Accepted Manuscript

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PII: S0091-7435(18)30056-2
DOI: doi:10.1016/j.ypmed.2018.02.021
Reference: YPMED 5318

To appear in: *Preventive Medicine*

Received date: 8 September 2017
Revised date: 25 January 2018
Accepted date: 19 February 2018

Please cite this article as: Eliana V. Carraça, Joreintje D. Mackenbach, Jeroen Lakerveld, Harry Rutter, Jean-Michel Oppert, Ilse De Bourdeaudhuij, Sofie Compernolle, Célina Roda, Helga Bardos, Pedro J. Teixeira , Lack of interest in physical activity - individual and environmental attributes in adults across Europe: The SPOTLIGHT project. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Ypmed(2017), doi:10.1016/j.ypmed.2018.02.021

Lack of interest in physical activity - individual and environmental attributes in adults across Europe: the SPOTLIGHT project

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Word count

Abstract – 250 words

Main text (excluding author citations)– 3878 words

Abstract

A considerable proportion of European adults report little or no interest in physical activity. Identifying individual-level and environmental-level characteristics of these individuals can help designing effective interventions and policies to promote physical activity. This cross-sectional study additionally explored associations between level of interest and physical activity, after controlling for other individual and environmental variables. Measures of objective and perceived features of the physical environment of residence, self-reported physical activity and other lifestyle behaviors, barriers towards physical activity, general health, and demographics were obtained from 5205 European adults participating in the 2014 online SPOTLIGHT survey. T-tests, chi-square tests, and generalized estimating equations with negative binomial log-link function were conducted. Adults not interested in physical activity reported a higher BMI and a lower self-rated health, were less educated, and to a smaller extent female and less frequently employed. They were more prone to have less healthy eating habits, and to perceive more barriers towards physical activity. Only minor differences were observed in environmental attributes: the non-interested were slightly more likely to live in neighborhoods objectively characterized as less aesthetic and containing more destinations, and perceived as less functional, safe, and aesthetic. Even after controlling for other individual and environmental factors, interest in physical activity remained a significant correlate of physical activity, supporting the importance of this association. This study is among the first to describe characteristics of individuals with reduced interest in physical activity, suggesting that (lack of) interest is a robust correlate of physical activity in several personal and environmental conditions.

Keywords: Interest level, motivation, physical activity, correlates, SPOTLIGHT

Background

Lack of physical activity is an important determinant of a wide range of non-communicable diseases (Fisher et al., 2011; WHO, 2010). Elimination of physical inactivity would reduce 6-10% of the major non-communicable diseases of coronary heart disease, type-II diabetes, and breast and colon cancers, and increase life expectancy (Lee et al., 2012). However, despite the well-recognized benefits of regular physical activity (Pedersen and Saltin, 2015; Sallis et al., 2016), a large proportion of European adults do not meet existing physical activity recommendations (e.g., Garber et al., 2011). According to the Eurobarometer (2014), about two thirds of European adults (59%) seldom or never exercise or play sports, one third never engage in other forms of physical activity like cycling, dancing or gardening (30%), and 13% do not walk for at least 10 consecutive minutes on a given day within a week. Results from the same survey indicated that about 20% of European adults "lack motivation or are not interested" in being physically active, and 42% reported "not having the time" for it (Eurobarometer, 2014). In both cases, physical activity appears not to be a priority for these individuals, compared to other interests and commitments during discretionary time. These findings highlight the need to take motivation for, and level of interest in, physical activity into account when developing physical activity promotion programs at the population level. Knowing who is not interested or motivated to be physically active, and what characteristics they have, should be an important factor in policy development.

Socio-ecological models emphasize that physical activity behaviors are influenced by interactions between individual, social, and environmental factors (Sallis et al., 2008). Results from previous studies indicated that, in general, regular physical activity participation is associated with: (1) demographic characteristics such as younger age, male gender, higher education, and higher socio-economic status (SES) (Eurobarometer, 2014; Nies and Kershaw, 2002; Trost et al., 2002); (2) physical environmental factors such as availability, proximity, safety of exercise facilities and trails, and higher neighborhood aesthetics (e.g., De Bourdeaudhuij et al., 2005; Humpel et al., 2002; Sallis et al., 2012) (3) social factors such as perceived social support from peers and family (e.g., Anderson et al., 2006); (4) behavioral/lifestyle factors such as healthy dietary habits and not being a smoker (Blakely et al., 2004; De Vries et al., 2008; Trost et al., 2002); and (5) psychological factors such as high self-

