outcomes, which, once again, is aligned with SDT assumptions (Ryan & Deci, 2017; Teixeira et al., 2012) For instance, dependence solely on external factors, such as social recognition or tangible rewards, can impede long-term exercise adherence. In line with this, Beshears et al. (2021) examined the impact of diverse external incentives and found that individuals predominantly motivated by external factors tend to discontinue their exercise routines prematurely.

On another topic of discussion, several studies have consistently reinforced the role of habit formation in promoting long-term exercise behavior (Tappe et al., 2013; Kaushal et al., 2014; Weyland et al., 2020; Beshears et al., 2021; Faria et al., 2021; Marques et al., 2022). These studies emphasized the importance of habit formation in the automaticity of the behavior, which tends to have a positive association with the continuity of long-term exercise behavior. However, it became evident that habit formation was influenced by a variety of other psychological determinants, including interpersonal behavior, perceived barriers, social support, and attitudes. This wide range of influences introduces uncertainty about whether habit is a predictor or an outcome of exercise behavior, an issue already explored in a recent review (Feil et al., 2021), and a topic in need of future exploration. Additionally, for a behavior to become a firmly established habit, the research underscores intention as a crucial predictor for behavior

to transition from intention to a natural or spontaneous state, particularly when past experiences are characterized by positivity and joyful actions, as highlighted in studies by Kaushal et al. (2014), Jekauc et al. (2015), and Rodrigues et al. (2019). In addition, other factors tend to influence adherence, intention, and persistence in physical activity, as explored by Sperandei et al. (2016), such as perceived barriers and social support. These factors may intersect with motivational determinants, such as autonomy, which are necessary to motivation theories, as studied by Rodrigues et al. (2020b). Collectively, these studies suggest that interventions on these psychological determinants may be effective in promoting habit formation and supporting the maintenance of exercise behavior over the long term.

Another topic of discussion regarding the potential psychological determinants of exercisers in HCG was introduced by several studies. For example, Rodrigues et al. (2019) suggested that fitness trainers had a significant role in influencing exercisers' commitment to regular exercise and meeting their psychological needs. Specifically, it highlighted the importance of instructors avoiding behaviors that might undermine exercisers' intentions to continue exercising and frustrate their basic psychological needs. In addition, other studies emphasized the importance of need-supporting behaviors, with a particular focus on interpersonal support, in facilitating engagement in adherence to exercise programs (Rodrigues et al., 2020a, 2020c). Once more, these determinants are heavily grounded in SDT assumptions (e.g., Rodrigues et al., 2018; Ryan & Deci, 2017). However, studies grounded in other theoretical frameworks also supported these assumptions, as seen in Jekauc et al. (2015), Middelkamp et al. (2016), and Rodrigues et al. (2020b, 2020c), where important insights into the role of social support and autonomy to exercise adherence were provided. These collective findings significantly contribute to the affirmation of the importance of the quality of interpersonal dynamics in the continuous adherence to exercise programs.

The studies conducted by Faria et al. (2021) and Marques et al. (2022) explored the potential and indirect relationship between affective responses to exercise, studied by exploring individual intensity traits and their level of agreement with the current exercise regime, and exercise habit, intention, and persistence. Faria et al. (2021) emphasized the positive association between potential affective responses and adherence rates, highlighting the importance of exercise professionals paying attention to clients' affective responses during exercise to promote better adherence and enjoyment, evidenced by the positive association detected with exercise habit. Marques et al. (2022) research delved into the associations between intensity traits, exercise training intensity, subjective vitality, exercise habit, and weekly exercise frequency within a one-year period. The author's findings emphasized the importance of recognizing individual differences in preference/tolerance traits to promote exercise persistence and design effective exercise programs, sustaining that positive affective responses could be one of the reasons for sustaining exercise maintenance in this context. While both studies converge on the importance of understanding affective responses in exercise settings, they diverge in their focal points. Faria et al. prioritize the influence of affective responses on adherence (through habit development), whereas Marques et al. emphasize the significance of individual preference/tolerance traits for exercise persistence and program design. Integrating insights from both studies could pave the way for more comprehensive and personalized exercise interventions, a topic of potential relevance for future research endeavors.

