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Personality traits and preferred exercise environment of fitness club members

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Background: Fitness environment can be adjusted to better combine with salient personality characteristics. Nevertheless, previous research seems to neglect the personal characteristics of individuals. It would be beneficial if the fitness club environment will be adapted to the personality characteristics of their visitors because these changes could increase adherence to various exercise programs. However, there is a lack of research on individual preferences and predispositions of fitness club members. **Objective:** The purpose of the present study was to assess associations between personality traits and physical/social environment preferences of fitness club members. **Methods:** A total of 613 fitness club members (286 men and 327 women), age ($M \pm SD$) 29.2 ± 10.1 years, answered 15 questions regarding physical and social environment preferences and the short version of the NEO-Five Factor Inventory. **Results:** The path analysis showed that a general personality factor, represented by Conscientiousness, Extraversion, and Agreeableness, predicted preferred environment in a fitness club setting, especially concerning to performing new/repeated exercises and social aspects of exercise. Furthermore, Openness and Neuroticism did not correlate to fitness club exercise practice preferences. **Conclusions:** The study found evidence suggesting that a general personality factor represented by Extraversion, Conscientiousness, and Agreeableness can predict preferred fitness environment regarding the performance of new/repeated exercises and social aspects of the exercise.

Keywords: preferences, individual differences, physical activity, gym

Introduction

It is widely known that substantial psychological and physiological benefits are related to regular physical activity and exercise (Burke, Carron, Eys, Ntoumanis, & Estabrooks, 2006; Daley & Maynard, 2003; Kantomaa, Tammelin, Ebeling, & Stamatakis, 2015). Physical inactivity is the fourth leading risk factor for death worldwide (World Health Organization, 2018), and, should insufficient levels of physical activity be held, the desired 10% global reduction in physical inactivity levels in 2025 will not be achieved (Guthold, Stevens, Riley, & Bull, 2018). In this context, adherence is an important issue regarding exercise. For example, those who decide to engage in a regular physical activity program tend to quit within the first six months (Buckworth, Dishman, O'Connor, & Tomporowski, 2013; Nigg, Borrelli, Maddock, & Dishman, 2008). Thus, it seems reasonable that if the health goal pursued worldwide is to increase participation of individuals in regular physical activity (World Health Organization, 2018), it is crucial to add to the research agenda the investigation of individual factors that influence the adherence to physical activity programs.

Participation in exercise programs enables coexistence, fun, social inclusion, social identity, feeling of belonging, and entertainment (Burke et al., 2006; Kantomaa et al., 2015; Parfitt & Gledhill, 2004; Rhodes & Smith, 2006). In addition, people engaged with physical activity programs self-declared greater improvements in positive affect when practicing high preference exercise modes (Hutchinson & Sherman, 2014; Miller, Bartholomew, & Springer, 2005). These psychological and social characteristics of exercise can be related to an important individual factor that has been examined regarding regular exercise: the

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personality trait. The Five-Factor Model (FFM; Costa & McCrae, 1992, 1995), also known as the Big-5, has arguably been the most dominant instrument used in the study of personality traits. This model assumes the existence of five relatively stable dimensions – Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism. The Openness trait indicates how open-minded a person is. Conscientiousness reflects the tendency to be responsible, organized, hard-working. Extraversion entails characteristics of creativity, activity and the search for stimuli. Agreeableness is related to being trustworthy, altruistic, honest, and cooperative. Neuroticism is associated with emotional (in)stability, anxiety, and vulnerability (Meira, Gomes, Gomes, Santos, Basso, & Tani, 2019).

These traits have been identified as predictors of behavior patterns, which can be applied to a wide range of situations (Ozer & Benet-Martínez, 2006), including physical activity settings (Butković, Hlupić, & Bratko, 2017; Rhodes, 2006; Rhodes & Smith, 2006; Wilson & Dishman, 2015). Studies' findings on personality traits and physical activity have suggested that individuals with high levels of Extraversion and Conscientiousness and low levels of Neuroticism are most likely to have a physically active lifestyle (Butković et al., 2017; Hoyt, Rhodes, Hausenblas, & Giacobbi, 2009; Rhodes & Smith, 2006; Wilson & Dishman, 2015). Considering the fundamental characteristics of Extraversion (i.e., the tendency to seek excitement and to be sociable, assertive, and energetic) and Conscientiousness (i.e., the tendency to be self-disciplined, and achievement-oriented), it is plausible to admit that those with high scores on these dimensions are more prone to adhere to physical activity. Moreover, individuals who have low levels of Neuroticism tend to be emotionally stable and to have lower anxiety levels (Rhodes & Smith, 2006). This predisposition seems to facilitate readiness for physical activity or the search for practice opportunities (Wilson & Dishman, 2015). However, given that Neuroticism is related to an increased capacity for autonomic response to intense stimuli and predisposition to negative effects (Eysenck, 2017), lower scores on this trait would help to explain the permanence in exercise programs, even if the individual perceives as negative the physiological response to increased stimulation during exercise.

