



Personal, social and environmental correlates of physical activity in adults from Curitiba, Brazil



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ABSTRACT

Background. Leisure-time physical activity is a complex behavior influenced by factors at multiple levels.

Objective. To examine the associations between intrapersonal, interpersonal, environmental factors and leisure-time walking (LTW) and leisure-time physical activities (LTPA), excluding walking. We also examined the moderating effect of sociodemographic characteristics on these associations.

Methods. A cross-sectional study was conducted with 1461 adults from Curitiba, Brazil (63.7% women). LTW and LTPA were assessed through the *International Physical Activity Questionnaire (IPAQ)*, and a cutoff point of ≥ 150 min/week was used. Associations were examined through multilevel logistic regressions.

Results. LTW was positively associated with self-efficacy, enjoyment, social support from family and friends, presence of public places for leisure and neighborhood esthetics. LTPA was associated with self-efficacy, enjoyment, social support from family and friends, safety from crime and neighborhood esthetics. Safety from crime was a predictor of LTPA among older adults only.

Conclusions. Factors at multiple levels were associated with LTW and LTPA. Interventions to promote LTPA would likely benefit from considering personal, social and environmental factors and different levels of influence.

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Introduction

Leisure-time physical activity (LTPA) is a complex behavior influenced by personal, social, environmental and community factors (Bauman et al., 2012; Sallis et al., 2012). There is a growing interest in identifying factors that may explain LTPA to promote more effective interventions that address this complexity. Intrapersonal factors, such as gender, age, and income, are consistently associated with LTPA both in high and in low and middle-income countries (Bauman et al., 2012; Chen et al., 2011). Furthermore, evidence shows that sociodemographic characteristics are important moderators of LTPA (Rech et al., 2012; Silva et al., 2013). For example, social support for LTPA seems to be more important for subjects over 40 years of age than for younger adults (Silva et al., 2013; Van Dyck et al., 2010). Similarly, it has been suggested that social support for LTPA is more important for people from lower socioeconomic status (Silva et al., 2013).

However, little is known about other intrapersonal (e.g., self-efficacy and satisfaction LTPA), interpersonal (e.g., social support) or environmental (e.g., access to places for LTPA practices, safety from crimes

and esthetics of the neighborhood) correlates of physical activity in populations from low and middle-income countries (Bauman et al., 2012). Wider social inequalities and lack of safety and infrastructure are markedly more prevalent in these countries than in high-income countries. Such characteristics have been linked to higher levels of inactivity (Rech et al., 2012). Studies in Latin America have investigated the independent effects of built and social environment in LTPA but to this date the moderating role of sociodemographic characteristics has not been tested (Hallal et al., 2010; Hino et al., 2011; Parra et al., 2011). The understanding of the association of these factors with LTPA is an important step in the planning and evaluation of interventions focused on promoting LTPA in developing countries (Bauman et al., 2012). Thus, the objective of this study was to examine the association between intrapersonal, interpersonal, environmental factors with leisure-time walking (LTW) and moderate-to-vigorous intensity LTPA excluding walking, and to examine the moderating effect of sociodemographic characteristics on these associations.

Methods

Study design

This study was conducted in Curitiba, a state capital in Southern Brazil, in 2009. The sample was drawn from an area of 500 m around eight public spaces (four parks and four squares), selected according to the neighborhoods' social

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and built environment and family income. Further details about the sampling approach are available in another publication (Rech et al., 2012). The final sample consisted of 1461 adults (≥ 18 years) who had resided in the selected locations for at least one year. The sample size was able to detect odds ratios equal or greater than 1.15 with a power of at least 90% and a significance level of 5%. This study was approved by the Federal University of Pelotas Ethics Committee on Human Research (005/2008).

Outcome variables

LTPA was measured using the leisure-time section of the *International Physical Activity Questionnaire* (IPAQ – long version) (Craig et al., 2003). The frequency (days/week) and duration (min/day) of LTW and other LTPA were analyzed. Individuals were classified as “active” when performing at least 150 min/week of LTW or LTPA. To compute minutes per week of LTPA, minutes of moderate and vigorous physical activities were summed (vigorous-intensity activities were multiplied by two). Although there is no specific recommendation for walking there is convincing evidence showing that individuals who walk between 120 and 180 min/week have clear health benefits (Caspersen and Fulton, 2008). Hence LTW was analyzed separately.

Independent variables

Intrapersonal

Enjoyment was assessed using a scale consisting of six items, three related to LTW and three specific to LTPA, all valid and reliable for Brazilian adults (Rech et al., 2011a). The perception of self-efficacy from LTW and LTPA was assessed by an instrument with five items using dichotomous scale (“not confident = 0” and “very confident = 1”), also valid for the Brazilian population (Rech et al., 2011b). Overall scores for both, enjoyment and self-efficacy were obtained by summing the items. The final scores were later dichotomized using the median.

