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The preference for and tolerance of exercise intensity: An exploratory analysis of intensity discrepancy in health clubs settings

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Abstract

Health clubs are considered one of the most relevant contexts of exercise. However, they suffer from high dropout rates and struggle to keep exercisers enrolled in the long run. Considering the exercise intensity-affect relation, the main objective of this exploratory study was to test the relation of the discrepancy between the intensity traits and current exercise training intensity, and possible differences in subjective vitality, habit, and weekly exercise frequency. A total of 485 participants (female = 274) aged between 18 and 63 years ($M = 39.9$) enrolled in several activities participated in this study. Descriptive, correlational, and group comparison analyses were developed for study hypothesis testing. Results tend to support that different levels of agreement between the intensity traits and current training intensity have differentiated outcomes. Particularly, having both intensity traits in agreement with current training intensity depicted the most relevant scores for vitality, habit, and exercise frequency. Both traits in disagreement presented the worst scores.

Keywords Hedonism · Preference · Tolerance · Intensity · Health Club · Exercise

Health Clubs are one of the most relevant contexts of exercise practice in most countries (EC, 2018; IHRSA, 2020). However, high dropout issues persist and efforts trying to address this have fallen short, whit many reports indicating losses of around 50% in the first 6 months of practice (Buckworth et al., 2013; IHRSA, 2020; Sperandei et al., 2016). This concern has been the target of several endeavors aiming to explore the relationship between behavior change (and maintenance) techniques, and various theoretical frameworks (e.g., Self-Determination Theory: Deci & Ryan, 1985; Transtheoretical Model: Prochaska & Velicer, 1997; Theory of Planned Behavior: Ajzen, 1991) have emerged to address this issue (Klos et al., 2020; Kwasnicka et al., 2016; Rhodes et al., 2017).

One theoretical approach that has conceptualized affect as a predictor of exercise maintenance is the Affect and Health Behavior Framework (AHBF; Williams & Evans, 2014). This framework suggests that affect (i.e., core affect, emotions, and mood) and affect-related constructs (e.g., affect related cognition) are relevant correlates and determinants of physical activity. The AHBF organize them into four categories: i) affective response (i.e., how one feels during and immediately after an activity), ii) incidental affect (i.e., how one feels outside the behavior context and throughout the day or time passed after the activity), iii) affect processing (i.e., cognitive processing of previous affective responses; automatic: affective associations and implicit attitude; reflective: anticipated/remembered affective response and affective judgments), and iv) affectively charged motivation (i.e., motivational states based in past affective responses triggered both automatically (hedonic motivation) or reflective (e.g., intrinsic motivation)) (Stevens et al., 2020; Williams & Evans, 2014). That said, the AHBF sustains that the development and maintenance of a health behavior like physical activity result from a dynamic and continuous balance of

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these factors, where previous affective responses to exercise (during the activity and/or immediately after) can trigger automatic and reflective pathways of affect processing. These affective responses are sustained to have direct and indirect effects on several other behavior relevant factors (e.g., enjoyment, behavioral cues, intention, and motivation). Indeed, several systematic reviews have highlighted distinct aspects of the hedonic approach (i.e., pleasure promotion/displeasure avoidance) in physical activity related contexts and its promising role to support and develop a sustainable exercise practice (Chen et al., 2020; Klos et al., 2020; Rhodes & Kates, 2015).

Considering the multitude of activities and exercise modes usually available in gyms and health clubs, promoting a pleasurable exercise experience can be challenging for the exercise professional. One particularly relevant aspect related to the pleasure/displeasure one feels during and immediately after exercise (i.e., affective response) is exercise intensity. As reported in several studies with distinct exercise protocols, individuals usually report a better affective response as intensity increases. However, it is also reported that this tends to change with increasingly higher intensities (Ekkekakis et al., 2011). For example, a transition from the aerobic to the anaerobic energetic metabolism in an incremental treadmill test presented a quadratic decline in the participant's affective valence (Ekkekakis et al., 2004); additionally, when exercise intensities exceed the ventilatory threshold, declines in pleasure are always detected (Ekkekakis et al., 2004; Ekkekakis et al., 2008a). However, the magnitude of this perception (i.e., pleasure decline in high or increasing intensities) can be highly dependent on individual characteristics and exercise modes (Evmenenko & Teixeira, 2020; Ladwig et al., 2017; Rhodes & Kates, 2015).