Physical activity preferences may include several general attributes, such as exercise type, surrounding environment, and trait characteristics. Nevertheless, previous research on the topic seems to neglect the personal characteristics of individuals (Cohen-Mansfield, Marx, Biddison, & Guralnik, 2004; Rhodes & Smith, 2006). In this vein, physical activity interventions seem to be most beneficial when adapted to particular preferences (Burke et al., 2006), such as personality traits. The present study is aimed at assessing associations between personality traits and physical and social environment preferences in fitness club members. As multiple aspects of personality traits and exercise were addressed in this paper, we did not develop a set of a priori hypotheses; instead, we raised the following general expectation which was built upon previously available research: aspects of social behavior, practice supervision, and exercise type are associated with Extraversion, Conscientiousness, and Neuroticism (Bogg, 2008; Courneya & Hellsten, 1998; Rhodes, 2006; Rhodes & Smith, 2006; Wilson & Dishman, 2015).

Method

Participants

Participants (N = 613) were 286 men and 327 women, aged from 15 to 66 years, 84% of young adults (18–40 years old), 5% of adolescents (15–17 years old), and 11% middle-aged/elderly (41–66 years old). Mean age of the sample was 29.2 years, with a standard deviation of 10.1 years. They were enrolled in five fitness clubs in the metropolitan area of São Paulo, Brazil. We did not stratify the sample by gender and age in favor of statistical power.

University Ethics Committee approved the study, CAAE 49991115.3.0000.5390, under the observance that participants and/or parents/tutors read and signed an informed consent, which assured anonymity and confidentiality.

Measures and procedures

The short version of the NEO-Five Factor Inventory (John & Srivastava, 1999), validated for the Brazilian population (Andrade, 2008), was used to measure the five personality traits (Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism). The questionnaire consists of 44 questions using a Likert scale, which ranges from 1 (strongly disagree) to 5 (strongly agree).

Inspired by previously published questionnaires (Burke et al., 2006), the Preferred Exercise Environment Questionnaire (PEQ) was elaborated for the present study. The PEQ is a self-reporting non-dimensional questionnaire composed by the following fifteen questions in this exact order: 1. Do you prefer practicing alone? 2. Do you get bothered when people are around while practicing physical activity? 3. Do you prefer practicing with the teachers around? 4. Do you prefer the same professor for your practicing? 5. Do you give your opinion about the practice? 6. Do you usually talk to other people during practice? 7. Do you

strictly follow the instructions given to practice? 8. Do you prefer activities with repeated movement? 9. Do you like varied practices? 10. Do you like practicing with familiar movements? 11. Do you like motivational stimuli from others during practice? 12. Do you prefer practicing surrounded by mirrors? 13. Do you prefer music during your practicing? 14. Do you prefer bright light during practice? 15. Do you practice in a hurry? Participants had three options of responding to each question: "yes", "no", or "indifferent". The questionnaire was conceived with general questions associated with the five personality traits on physical activity practice in the fitness club.

The Big Five Inventory and the PEQ were administered in situ and via the website.

Analysis

The two instruments (Big Five and PEQ) used in the present study were psychometrically analyzed. The Cronbach's alpha of the Big Five Inventory was .723, an acceptable internal consistency coefficient, however, the corrected item-total correlation of 16 items was either negative or close to zero. The exploratory factor analysis (EFA), using Maximum Likelihood (ML) extraction (EFA–ML) indicated 10 factors using all 44 items and 2 factors for each personality dimension when EFA-ML was conducted for each dimension. After the exclusion of these 16 items, the internal consistency coefficient increased to .802. Then, the MPlus software (Version 8.5 for Microsoft Windows; Muthén & Muthén, Los Angeles, CA, USA) was used to run both EFA (ML and rotation Varimax) and confirmatory factor analysis (CFA) to identify the factor model with better adjustment to the data. The cutoff values considered acceptable for the measurement model test are CMIN/*df* < 5.0, CFI > .90, RMSEA < .08, and SRMR < .08 (Bentler, 1990); where RMSEA is root mean squared error approximation, CMIN/*df* is minimum discrepancy per degree of freedom, CFI is comparative fit index, and SRMR is standardized root mean squared residual.