Other less-studied potential psychological determinants were detected in the included studies. The role of these is still poorly explored, indirectly assessed, or extrapolated within the context of each study. The general sense of the results of the present study clearly shows that there is a gap between the claims of several theoretical frameworks and evidence of operational (context applied) evidence. More experimental studies, grounded in BCT and relevant theories, translated to the context needs (e.g., clients and professional characteristics) are still needed to help fight the scourge of abandonment and physical inactivity.

Study Limitations and Future Directions

This systematic literature review has explored the psychological determinants influencing exercise behaviors in HCG. However, it is important to acknowledge its limitations and outline future study directions. One of the main

challenges is the high heterogeneity in methodologies and results among the included studies. This heterogeneity can make it difficult to draw clear conclusions and generalize findings, affecting the overall reliability of the review. Moreover, many of the studies analyzed in this context rely on non-experimental studies (e.g., cross-sectional study designs), which provide a snapshot of data at a specific point in time. However, they fail to establish causality and provide a comprehensive understanding of how psychological determinants influence exercise behavior over time. It is also important to note that while we have identified other potentially relevant determinants (e.g., attitudes, self-efficacy), the precise impact of these determinants on sustained exercise adherence remains uncertain. Considering mediators and moderators is necessary to better understand the complexities of the relationships between psychological determinants and exercise behavior. Another limitation is the insufficient consideration of participant age as a potential moderator in the relationship between psychological determinants and exercise adherence. While the reviewed studies included participants across a broad age range (mean ages ranging from 23.6 to 47.7 years), most did not analyze how age-specific factors might influence these relationships. Future research should address this gap by investigating the role of age in moderating the effects of psychological determinants, as such insights could help develop more tailored and effective interventions. Further research is needed for a deeper understanding of the extent of their influence and how they interact with other factors.

CONCLUSIONS

Present study results indicated that autonomous motivation, particularly intrinsic motivation, was positively associated with adherence and persistence in exercise programs. Additionally, individual motives (intrinsic vs. extrinsic), exercise habit, intention, enjoyment, and affective response were detected as potentially relevant psychological determinants influencing exercise persistence. Given the high heterogeneity of the studies, methods, and variables studied, caution is warranted when interpreting these results. Currently, there is insufficient evidence to adequately propose a strong focus of future research on the detected determinants, and more experimental, operational, and evidence-based approaches are needed to understand how to establish conditions conducive to long-lasting and health-promoting exercise in HCG.

PRACTICAL APPLICATIONS

Knowing how to promote and support motivation is paramount for those performing exercise evaluation, prescription, and evaluation. The findings of this systematic review reinforce that several psychological determinants can be relevant for adherence. It is suggested that professionals and HCG must develop the conditions to properly evaluate the motivational profile of the exercisers and continuously act upon it to ensure sustained practice.

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Appendix 1. Sample MEDLINE search strategy