Identifying a priori how an exerciser will respond to a prescribed exercise intensity can be advantageous. This may allow to adjust the affective experience and provide more individualized supervision and intervention. Theoretically, it may promote a pleasurable training experience and, despite being hypothetical at this point, impact incidental affect, affect processing, and affectively charged motivation (Ekkekakis et al., 2011; Stevens et al., 2020; Teixeira, Ekkekakis, et al., 2021a).

For this matter, the intensity traits proposed by Ekkekakis et al. (2005), and recently tested in the exercise context by Teixeira, Ekkekakis, et al. (2021a), aim to assess the individual preference (predisposition to select a particular exercise intensity) and tolerance (ability to exercise at an imposed level of intensity even when uncomfortable) regarding exercise intensity. These have been proposed to be relevant variables when aiming to address individual responses and adaptations to exercise intensity (Box & Petruzzello, 2020; Jones et al., 2018). Conceivably, exercisers who present their preference and/or tolerance in alignment with the intensity of the activities developed are hypothesized to depict better affective responses. This outcome may, given known literature, be positively associated with exercise adherence and other relatable outcomes (e.g., behavioral intention, well-being, motivation) (Faria et al., 2021; Teixeira, Ekkekakis, et al., 2021a; Teixeira & Palmeira, 2016; Teixeira, Rodrigues, et al., 2021b).

Current Study

As proposed by the AHBF, how one feels during or immediately after exercise can impact directly or indirectly the behavior (e.g., exercise frequency), and other affect-related constructs. Habit, for example, may be one of those relevant outcomes. Generally considered as one of the various non-conscious processes assumed to influence behavior, is defined as an acquired behavioral pattern related to context-behavior associations (Gardner et al., 2012). It has been proposed to be related to implicit regulatory processes, like the ones proposed by dual-process approaches (type 1: fast, non-conscious, and automatic; type 2: slow, conscious, and controlled) (Brand & Ekkekakis, 2018), and has been related to exercise adherence (Rhodes & Kates, 2015; Weyland et al., 2020). As stated by some authors, affective responses may be partially responsible for this automaticity development, and thus account for exercise maintenance (Feil et al., 2021; Rhodes & Kates, 2015). Thus, if a pleasurable experience can be promoted *during* exercise that elicits a better affective response (e.g., by an agreement between exercise intensity and individual traits), it is expected that by reflective, but mainly automatic processes as the ones proposed by the AHBF (e.g., affective association), there would be a support for the exercise habit development (Feil et al., 2021; Stevens et al., 2020).

Another example of an indirect possible outcome of affective responses is subjective vitality. It is considered a state of feeling alive and alert, and having energy available to the self (Ryan & Frederick, 1997). This construct is subjectively evaluated and represents a general life state and perception. In exercise, is usually positively associated with intrinsic motivation (which includes an enjoyment component) and positive affect, and negatively associated with negative affect (Faria et al., 2021; Guérin, 2012; Rodrigues, Faustino, et al., 2021a). As stated in the AHBF, intrinsic motivation is an affectively charged motivation that receives the influence of automatic and reflective affect processing, both dependent, although not exclusively, of exercise affective response. Additionally, subjective vitality may also reflect (indirectly) the state of the incidental affect, given that vitality is related to individual well-being which depends on emotional states (Faria et al., 2021; Rodrigues, Faustino, et al., 2021a). Thus, the promotion of a better affective response in exercise, as is

the case of the intensity adjustment through traits individual preferences, could elicit a better subjective vitality, which is a relevant outcome for the subjective exercise experience and adherence (Faria et al., 2021; Teixeira, Ekkekakis, et al., 2021a).