Regarding the personality questionnaire, a five-factor model with 25 items (five items for each personality trait) explained 39.2% of the variance and presented better adjustment indexes: CMIN/*df* = 515.920/185, RMSEA = .054, CFI = .918, SRMR = .035 (Table A1).

Regarding the PEQ, the internal consistency (Cronbach's alpha) was .665 after the exclusion of two items (5 and 7) with low item-total correlation (< .150). To investigate the factor structure, an exploratory factor analysis (Maximum Likelihood analysis, Varimax rotation) was conducted. The results indicated four components responsible for 48.8% of the total variance. The model adjustment determination was based on comparing the indexes of two CFAs (3-factor and 4-factor model). The 3-factor model had an acceptable adjustment (CMIN/*df* = 2.73. CFI = .902, RMSEA = .053, SRMR = .038), however the four factor-model showed the best adjustment (CMIN/*df* = 1.93, CFI = .960, RMSEA = .039, SRMR = .027). These factors related to the preferred environment (PE) were named as supervised exercising (PE1; items 3 and 4), performing new or repeated exercises (PE2; items 8, 9, and 10), social aspects of exercise (PE3; items 6, 11 and 13), and non-supervised exercising (PE4; items 1, 2, 12, and 14), see Table A2.

Finally, a latent trajectory analysis was conducted to evaluate assumed causal relationships (direct and indirect) between the indicators studied.

Results

Table 1 shows the descriptive statistics for the five variables of interest. The correlation matrix is also shown.

Table 1 reveals that personality traits Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism share common components (significant correlations between .376 and .445) and preferred fitness environment PE1, PE2, PE3 and PE4 also share common components (significant correlations between .151 and .325); PE1 is not related to any personality trait. Table 1 also shows that PE4 is not related to any personality trait, and that the personality traits Openness and Neuroticism are not related to any PE factor. Additionally, the personality traits Conscientiousness, Extraversion, and Agreeableness have positive correlations with PE2 (performing exercises) and PE3 (social aspects of exercise).

When considering the results presented in Table 1, personality traits, except Neuroticism, can be represented by a general personality factor. This general factor was identified within the five-factor model's studies (Erdle, Irwing, Rushton, & Park, 2010; Musek, 2007). According to Table 1, personality traits Conscientiousness, Extraversion, and Agreeableness are related to preferred fitness environments, especially PE2 and PE3.

Next, the variables of interest were submitted to a path analysis considering the personality (PERS) and the preferred fitness environment (PE) as latent variables. Results are shown in Figure 1. Note that non-significant relationships have been removed from the model for simplicity, but they were reported in Table 1. Figure 1 shows that personality, represented by traits Conscientiousness, Extraversion, and Agreeableness, predicts preferred fitness environment ($\beta = .493$, $p < .001$) based on performing exercise (PE2) and

Table 1
Personality traits (Openness, Conscientiousness, Extraversion, Agreeableness, Neuroticism) and preferred fitness environment

Variable	1	2	3	4	5	6	7	8	9
1. Openness	–	.400**	.445**	.376**	.168**	–.016	.027	.057	–.052
2. Conscientiousness		–	.389**	.379**	.048	.050	.104*	.080*	.046
3. Extraversion			–	.436**	.002	.006	.111**	.243**	–.021
4. Agreeableness				–	–.086	.051	.092*	.174**	.006
5. Neuroticism					–	.078	–.057	.027	.048
6. PE1						–	.268**	.225**	.241**
7. PE2							–	.236**	.325**
8. PE3								–	.151**
9. PE4									–
M	19.8	21.1	19.3	21.4	14.4	3.3	5.1	4.2	7.0
SD	3.4	2.8	3.7	2.9	3.9	1.3	1.9	1.3	1.8

Note. PE1 = supervised exercise; PE2 = performing new or repeated exercises; PE3 = social aspects of exercise; PE4 = non-supervised exercise. *p < .05, **p < .01.