efficacy, autonomous motivation, and intrinsic motives to be active (e.g., enjoyment/interest, social engagement) (e.g., Anderson et al., 2006; De Bourdeaudhuij et al., 2005; Ingledew and Markland, 2008; Santos et al., 2016; Teixeira et al., 2012). Psychological factors that influence physical activity include perceived barriers towards being physically active, of which lack of time due to work and/or family commitments and lack of interest are two of the most common ones (De Bourdeaudhuij et al., 2005). Personal interest in a given activity is also described in self-determination theory as a key marker of intrinsic motivation, one of the most adaptive forms of motivation (Plant and Ryan, 1985; Ryan and Deci, 2000). Yet, while other dimensions of intrinsic motivation such as enjoyment have been thoroughly investigated as predictors of physical activity (e.g., Dunton and Vaughan, 2008; Rhodes and Kates, 2015; Ruby et al., 2011; Williams et al., 2006), few studies have specifically focused on the potential role of interest as a psychological correlate or predictor of physical activity, especially in relation to demographic, physical environmental, social, behavioral/lifestyle-related and other psychological correlates. This study aims to address this gap.

Based on data collected in the framework of the EU-funded SPOTLIGHT project (Lakerveld et al., 2015; Lakerveld et al., 2012), we first examine characteristics of individuals who indicated not being interested in physical activity. Second, we analyze whether interest level is a correlate of physical activity after controlling for potentially important correlates at the individual and environmental level.

Methods

Study Design and Setting

This cross-sectional study was part of the European Commission-funded SPOTLIGHT project (Lakerveld et al., 2015; Lakerveld et al., 2012), conducted in 60 randomly selected urban neighborhoods from five European countries (Belgium, France, Hungary, the Netherlands, and the UK), and established to increase and combine knowledge on overweight and obesity-related determinants to support effective health promotion approaches. The rationale, design, procedures and methodology of this project have been described elsewhere (Lakerveld et al., 2015; Lakerveld et al., 2012).

Participant recruitment

Between February and September 2014, a random sample of residents (≥18 years) from the selected neighborhoods was invited by letter to participate in an online survey assessing participants' energy-balance related behaviors, determinants of these behaviors and body weight and height. A total of 6037 adults (mean age 51.8 (sd=16.4) years, 56% female) completed the online survey (overall response rate of 10.8%) (Lakerveld et al., 2015). A total of 832 participants were excluded from the analyses in this paper because they could not be geolocalized, or their neighborhood was not covered within Google Street View. This resulted in a total of 5205 participants. Local ethics committees of each participating research center approved the study protocol. All participants provided informed consent.

Measures

Socio-demographic measures included age, gender, education level, and employment status. For gender, males served as the reference category. Due to differences between the educational systems across the countries, education level was categorized into: 'higher' (college or university level) and 'lower' (secondary education or less – used as the reference category). Employment status classified individuals into being currently 'employed', 'homemaker', 'studying', 'unemployed' and 'retired', which we collapsed into those employed and those unemployed (reference category). Participants were asked to report their height and weight. Body mass index was calculated by dividing self-reported weight (in kilograms) by the square of the self-reported height (in meters). Self-rated health was measured with a Visual Analogue Scale (VAS) ranging from 0 (very unhealthy) to 100 (very healthy). Participants further reported on their smoking status: smoker vs. not smoker (reference category).

Lack of interest in physical activity

Individuals indicated "How often does lack of interest prevent you from getting regular physical activity" on a five-point Likert scale ('never', 'rarely', 'sometimes', 'often' or 'very often'). This item was derived from the Neighborhood Quality of Life Study - NQLS (Frank et al., 2006). Participants were classified as not interested in physical activity if they answered 'sometimes', 'often' or 'very often' to this question, while those answering 'rarely' or 'never' were classified as interested in physical activity (which was used as reference category). Sensitivity analysis using different

cut-off points were performed – a) participants answering only "often" and "very often" classified as not interested in physical activity, and b) not including participants who answered "sometimes" in either category – which revealed similar results (data not shown).