Thus, besides affective response associations with behavioral variables like exercise frequency and adherence, several other outcomes related to well-being (e.g., vitality) and known predictors of adherence (e.g., habit) are not fully understood in current research. Given all the aforementioned, the main objective of this exploratory cross-sectional study was to test the relation of the discrepancy between the intensity traits and current exercise training intensity, and possible differences in weekly exercise frequency, subjective vitality, and exercise habit, in a sample of health clubs exercisers. For that purpose, four groups representing the levels of agreement and/or disagreement for the two dimensions will be created (see method). It is hypothesized that the discrepancy between the intensity traits will present differentiated associations with the psychological and behavioral outcomes. Particularly, exercisers that report an agreement between both preference and tolerance and current training intensity should depict better scores on habit, subjective vitality, and exercise frequency (Faria et al., 2021; Teixeira, Ekkekakis, et al., 2021a; Teixeira, Rodrigues, et al., 2021b). Intercalated levels of agreement (i.e., preference in agreement and tolerance in disagreement, or preference in disagreement and tolerance in agreement) should present, in general, mixed results (i.e., lower or non-significant scores in subjective vitality, exercise habit, and exercise frequency). Thus, the present study may add new information regarding affective determinants relevant for a better subjective exercise experience, which aligns with the theoretical and empirical assumptions suggested for continuous adherence in gyms and health clubs.

Method

Participants

Data were collected from a sample of Portuguese volunteer gym exercisers enrolled in supervised activities in several clubs. The study involved a total of 485 participants (female = 274; male = 211) aged between 18 and 63 years ($M = 39.9$; $SD = 11.6$). All participants had at least 3 months of regular exercise practice (training experience: 3–6 months = 8.9%; 6–12 months = 7.0%; > 12 months = 84.1%). Exercise session duration was structured as: < 45 minutes = 39%; 45 to 60 min = 42%; > 60 min = 19%. To be included in the sample, the participants had to be ≥18 years old, speak and understand the Portuguese language, and have a minimum experience of 3 months in training activities in a gym or a health club. The sample size was determined through power calculations developed with G*Power v.3.1 (Faul et al., 2009). The following inputs parameters were defined for the one-way ANOVA (Denis, 2009): $f = .25$, $\alpha = .05$, $1\text{-}\beta = .80$, with 4 groups for comparison. The sample size calculation suggested 180 participants (180/4 = 45 per group).

Procedures

An invitation to complete an online sociodemographic and psychometric questionnaire developed in Google Forms was made available through mailing lists and social networks to anyone willing to participate. An explanation of the study purpose and expected participation was presented before the appearance of the questionnaire. Particularly, it was explained that participants could terminate their participation at any time, that no harm or consequence would exist in study participation and/or deliberate interruption. To access the questionnaires, participants needed to consent to the use of their data for research purposes and agree to participate in the study. The lead researcher's contact information was made available to clarify any remaining doubts regarding research purposes and participation. The present study is part of a research approved by the FEFD/ULHT ethics committee, and research was developed following the Helsinki Declaration and its later amendments. Responses were screened to verify whether the inclusion criterion was met. The time of completion was approximately 10 to 15 minutes for all data collection.

Instruments

Preference for and Tolerance of the Intensity of Exercise Questionnaire – Portuguese version (PRETIE-Q-PT; Teixeira et al., in 2021a). The instrument comprises 10 items representing the two scales that correspond to intensity-preference (i.e., *"While exercising, I prefer activities that are slow-paced and do not require much exertion"*) and intensity-tolerance (e.g., *"Feeling tired during exercise is my signal to slow down or stop"*). Questions are answered in a 5-point bipolar Likert scale ranging from 1 ("Totally disagree") to 5 ("Totally agree"). This instrument has been validated in this context and presented good psychometric properties (Teixeira, Ekkekakis, et al., 2021a). In present sample, both subscales present acceptable reliability (Cronbach's alpha; preference = .77; tolerance = .73). The instrument presents some questions that pertain to previous exercise experiences and feelings. Thus, and as suggested by the Portuguese validation authors, a minimum of 3 months of experience was defined as an inclusion criterion to account for this issue.

For study purposes, and considering the author's suggestions (Teixeira, Ekkekakis, et al., 2021a), two additional questions were added before this questionnaire application (i.e., "*The intensity of my training is in accordance with my preference"*; *"The intensity of my training is in accordance with my tolerance"*) to assess the discrepancy of current training intensity and the individual intensity traits. Answers given were coded with 0 (not in agreement/disagreement) or 1 (in agreement) (Teixeira, Ekkekakis, et al., 2021a) and four groups were created (group 1: Preference & Tolerance = 1; group 2: Preference & Tolerance = 0; group 3: Preference = 1 & Tolerance = 0; group 4: Preference = 0 & Tolerance = 1).