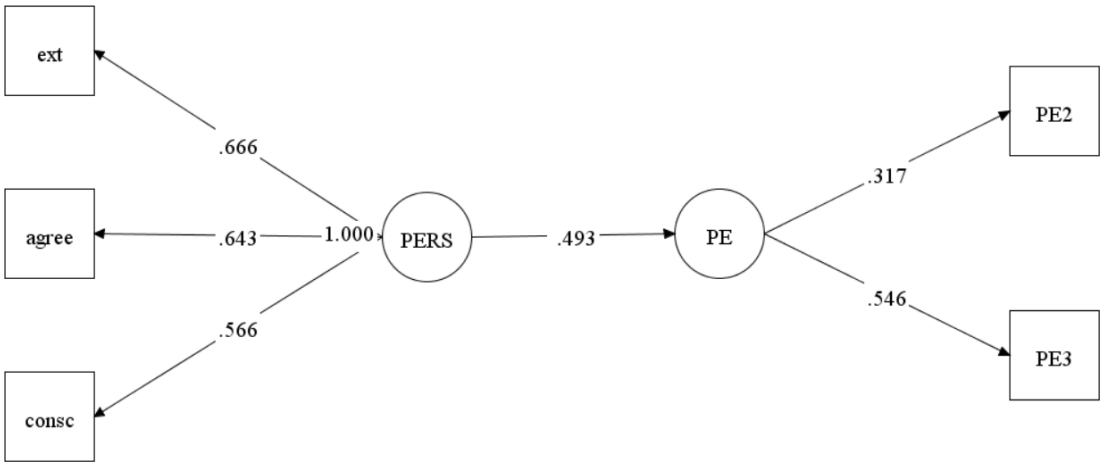

Figure 1. Standardized path coefficient relating personality PERS (at latent level) to preferred fitness environment PE (at latent level). Ext = Extraversion; agree = Agreeableness; consc = Conscientiousness; PE2 = performing new or repeated exercises; PE3 = social aspects of exercise.

social aspects of exercise (PE3). The proportion of the variance (R^2) for the dependent variable (PE) explained by the independent variable (PERS) was 24.3%. The adjustment indexes for this model were great: χ^2 = 2.957, *df* = 4, *p* =.565, RMSEA = .00, 95% 95% confidence interval RMSEA [0.000, 0.053], CFI = 1.000, TLI = 1.000, SRMR = .012.

Discussion

Previous research on physical activity preferences seems to be focused especially on general attributes, not to the personal characteristics of the individuals (Cohen-Mansfield et al., 2004). From an individual differences perspective, if someone can adapt instruction to personal exercise preferences, the feeling of enjoyment and the adherence to exercise programs can be promoted (Burke et al., 2006; Kantomaa et al., 2015). The present study aimed to tackle this topic by assessing relationships between personality traits and exercise preferences in fitness club members.

Our latent model revealed that a general personality factor predicts the preferred fitness environment, especially concerning the performance of new/repeated exercises (PE2) and social aspects of exercise (PE3). Performing new or repeated exercises (PE2) is associated with repetition, variation, and familiarity of movements, while social aspects of exercise (PE3) involve interactions with other people and preference for music

during practice. We expected that, in some way, personality traits could be related to PE1, PE2, PE3 and/or PE4. For instance, extraverts, self-disciplined, and emotionally stable individuals would be most likely to have a physically active lifestyle. Therefore, they would endorse positive behaviors of involvement, adherence, and maintenance of physical activity (Butković et al., 2017; Rhodes, 2006; Wilson & Dishman, 2015).

Our results indicated that Conscientiousness, Extraversion, and Agreeableness were positively correlated with the performance of new or repeated exercises (PE2) and social aspects of exercise (PE3). The PE2 factor, performing new or repeated exercises, is linked to repetition and variation during the exercise. In the learning of a sequential-timing motor task, it was detected more pronounced contextual interference effects for introverts when compared to extraverts (Meira, Fairbrother, & Perez, 2015), while introverted elderly women showed worse speed-accuracy tradeoff performance than their introverted counterparts (Meira, Moraes, Moura, Ávila, Tosini, & Magalhaes, 2018). Both studies implied handling variations of a motor task, which were for introverts more difficult to cope. Our findings are in line with this notion that Extraversion is related to variation and repetition during exercise practice.

The relationships of Conscientiousness, Extraversion, and Agreeableness regarding the third PE factor social aspects of exercise seem to be robust. Extraverted, self-disciplined, and agreeable fitness club members tend to show behaviors associated with acoustic stimuli, which are most associated with facets of activity, excitement seeking, positive emotions, dutifulness, interaction with other people, and motivational feedback (Wang, Begley, Hui, & Lee, 2012). Listening to music while practicing exercise has been considered a high source of motivation which boosts acute performance (Alter et al., 2015; Hutchinson & Sherman, 2014). In addition, encouragement, as a manifestation of motivation, has the potential to increase self-efficacy and performance (Tuckman & Sexton, 1991).