Description	Search terms
Limit: humans only and language	((humans[Filter]) AND (english[Filter]))
Limit: Adult: 18+ years	((18+ years [Filter])
health club:	"fitness centers"[MeSH Terms] OR ("fitness"[All Fields] AND "centers"[All Fields]) OR "fitness centers"[All Fields] OR ("health"[All Fields] AND "club"[All Fields]) OR "health club"[All Fields]
Gymnasium:	"fitness centers"[MeSH Terms] OR ("fitness"[All Fields] AND "centers"[All Fields]) OR "fitness centers"[All Fields] OR "gymnasium"[All Fields] OR "gymnasiums"[All Fields]
Fitness center:	"fitness centre"[All Fields] OR "fitness centers"[MeSH Terms] OR ("fitness"[All Fields] AND "centers"[All Fields]) OR "fitness centers"[All Fields] OR ("fitness"[All Fields] AND "center"[All Fields]) OR "fitness center"[All Fields]
Fitness:	"fitness"[All Fields] OR "fitnesses"[All Fields]
Psychological:	"psychologic"[All Fields] OR "psychological"[All Fields] OR "psychologically"[All Fields] OR "psychologization"[All Fields] OR "psychologized"[All Fields] OR "psychologizing"[All Fields]
Determinants:	"analysis"[Subheading] OR "analysis"[All Fields] OR "determination"[All Fields] OR "determinant"[All Fields] OR "determinants"[All Fields] OR "determinate"[All Fields] OR "determinated"[All Fields] OR "determinates"[All Fields] OR "determinating"[All Fields] OR "determinations"[All Fields] OR "determine"[All Fields] OR "determined"[All Fields] OR "determines"[All Fields] OR "determining"[All Fields]
Determinant:	"analysis"[Subheading] OR "analysis"[All Fields] OR "determination"[All Fields] OR "determinant"[All Fields] OR "determinants"[All Fields] OR "determinate"[All Fields] OR "determinated"[All Fields] OR "determinates"[All Fields] OR "determinating"[All Fields] OR "determinations"[All Fields] OR "determine"[All Fields] OR "determined"[All Fields] OR "determines"[All Fields] OR "determining"[All Fields]
Correlator:	"correlator"[All Fields] OR "correlators"[All Fields]
Mediator:	"mediated"[All Fields] OR "mediational"[All Fields] OR "mediator"[All Fields] OR "mediator's"[All Fields] OR "mediators"[All Fields] OR "negotiating"[MeSH Terms] OR "negotiating"[All Fields] OR "mediate"[All Fields] OR "mediates"[All Fields] OR "mediating"[All Fields] OR "mediation"[All Fields] OR "mediations"[All Fields]
Moderator:	"moderate"[All Fields] OR "moderated"[All Fields] OR "moderately"[All Fields] OR "moderates"[All Fields] OR "moderating"[All Fields] OR "moderation"[All Fields] OR "moderational"[All Fields] OR "moderations"[All Fields] OR "moderator"[All Fields] OR "moderators"[All Fields]
Contributor:	"contributor"[All Fields] OR "contributors"[All Fields]
Modifier:	"modifiable"[All Fields] OR "modified"[All Fields] OR "modifier"[All Fields] OR "modifiers"[All Fields] OR "modifies"[All Fields] OR "modify"[All Fields] OR "modifying"[All Fields]
Confounder:	"confound"[All Fields] OR "confounded"[All Fields] OR "confounder"[All Fields] OR "confounders"[All Fields] OR "confounding"[All Fields] OR "confounds"[All Fields]
Pattern:	"behavior"[MeSH Terms] OR "behavior"[All Fields] OR

	"behavioral"[All Fields] OR "behavioural"[All Fields] OR "behavior's"[All Fields] OR "behaviorally"[All Fields] OR "behaviour"[All Fields] OR "behaviourally"[All Fields] OR "behaviours"[All Fields] OR "behaviors"[All Fields] OR "pattern"[All Fields] OR "pattern's"[All Fields] OR "patternability"[All Fields] OR "patternable"[All Fields] OR "patterned"[All Fields] OR "patterning"[All Fields] OR "patternings"[All Fields] OR "patterns"[All Fields]
Predictor:	"predictor"[All Fields] OR "predictors"[All Fields]
Adherence:	"adherance"[All Fields] OR "adhere"[All Fields] OR "adhered"[All Fields] OR "adherence"[All Fields] OR "adherences"[All Fields] OR "adherent"[All Fields] OR "adherents"[All Fields] OR "adherer"[All Fields] OR "adherers"[All Fields] OR "adheres"[All Fields] OR "adhering"[All Fields]
Maintenance:	"maintenance"[MeSH Terms] OR "maintenance"[All Fields] OR "maintenances"[All Fields]
Dropout:	"dropout"[All Fields] OR "dropouts"[All Fields]
Persistence:	"persist"[All Fields] OR "persistance"[All Fields] OR "persistant"[All Fields] OR "persisted"[All Fields] OR "persistence"[All Fields] OR "persistences"[All Fields] OR "persistencies"[All Fields] OR "persistency"[All Fields] OR "persistent"[All Fields] OR "persistently"[All Fields] OR "persistents"[All Fields] OR "persister"[All Fields] OR "persisters"[All Fields] OR "persisting"[All Fields] OR "persists"[All Fields]
Engagement:	"engage"[All Fields] OR "engaged"[All Fields] OR "engagement's"[All Fields] OR "engagements"[All Fields] OR "engages"[All Fields] OR "engaging"[All Fields] OR "social participation"[MeSH Terms] OR ("social"[All Fields] AND "participation"[All Fields]) OR "social participation"[All Fields] OR "engagement"[All Fields]
Sport:	"sport's"[All Fields] OR "sports"[MeSH Terms] OR "sports"[All Fields] OR "sport"[All Fields] OR "sporting"[All Fields]