Subjective Vitality Scale - Portuguese version (SVS; Moutão et al., 2013). This 6-item scale assesses subjective vitality (e.g., "*I fell alive and vitalized*") using a 7-point bipolar Likert scale, ranging from 1 ("Totally disagree") to 7 ("Totally agree"). The score is obtained by averaging the values of all items. This scale has been previously used in studies in the physical activity context (Guérin, 2012). In the present sample, the scale presented good reliability (Cronbach's alpha = .88).

Self-Report Behavioral Automaticity Index - Portuguese version (SRBAI; Rodrigues, Fortes, et al., 2021b). This 4-item scale assesses acquired behavioral development related to exercise (e.g., *"I do without thinking"),* and is answered in a 7-point bipolar Likert scale ranging from 1 ("Totally disagree") to 7 ("Totally agree"). It has been previously used in similar studies and contexts (Feil et al., 2021). The internal consistency in the present study sample is considered good (Cronbach's alpha = .89).

Exercise frequency. Weekly attendance was measured through self-report. Participants were asked to report *"How many workouts do you do on average per week?"*

Statistical Analysis

Given the study's main objective, several statistical tests and approaches were developed. Particularizing, descriptive, bivariate correlations, and group comparisons through ANOVA were conducted using SPSS v. 25.0. Normality was analyzed using Shapiro Wilk (n < 50) and Kolmogorov-Smirnov (n > 50) tests, boxplots interpretation, and skewness/kurtosis scores analysis (normality accepted ranging from −2 to +2 and − 7 to +7, respectively); homogeneity interpretation was made with Levene's test. Effect sizes were calculated using ω^2, suggested in the literature as appropriate for ANOVA calculations, particularly when existing small sample groups (Albers & Lakens, 2018; Okada, 2013). Values (ω^2) of .01, .06, .14 indicate small, medium, and large effects respectively (Cohen, 1988; Field, 2013). Regarding ANOVA tests, post-hoc analyses using Tukey or Games-Howell, according to homogeneity assumptions, were used for pairwise comparisons (Ho, 2014). The significance level was set at 5% for all previously mentioned analyses.

Results

Normality tests revealed that the majority of the studied variables were normally distributed ($p > .05$). More detailed analyses were developed in those in which this preliminary analysis showed possible distribution issues. The exploration of boxplots and the skewness and kurtosis values indicated that no violation of normality was present, thus allowing for further analysis through parametric tests. Levene's test for homogeneity assumptions revealed some issues with preference, tolerance, and habit. Thus, according to several authors' recommendations (e.g., Ho, 2014), the Welch test adjusted scores and Games-Howell post-hoc procedures were applied for further testing and controlling type I errors.

Descriptive and bivariate correlational analyses of global sample are presented in Table 1. As seen, exercisers presented on average a preference ($M = 18.27$, $SD = 4.11$) and tolerance ($M = 16.49$, $SD = 3.95$) for moderate intensities (minimum 5; medium 15; maximum 25). Subjective vitality ($M = 5.41$, $SD = 1.00$) and habit ($M = 4.31$, $SD = 1.63$) presented above midpoint scores, and exercise frequency had an average of 4.03 sessions/week ($SD = 1.49$). For the correlational analysis, both preference and tolerance presented weak positive associations with all tested variables (all $p < .05$).

The four groups created by agreement levels (i.e., group 1: Preference & Tolerance = 1; group 2: Preference & Tolerance = 0; group 3: Preference = 1 & Tolerance = 0; group 4: Preference = 0 & Tolerance = 1) (0 = not in agreement/disagreement; 1 = in agreement) are represented in Table 2.