Even though previous research indicates that exercise behavior is negatively correlated with Neuroticism (Rhodes & Smith, 2006; Wilson & Dishman, 2015), we found that this trait was not related to exercise practice in a fitness club context. Further, the personality trait Openness is not linked to any PE factor, that is, the fact of being open to experiences bears little relationship with exercise practice.

Despite previous research (Burke et al., 2006; Cohen-Mansfield et al., 2004; Ginis, Jung, & Gauvin, 2003; Hawkley, Thisted, & Cacioppo, 2009; Kantermann et al., 2012; Katula & McAuley, 2001), we identified that the supervision of a teacher (PE1) and being alone during practice/practicing surrounded by mirrors and under bright light (PE4) were not associated with personality traits.

We recognize limitations in the present study. Although the sample is similar in size to previous studies on the topic, it is only representative of fitness club members from the metropolitan area of Sao Paulo, Brazil. In addition, several biases may have affected the results due to the acquisition of data via self-reports.

Conclusions

In summary, our study gives new evidence to suggest a general personality factor encompassing Conscientiousness, Extraversion, and Agreeableness that can predict preferred exercise environment of fitness club members, especially concerning to the performance of new/repeated exercises and social aspects of exercise.

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Conflict of interest

There were no conflicts of interest.

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Appendix

Table A1
Results of the Big Five Inventory using exploratory factor analysis (Maximum Likelihood extraction, Varimax rotation)

Construct/Item	*M*	*SD*	Loading	A	Explained variance (%)
Openness				.720	3.4
You are original, always with new ideas	3.93	0.8	.628		
You are inventive, creative	3.89	0.9	.705		
You have a fertile imagination	4.01	1.0	.426		
You are ingenious, someone who likes to deeply analyze things	3.86	1.0	.379		
You like to reflect, play with ideas	4.08	0.9	.406		
Conscientiousness				.677	19.8
You are meticulous, detail-oriented at work	4.18	0.9	.435		
You insist until you complete the task or the job	4.34	0.8	.541		
You do things efficiently	4.24	0.7	.608		
You are a reliable worker	4.62	0.7	.535		
You make plans and follow them to the letter	3.69	1.0	.511		
Extraversion				.719	4.6
You are talkative, communicative	3.91	1.1	.673		
You are assertive, you are not afraid to express what you feel	3.69	1.1	.329		
You are sociable and outgoing	4.02	1.0	.799		
You have a lot of energy and vitality	3.95	0.9	.409		
You convey a lot of enthusiasm	3.68	0.9	.409		
Agreeableness				.685	7.9
You like to cooperate with others	4.36	0.8	.675		
You are helpful and help others	4.42	0.7	.631		
You are kind and considerate of others	4.42	0.7	.605		
You are generally trustworthy	4.64	0.6	.352		
You have the ability to forgive easily	3.59	1.2	.399		
Neuroticism				.665	3.5
You are depressed and sad	1.90	1.1	.470		
You are temperamental and change your mind easily	2.67	1.2	.360		
You get tense often	3.09	1.2	.786		
You get nervous easily	2.76	1.2	.752		
You worry about everything	4.00	1.0	.305		

Table A2
Results of the Preferred Exercise Environment using exploratory factor analysis (Maximum Likelihood extraction, Varimax rotation)

Construct/Item	*M*	*SD*	Loading	Explained variance (%)
PE1 – supervised exercise				11.7
Do you prefer practicing with the teachers around?	1.65	0.8	.343	
Do you prefer the same professor for your practicing?	1.69	0.8	.964	
PE2 – performing new or repeated exercises				10.9
Do you prefer activities with repeated movement?	1.82	0.8	.633	
Do you like varied practices?	1.47	0.8	.644	
Do you like practicing with familiar movements?	1.84	0.9	.440	
PE3 – social aspects of exercise				5.8
Do you usually talk to other people during practice?	1.58	0.6	.479	
Do you like motivational stimuli from others during practice?	1.44	0.7	.502	
Do you prefer music during your practicing?	1.19	0.5	.275	
PE4 – non-supervised exercise				3.8
Do you prefer practicing alone?	1.85	0.7	.369	
Do you get bothered when people are around while practicing physical activity?	1.92	0.5	.275	
Do you prefer practicing surrounded by mirrors?	1.57	0.8	.393	
Do you prefer bright light during practice?	1.69	0.8	.403	
Cronbach's alpha for the total scale	.661			