



Personality traits and adherence to physical activity in patients attending a primary health centre¹

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ABSTRACT. Personality influences the practice of physical activity (PA). The purpose of this observational descriptive study was to analyze the association of personality traits with adherence to PA among 208 patients attending a primary health care centre (Granada, Spain). The patients answered a questionnaire inquiring socio-demographic characteristics, personality traits and PA. Personality was measured using the Temperament and Character Inventory (TCI-125); and PA by the International Physical Activity Questionnaire (IPAQ). Multiple linear regression analysis showed (in both men and women) that the higher the score on the *Temperament* dimension of harm avoidance the lower the adherence to PA (partial $r = - .19$). Similarly, age (partial $r = - .30$) and educational level (partial $r = - .22$) were inversely associated with adherence to PA. The present results can help to predict poor adherence to lifestyle PA. Interventions on high harm avoidance individuals through anxiety reduction might help them in becoming more physically active.

KEYWORDS. Adherence. Personality traits. Physical activity. Survey descriptive study.

RESUMEN. La personalidad influye en la práctica de la actividad física. El objetivo de este estudio descriptivo mediante observación ha sido analizar la asociación de rasgos

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de la personalidad con la adherencia a la actividad física (AF) en 208 pacientes atendidos en un centro de salud (Granada, España). Los pacientes respondieron un cuestionario que incluyó características socio-demográficas, rasgos de personalidad y AF. La personalidad fue medida con el Inventario de Temperamento y Carácter (TCI-125) y la AF con el Cuestionario de Actividad Física (IPAQ). Los análisis de regresión lineal múltiple mostraron (tanto en hombres como en mujeres) que, cuanto más altas puntuaciones en la dimensión temperamental *Evitación de daño*, más bajas eran las puntuaciones en la adherencia a la AF (r parcial = $-.19$). Igualmente se observó una relación inversa de la edad (r parcial = $-.30$) y el nivel educativo (r parcial = $-.22$) con la adherencia a la AF. Estos resultados pueden ayudar a predecir baja adherencia a AF. Intervenir en individuos de alta evitación de daño a través de reducción de ansiedad podría ayudar a que se hagan físicamente más activos.

PALABRAS CLAVE. Adherencia. Rasgos de personalidad. Actividad física. Estudio descriptivo mediante encuestas.

There is strong scientific evidence of the inverse relationship between physical activity (PA) and rates of all-cause mortality, coronary heart disease, high blood pressure, stroke, type 2 diabetes, metabolic syndrome, colon cancer, breast cancer and depression in both adults and older adults (US Department of Health and Human Services, 2008). Indeed, physical inactivity is reported to be worldwide the fourth risk factor of mortality (World Health Organization, 2009). On the other hand, exercise either directly or through its mood-changing effect is important for weight loss, particularly among obese subjects (Annesi, 2010). PA interventions are a priority of public health; and the understanding of both individual characteristics (sociodemographic, psychological, cognitive and emotional skills) and social, cultural or environmental factors of potential influence on PA behaviour is fundamental for designing effective PA interventions (Bauman, Sallis, Dziewaltowski, and Owen, 2002; Luszczynska *et al.*, 2010; Mâsse, Nigg, Basen-Engquist, and Atenza, 2011; Moreno-Murcia, González-Cutre Coll, and Cervello-Gimeno, 2008).

The relationship of personality on the practice of PA is a current focus of investigation by its potential moderating role in PA interventions (de Bruijn, de Groot, van den Putte, and Rhodes, 2009; Hoyt, Rhodes, Hausenblas, and Giacobbi, 2009). In a previous meta-analysis by Rhodes and Smith (2006), lower neuroticism and higher extraversion and conscientiousness were found correlated to higher levels of PA; but most studies analyzed by Rhodes and Smith (2006) do not use multivariate analytical procedures to control for the potential moderating effect of sociodemographic variables on PA (Bauman *et al.*, 2002; Mâsse *et al.*, 2011). More recently, some studies applying multivariate analysis, have confirmed the independent association of lower neuroticism (Kern, Reynolds, and Friedman, 2010) and higher extraversion (Hoyt *et al.*, 2009; Kern *et al.*, 2010) and conscientiousness (de Bruijn *et al.*, 2009; Hoyt *et al.*, 2009) with higher levels of PA.

In addition, in the same way as PA is associated with better mental well-being (Jiménez, Martínez, Miró, and Sánchez, 2008; US Department of Health and Human Services, 2008), mental health could affect the practice of PA. In fact, a positive emotional outlook on life is associated with higher adherence to PA in men but not in women (Baruth *et al.*, 2011). Adults with current depression or a lifetime diagnosis of depression

or anxiety disorder are significantly more likely than those without such diagnoses to be physically inactive (Strine *et al.*, 2008). Since psychopathological vulnerability is related with certain temperament and character traits (Gurpegui *et al.*, 2009), personality traits could be interacting factors in the relationship between mental health and PA.

The purpose of this survey descriptive study (Montero and León, 2008; Ramos-Álvarez, Moreno-Fernández, Valdés-Conroy, and Catena, 2008) was to analyze the association of certain personality traits, including temperament and character, with adherence to PA among patients attending a primary health care centre, controlling for sociodemographic variables, psychiatric morbidity and other potential confounders.