Table 1 Descriptive and bivariate correlation analysis of studied variables

	Min – Max	M	SD	Preference	Tolerance	Vitality	Habit
Preference	5–25	18.27	4.11	–			
Tolerance	5–25	16.49	3.95	.492***	–		
Subjective Vitality	2–7	5.41	1.00	.090*	.167***	–	
Habit	1–7	4.31	1.63	.111*	.204***	.354***	–
Frequency	1–7	4.03	1.49	.100*	.230***	.297***	.314***

M Mean, *SD* Standard Deviation, *N* Sample size; * $p < .05$; ** $p < .01$; *** $p < .001$

Table 2 Training experience distribution across groups

		Sample % (N)		
	N	3 to 6 months	6 to 12 months	> 12 months
Exercise Experience Global Sample	485	8.9 (43)	7.0 (34)	84.1 (408)
Exercise Experience Group 1 (Pref & Tol = 1)	325	6.8 (22)	6.8 (22)	86.5 (281)
Exercise Experience Group 2 (Pref & Tol = 0)	49	20.4 (10)	12.2 (6)	67.3 (33)
Exercise Experience Group 3 (Pref = 1 & Tol = 0)	64	3.1 (2)	3.1 (2)	93.8 (60)
Exercise Experience Group 4 (Pref = 0 & Tol = 1)	47	19.1 (9)	8.5 (4)	72.3 (34)

N Sample size, *Pref* Preference, *Tol* Tolerance

Regarding exercise experience, the two groups where preference was in disagreement (groups 2 and 4) presented a higher percentage of exercisers in the 3 to 6 months of exercise experience (20.4% and 19.1%), the group with both traits in disagreement presented the lowest number of exercisers training over 12 months (67.3%), and groups where preference was in agreement (group 1 and 3) presented the higher percentage of participants over 12 months (86.5% and 93.8%, respectively).

In Table 3 are depicted the results of the one-way ANOVA, where distinct groups of agreement on intensity traits, subjective vitality, habit and exercise frequency were tested, and mean and standard deviation scores are also presented per group. Results indicate differences between groups in subjective vitality [$F(3, 481) = 3.481$, $p = < .001$, $\omega^2 = .03$], habit [$F(3, 481) = 8.107$, $p = < .001$, $\omega^2 = .04$], and frequency [$F(3, 478) = 15.406$, $p = < .001$, $\omega^2 = .08$], revealing small to moderate effect sizes. Preference and tolerance did not present differences between groups. Group 2 (Pref & Tol = 0) depicted the lower average scores for the intensity traits.

Given ANOVA differences, pairwise comparisons were developed for subjective vitality, habit, and exercise frequency, and group differences are depicted in Table 3. For subjective vitality, group 1 and group 3 (mean difference = .425, $p = .009$) as for group 1 and group 4 (mean difference = .451, $p = .018$) depicted differences. In habit, group 1 and group 2 (mean difference = 1.041, $p = < .001$), group 2 and group 3 (mean difference = −1.370, $p = < .001$), and group 2 and group 4 (mean difference = −1.284, $p = < .001$) also present significant differences. For exercise frequency, group 1 and group 2 (mean difference = 1.338, $p = < .001$), group 1 and group 4 (mean difference = .768, $p = .004$), group 2 and group 3 (mean difference = −1.352, $p = < .001$), and in group 3 and group 4 (mean difference = .782, $p = .024$), significant differences emerged.

Discussion

This exploratory cross-sectional study aimed to test the relation of the discrepancy between the intensity traits and current exercise training intensity and possible differences in subjective vitality, exercise habit, and exercise weekly frequency, in a sample of health clubs exercisers. In general, results tend to support that distinct levels of agreement between the intensity traits and the current training intensity have differentiated outcomes in the studied outcomes. This presents preliminary evidence for exercise intensity and traits' agreement role in exercise adherence and well-being.

Considering the need for continuous development of methods and strategies to aid professionals supporting

Table 3 ANOVA analysis of distinct groups of agreement on intensity traits, subjective vitality, habit, and exercise frequency