Interpersonal

Social support was measured with a scale adapted and validated for Brazilian adults (Reis et al., 2011) that also has specific scores for LTW and LTPA. The scales included items on the support received from family and/or friends in the last three months, using a three-point response scale (“never = 0,” “sometimes = 1,” “always = 2”). The scores obtained after summing all items were dichotomized using the median.

Environmental

Characteristics of the neighborhood were evaluated by self-report using the short version of the *Neighborhood Environment Walkability Scale (NEWS-A)* (Cerin et al., 2013) validated for the Brazilian population (Malavasi et al., 2007). This instrument consists of 40 items, including 17 with a five-point ordinal scale and 23 on a four-point ordinal scale. In this study, all response scales were adapted to be dichotomous (“no = 0,” “1 = yes”). This procedure was used previously because it increases clarity and understanding of the population (Amorim et al., 2010). *NEWS-A* comprises characteristics related to residential density, access to leisure facilities, neighborhood esthetics, and

safety from crime in the neighborhood. Previous studies indicate that these environmental characteristics are associated with LTPA in Brazilian adults (Hino et al., 2011; Rech et al., 2012). For each construct, an overall score was created based on the sum of the items, which was subsequently dichotomized using the median.

Sociodemographic variables

The following sociodemographic variables were included in this study: Gender (male vs. female), age (<40.0 vs. ≥ 40.0 years), marital status (single, widowed, living alone or living with others), body mass index (normal vs. overweight) (Silveira et al., 2005). The socioeconomic status (SES) was determined according to the Brazilian Economic classification (ABEP, 2010). This classification is widely used in Brazilian research and is based on the number of assets within the household (e.g. refrigerators, TV), household characteristics (e.g. number of bathrooms) and the highest educational degree in family (defined as all people living together within the same household). The original measure provides an overall score ranging from zero to 46 which are used to categorize the families into seven SES groups. Due to the lack of variability across of all seven categories in our sample the original SES categories were grouped into three SES levels (high, medium and low).

Data analysis

Frequency distribution was used to describe the sociodemographic variables, LTW and LTPA by gender. Logistic regressions were used to test the association between individual, interpersonal, environmental factors and LTW and LTPA. Because the sample was obtained from eight primary sampling units (Pucci et al., 2012), a multilevel modeling with random intercept was used to consider the clustering effect. In the unadjusted model, each independent variable was included separately, and in the adjusted model, all confounding variables were included. Finally, an interaction term was included in the adjusted model to verify the moderating role of the sociodemographic variables (gender, age, SES) in the association between the independent and outcomes variables. For significant interactions, we displayed the predicted prevalence of individual that meet recommendations to LTW and LTPA. All analyses were performed using STATA 9.2 and the *xtmelogit* command. A significance level of 5% was adopted in all analyses.

Results

Table 1 shows the characteristics of the sample. The study included 1461 individuals aged 18 to 69 years (63.7% women). The sample had more women classified at high SES level (40.5%) and normal weight (53.6%) than men (32.8% and 48.1%, respectively). The prevalence of individuals classified as “active” considering only LTW was 18.2% (95% CI: 14.2 to 22.5%) and was similar between men and women. The prevalence of LTPA, excluding walking, practiced for at least 150 min/week was 18.8%, and higher among men than women (27.5% versus 13.7%; $p < 0.01$).

Table 1
Sample socio-demographic characteristics by gender (Curitiba, Brazil – 2009; n = 1461).

Variables	Categorical	All (n = 1461)		Men (n = 530)		Women (n = 931)		p ^a
		n	%	n	%	n	%	
Age group	18–39.9	604	41.3	238	44.9	366	39.3	0.070
	40–59.9	673	46.1	235	44.3	438	47.0	
	≥ 60	184	12.6	57	10.8	127	13.6	
Socioeconomic status	Low	189	12.9	83	15.7	106	11.4	0.004
	Medium	721	49.3	273	51.5	448	48.1	
	High	551	37.7	174	32.8	377	40.5	
Marital status	Single	622	42.6	221	41.7	401	43.1	0.610
	Married	839	57.4	309	58.3	530	56.9	
Weight status	Normal	754	51.6	255	48.1	499	53.6	0.044
	Overweight	707	48.4	275	51.9	432	46.4	
Walking	≤ 149 min/week	1195	81.8	435	82.1	760	81.6	0.833
	≥ 150 min/week	266	18.2	95	17.9	171	18.4	
MVPA ^b	≤ 149 min/week	1187	81.2	384	72.5	803	86.3	0.001
	≥ 150 min/week	274	18.8	146	27.5	128	13.7	

^a Chi-square test.

^b MVPA: physical activity moderate and vigorous intensity.

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