Method

Participants

This study included 208 patients recruited at a primary health care centre located in Granada, Spain, during 2007-2008.

Instruments

The consenting participants answered an anonymous questionnaire. The questionnaire included information about socio-demographic features, personality traits and PA.

Personality was measured using a Spanish version of the Temperament and Character Inventory (TCI-125) (Cloninger, Przybeck, Svrakic, and Wetzel, 1994) which comprises the temperament dimensions of novelty seeking, harm avoidance, reward dependence, and persistence; and the character dimensions of self-directedness, cooperativeness and self-transcendence. The psychometric properties of the TCI have been demonstrated with Spanish non-psychiatric subjects (Gutierrez-Zotes *et al.*, 2004)

PA was assessed using a Spanish version of the International Physical Activity Questionnaire (IPAQ) (Fogelholm *et al.*, 2006); and was recorded as a continuous measure in Metabolic Equivalent Task (MET). The total score (METs, minutes/week) was calculated multiplying the MET value of each activity (walking = 3.3 METs; moderate PA = 4.0 METs; and vigorous activity = 8.0 METs) by the frequency (days/week) and the duration (minutes) reported for each activity.

Moreover, the questionnaire included information about other health related behaviours (smoking, alcohol consumption, Mediterranean diet); psychiatric morbidity measured with the General Health Questionnaire (GHQ-28) (Lobo, Pérez-Echeverría, and Artal, 1986) and the presence of chronic illnesses (hypertension, diabetes mellitus, hypercholesterolemia), among other clinical variables.

Procedure

The research protocol was approved by the San Cecilio University Hospital IRB. The participants of this study were recruited among the patients attending a primary health care centre of Granada (Spain). The patients answered a structured questionnaire after they had read a detailed consent form and agreed to participate in this anonymous survey. Clinical data (presence of chronic illnesses such as hypertension, diabetes

mellitus, hypercholesterolemia and other clinical variables) was obtained by the same clinical researcher (EBG).

Statistical analysis

Statistical analysis was performed with the SPSS program. Bivariate associations were explored by parametric or non-parametric tests as appropriate. Multiple linear regression was used to evaluate the association of personality traits with adherence to PA (METs score), controlling for potential confounders (socio-demographic variables; other health related behaviours such as smoking status, alcohol consumption, or Mediterranean diet; psychiatric morbidity and the presence of chronic illness). Given that men and women behave in a different way regarding PA (Bauman *et al.*, 2002; Kern *et al.*, 2010), stratified multivariate analyses were performed according to sex. The parameters used to show the strengths of the associations were the coefficient of partial correlation (partial r) and the coefficient of determination (R^2), which indicates the proportion of variance of the dependent variable explained by the model.

Results

Of the 208 patients, 34% were men and 66% women, similar in age (men $M = 40.6$, $SD = 14.4$ years; women $M = 39.2$, $SD = 13.2$), marital status and educational level; yet there were significant differences between men and women in employment status (without employment, pensioner or student, 30% vs. 24%; with employment, 70% vs. 55%; and housewife without other employment, 0% vs. 21%; $p < .001$). Regarding personality traits, men and women significantly differed in the temperamental dimensions of harm avoidance ($M = 8.5$, $SD = 3.9$ vs. $M = 10.5$, $SD = 4.1$; $p = .001$), reward dependence ($M = 9.6$, $SD = 2.5$ vs. $M = 10.6$, $SD = 2.4$; $p = .005$), and in the character dimension of cooperativeness ($M = 18.7$, $SD = 3.0$ vs. $M = 19.6$, $SD = 1.9$; $p = .008$). The mean total GHQ-28 score was significantly ($p = .045$) lower in men ($M = 4.2$, $SD = 4.9$) than in women ($M = 5.8$, $SD = 5.7$). There were no significant differences in the adherence to PA between men and women (MET-minutes/week $M = 2419$, $SD = 2325$ vs. $M = 2183$, $SD = 1994$).

Factors associated with adherence to PA

In the bivariate analysis, adherence to PA showed a significant negative correlation with age among the 208 participants ($r = -.20$; $p = .005$) and among women ($r = -.19$; $p = .029$), but not among men; and it was almost significantly associated with educational level among men (primary level or less, $M = 2349$, $SD = 2274$; secondary level, $M = 3234$, $SD = 2767$; university level, $M = 1328$, $SD = 890$; $p = .054$). There was no association of adherence to PA with other health related behaviours (such as smoking status, alcohol consumption, or Mediterranean diet), with psychiatric morbidity or with the presence of chronic illness. Multiple linear regression analyses showed that adherence to PA was inversely associated with age, educational level and with the temperament dimension of harm avoidance, among all 208 participants as well as among men or women (see Table 1). In addition, there were no significant associations of adherence to PA with other personality traits (novelty seeking, reward dependence, persistence, self-directedness, cooperativeness and self-transcendence).

TABLE 1. Multiple linear regression analysis of factors associated with adherence to physical activity in 208 patients.