	Group 1 Pref & Tol = 1 (*N* = 325)		Group 2 Pref & Tol = 0 (*N* = 49)		Group 3 Pref = 1 & Tol = 0 (*N* = 64)		Group 4 Pref = 0 & Tol = 1 (*N* = 47)		F	df	*p*	ω^2	Pairwise comparisons
	M	SD	M	SD	M	SD	M	SD					
Preference¥	18.18	4.06	18.04	5.08	18.56	3.85	18.77	3.73	.435	3, 481	.728	< .01	§
Tolerance¥	16.53	4.12	15.31	4.03	16.83	3.09	17.04	3.61	1.949	3, 481	.121	.01	§
Vitality	5.54	.97	5.20	.97	5.11	1.08	5.09	.94	6.260	3, 481	< .001	.03	1 ≠ 3, 4
Habit¥	4.35	1.68	3.31	1.14	4.68	1.63	4.59	1.31	8.107	3, 481	< .001	.04	2 ≠ 1, 3, 4†
Frequency	4.24	1.39	2.90	1.48	4.25	1.65	3.47	1.28	15.406	3, 478	< .001	.08	1 ≠ 2, 4; 3 ≠ 2, 4

M Mean, *SD* Standard Deviation, *Pref* Preference, *Tol* Tolerance; 0 = in disagreement; 1 = in agreement; F = Test score, df = Degrees of Freedom; *p* = significance value; ω^2 = Omega Squared; ¥ = Welch test adjusted scores; § = no differences detected; † = Games-Howell post-hoc

exercise persistence, the exploratory approach of the present study focused on intensity-dependent possible associations and differences grounded in hedonic assumptions. In the first analysis, the present sample of exercisers demonstrated above midpoint scores for preference and tolerance, which aligns with previous studies on this context (Faria et al., 2021; Smirmaul et al., 2015; Teixeira, Ekkekakis, et al., 2021a). No differences emerged in group comparison regarding the intensity traits. However, group 2 (preference and tolerance in disagreement) presented the lowest scores of all groups. Despite statistical indications, in future analyses with different samples sizes and characteristics, it may be relevant to consider the possible impact that these differences may have on individuals. For example, if a group class is applied equally to a heterogeneous group, it is expected that exercisers with, for example, moderate tolerance (value around 15 in traits score), may perceive intensity changes as more unpleasant than the ones with moderate-to-vigorous tolerance (values around 20). This hypothesis has received some support in similar contexts and modalities, where a higher tolerance trait seems to present a different 'flexibility' toward intensities changes, and thus possibly depicting better affective and enjoyment results in a wider intensity spectrum (Box & Petruzzello, 2020; Teixeira, Rodrigues, et al., 2021b). This may suggest that the magnitude of individual implications for these partially overlapping scores (i.e., moderate vs. moderate-to-vigorous) may warrant future attention, particularly in the tolerance trait.

Additionally, exercise experience in each group presented some differentiation, highlighting the importance of the intensity agreement. The results tend to suggest that the agreement of the training with both traits (group 1) depicts a higher percentage of participants with more than 12 months of practice (86.5%). Interestingly, a similar result was obtained in the other group with preference agreement (group 3; 93.8%). This could be an indicator that preference may be of particular interest for exercise persistence, evidence shown previously in a similar context. In Ekkekakis et al. (2008a), both traits were associated with the frequency of strenuous exercise and total leisure-time exercise scores. Globally, these indicators tend to demonstrate the influence of the intensity traits in exercise participation, although the magnitude of the effects and impacted variables is not clear yet.

The analyses focused on testing differences between the four groups presented support for the proposed study hypothesis. As reported, subjective vitality, habit, and exercise frequency presented significant differences across groups, and small to moderate effect sizes. The *post-hoc* analysis also indicated several differences in these variables. Results suggest that exercisers that perceive their training as aligned with their intensity traits present better exercise habit scores (all mean differences >1 scale point), but particularly, having both traits in disagreement appears to be particularly detrimental ($M = 3.31$; below midpoint). This trend also emerged in exercise frequency, particularly between group 1 and group 2 (both traits in agreement vs. both traits in disagreement) with a mean difference representing >1 weekly training. These results align with Teixeira, Ekkekakis, et al. (2021a) and Teixeira et al. (2022) suggestions of a distinct role of traits agreement in health club exercisers, where both traits agreement depicted higher associations with exercise frequency, subjective vitality, and well-being, and no relevant association emerged with traits disagreement.

Globally, results confirm the presented hypothesis grounded in the AHBF exploration of the affective response and the role of exercise intensity. The exercisers who presented a better alignment with the intensity traits, and thus hypothesized as having a better affective response, showed higher scores in the health behavior (i.e., exercise frequency). This also manifested with subjective vitality, proposed to be associated with affective response and intrinsic motivation (Faria et al., 2021; Rodrigues, Faustino, et al., 2021a). Given that the relation between vitality and contextual, somatic, and motivational aspects are generally indirect and not wholly straightforward (Ryan & Frederick, 1997), results seem to support the AHBF paths that relate affective response, affectively charged motivation, and incidental affect. In the present study, subjective vitality presented significant, albeit weak, associations with the intensity traits, and depicted group differences, which may reflect the indirect interactions postulated. As for habit, it has been proposed that *"performing physical activity can become habitual through automatically executed sub-actions"* (Feil et al., 2021, p. 2), and affect can be positively related to that automaticity (Rhodes & Kates, 2015; Weyland et al., 2020). Thus, the intensity-traits agreement hypothesis of promoting a better affective response may present advances in habit formation and may be relevant for exercise sustainability.

Considering results as a whole, it seems that exercise performed in alignment with the intensity traits depicts an advantageous approach, and mounting evidence tends to highlight this conceptual and contextual approach as relevant for the intervention of professionals aiming to address individual affective responses and subsequent improvements in exercise behavior. The results thus extend the knowledge on the intensity-affect response relation, and highlight some of the proposed AHBF categories direct and indirect associations that can emerge from the affective response to exercise. For example, an improved affective response may be relevant for enjoyment development, presented in the AHBF as a reflective process, and posited in literature as a key determinant for exercise participation (Klos et al., 2020; Teixeira et al., 2022), and even influence intrinsic motivation, defined as an affectively charged motivation (Stevens et al., 2020),

thus presenting multiple pathways for a positive influence on exercise behavior.

Study Limitations and Future Directions

The present exploratory study presented a new approach to a possible exercise selection and adjustment focused on the intensity-pleasurable dynamics and relatable outcomes performed in health clubs. Despite the strengths of the study, some limitations should be acknowledged for adequate study interpretation and future research developments.

First, it should be considered that some of the proposed associations and theoretical connections are still grounded mainly in exploratory and cross-sectional studies. Thus, despite several studies and systematic reviews suggesting the presented assumptions and relations, this is still an emerging line of research, particularly regarding exercise performed in health clubs, and further efforts must be made to test these assumptions.

Additionally, the present study sample was composed mainly of regular and long-term exercisers (84.1% had >12 months of training experience and an exercise frequency $M = 4.03$ workouts per week). This could bias results in several ways, particularly because i) the majority of the sample appeared to have integrated exercise behavior in their life, thus possibly representing the exercisers that with time have found an adequate equilibrium between the intensity traits and the exercise practice developed, and ii) that the intermediate agreement and disagreement groups had lower sample sizes, which may justify conducting more extensive research with heterogeneous groups, in order to clarify whether these traits may account for possible statistical bias/errors.

Another limitation that needs to be addressed in future studies is related to the current definition of agreement/disagreement levels and groups. As stated, this study follows the recommendations of one of the preliminary studies related to the intensity traits in health clubs (Teixeira, Ekkekakis, et al., 2021a). However, the dichotomous approach could limit the understanding of *to what extent* the exerciser is in agreement or disagreement with each trait. Thus, future approaches should aim to explore group creation and/or segmentation with other methodological approaches (e.g., latent profile analysis; response surface analysis), aiming to verify and extend the comprehension of present results.

In conclusion, the results of this study present support for the importance of preference and tolerance intensity traits in exercise prescription and supervision, given their indirect ability to understand the pleasurable response to the exercise program. In the global sample, exercisers presented an inclination to moderate-to-vigorous intensity preference and tolerance, and 67% (N = 325) reported having the current workout aligned with both intensity traits. Preference stood out as a possible indicator of exercise persistence, analyzed through the percentage of exercisers enrolled over 12 months. In group comparisons, having both intensity traits in agreement with current training depicted the most relevant scores for subjective vitality, habit, and exercise frequency. Both traits disagreement presented the worst scores.

Data Availability The datasets generated during and/or analyzed during the current study are not publicly available due to study privacy and ethics committee definitions, but are available from the corresponding author upon reasonable request.

Declarations

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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

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