Variables	Men ⁽¹⁾			Women ⁽²⁾		
	Partial r	t _{exp}	p	Partial r	t _{exp}	p
Socio-demographics						
Age (years)	-.30	-4.41	<.001	-.33	-2.80	.007
Educational level	-.22	-3.18	.002	-.29	-2.43	.018
Personality traits						
Novelty seeking				-.22	-1.81	.075
Harm avoidance	-.19	-2.8	.006	-.25	-2.13	.037
Reward dependence	-.12	-1.7	.094	-.16	-1.83	.069

Note: In addition to the variables presented in the table, other variables included in the multiple linear regression backward selection procedure were the other personality traits, marital status, employment, smoking, alcohol consumption, Mediterranean diet, psychiatric morbidity and the presence of chronic illness.

⁽¹⁾ Coefficient of determination (adjusted R²) = .12, F = 6.91, df = 4, 202, p < .001

⁽²⁾ Coefficient of determination (adjusted R²) = .17, F = 3.37, df = 4, 65, p = .014

⁽³⁾ Coefficient of determination (adjusted R²) = .11, F = 4.2, df = 4, 132, p = .003

Discussion

This study underlines the potential influence of personality traits on adherence to PA and shows the specific relationship of the temperament dimension of harm avoidance—behavioural inhibition in response to signals of aversive stimuli—with the adherence to PA in both male and female patients attending a primary health care centre; this association remained significant after controlling for socio-demographic variables, other lifestyle variables and psychiatric morbidity. The results are in line with an experimental study (Volkers *et al.*, 2002) that finds an inverse association of harm avoidance with motor activity in adults; and with previous epidemiological studies (Kern *et al.*, 2010; Rhodes and Smith, 2006) that show an inverse relationship between PA and neuroticism. Since harm avoidance is highly correlated with neuroticism ($r = .59$) (Zuckerman and Cloninger, 1996), our results are in agreement with the findings of these previous studies. Moreover, the effect of harm avoidance on the adherence to PA was somewhat higher in our study ($r = -.25$ among men and $r = -.17$ among women than the summary r value of $-.11$ obtained from 21 samples in a meta-analysis by Rhodes and Smith (2006).

High harm avoidance, meanwhile, is found to be high in anxiety disorders comorbid with depression (Öngür, Farabaugh, Iosifescu, Perlis, and Fava, 2005), and depressive disorder (Farmer *et al.*, 2003) or depressive symptoms (Cloninger, Svrakic, and Przybeck, 2006; Jurado *et al.*, 2005) as well as GHQ-defined psychiatric morbidity (Moreno-Abril *et al.*, 2007). Given that adults with current depression or a lifetime diagnosis of depression or anxiety disorders are more likely than those without such diagnosis to be physically inactive (Strine *et al.*, 2008), the inverse relationship of harm avoidance with PA found in this study could help to understand why anxious or depressed individuals are less physically active. Hoyt *et al.* (2009) report that individuals scoring high on the anxiety facet of neuroticism have a lower intention–behaviour relationship than those who score low; these authors interpret that individuals with predisposition to experience anxiety (inherent to the harm avoidance trait that we have measured) have ruminating thoughts and feelings about exercise which in turn interfere with their intentions.

We did not find a significant association of the character dimension of self-directedness with adherence to PA, in agreement with Kern *et al.* (2010) who, using growth curve modelling to analyse the relationships between activity patterns and personality predictors, find that conscientiousness (which similarly represents being a purposeful, self-disciplined individual) was not a significant predictor of activity in both men and women, in contrast with previous reports (Rhodes and Smith, 2006). According to Cloninger *et al.* (1994), conscientiousness is inversely correlated with novelty seeking [in our sample, only a marginal correlation ($r = -.13$)]; and novelty seeking inversely predicted (almost significantly) adherence to PA among men. Moreover, we did not find any significant association of adherence to PA with the temperament trait of persistence [in our sample, self-directedness was unrelated with persistence ($r = -.04$) and inversely correlated with harm avoidance ($r = -.43$), which is a significant predictor in our regression models].

Concerning the socio-demographic characteristics, the results of this study confirm the inverse association of the adherence to PA with age or educational level (Bergman,

Grjibovski, Hagströmer, Bauman, and Sjöström, 2008; Kaphingst *et al.*, 2007) in both men and women. A possible explanation of the inverse association with educational level—the lower the educational level, the higher the level of PA—is that people with university studies may have jobs that require less energy expenditure, while those with a lower level of studies may tend to have work involving more PA.

In summary, our study points to a specific relationship between the temperament dimension of harm avoidance and the adherence to PA in both men and women. Because persons high in harm avoidance exhibit poor adherence to physical activity, consideration of personality traits as well as other individual characteristics may prove helpful in interventions to promote physical activity in adult patients. Interventions on high harm avoidance individuals through anxiety reduction might help them in becoming more physically active. Moreover, bringing into mind the health benefits of physical activity may help those individuals in overcoming their tendency to inhibition—an effort in health education and counselling that should be stronger with them than with individuals without high scores on harm avoidance.

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