Physical activity

An adapted version of the International Physical Activity Questionnaire - IPAQ (Craig et al., 2003) was used in the SPOTLIGHT survey to evaluate leisure-time and transport-related physical activity. A composite measure of physical activity was derived from the data collected (min/week). To assess whether combining these two types of physical activity affected results, sensitivity analyses were conducted separately for each measure, generating similar results (data not shown).

Sedentary behaviors

Sedentary behaviors were assessed using a self-reported questionnaire validated by Marshall et al. (2010). This instrument assessed time spent sitting on weekdays and weekend days while traveling, working, watching television, using a computer, and on doing other leisure activities. Average daily minutes of sitting were calculated from the data collected.

Eating habits

To evaluate eating habits, a number of short questions commonly used in food frequency questionnaires were asked, including frequency of consumption of specific foods (fruit, vegetables, fish, fast food, sweets) and beverages (sugary drinks, alcohol), and frequency of breakfast consumption (Lakerveld et al., 2015). Available answers were 'once a week or less', '2 times a week', '3 times a week', '4 times a week', '5 times a week', '6 times a week', '7 times a week (each day)', 'twice a day', 'more than twice a day'. In addition, the number of meals per day was assessed.

Barriers for physical activity behaviors

Besides 'lack of interest' – which is framed as a dimension of motivation in the current study –, participants were asked about six potential barriers to regular physical activity using questions originating from the NQLS (Frank et al., 2006): 'lack of equipment', 'lack of time', 'lack of good weather', 'lack of facilities or space', 'lack of good health' and 'lack of sports partner, someone to be active with'. These

variables were rated on 5-point Likert scales ranging from 'never' to 'very often'. Items were defined as barrier if individuals answered that they perceived this to be a barrier 'sometimes', 'often' or 'very often', and not as a barrier if they answered 'rarely' or 'never' (reference category).

Physical environment

Perceived physical environmental characteristics were assessed using items from the validated ALPHA questionnaire (Spittaels et al., 2009), and the Multi Ethnic Study of Atherosclerosis (MESA) survey (Curl et al., 2013). Additionally, participants reported on the presence of destinations in the neighborhood. Perceived neighborhood features were divided into four domains, as previously reported (Compernolle et al., 2016; Mackenbach et al., 2016): functionality (e.g., choice of routes, special cycle lanes), safety (e.g., pedestrian crossings, traffic speed), aesthetics (e.g., maintenance of sidewalks and play areas), and destinations (e.g., supermarkets, local shops, fast food restaurants, café/bars, tram or bus stops, public bicycle facilities, open recreation areas or leisure facilities).

Neighborhood characteristics were also objectively assessed using the validated SPOTLIGHT virtual audit tool, based on Google Street View (Bethlehem et al., 2014). A total of 41 environmental characteristics were assessed in 59 neighborhoods (one Hungarian neighborhood was not covered by Google Street View at the time of the virtual audit), and categorized in four constructs (as for perceived environmental characteristics): 'traffic safety', 'aesthetics', 'functionality', and 'destinations'.

Statistical analysis

Missing values ranged from <1% (age) to 26% (perceived functionality). Based on the assumption that data were missing at random, multiple imputations were performed. Given the percentage of missing values, 30 imputed datasets were generated, as recommended (Bodner, 2008; Rubin, 1987). Missing values were imputed using predictive mean matching in SPSS version 22.0. All variables described in the methods section were entered in the imputation models.

In order to characterize the individuals who were not interested in physical activity, comparisons between individuals with and without interest in physical activity were conducted using independent samples t-test analysis for continuous variables and chi-square analysis for categorical variables. To quantify group differences, effect sizes

(Cohen's d) were calculated. Widely accepted criteria proposed by Cohen (1988) were used to assess the magnitude of the effect: 0.20, small effect size; 0.50, medium effect size; 0.80, large effect size.

To test whether interest level predicted regular physical activity after controlling for potential confounders, at the individual and environmental level, generalized estimating equations (GEE) using a negative binomial log-link and an exchangeable correlation structure were performed. GEE is an extension of generalized linear models, which allows the estimation of more efficient and unbiased regression parameters relative to ordinary least squares regressions, when outcome variables are not normally distributed (e.g., count or binary variables) (Balinger, 2004; McCullagh and Nelder, 1989). Negative binomial regression using generalized linear models has been accepted as the best means of estimating probabilities in cases in which the dependent variable consists of count data and is overdispersed (Gardner et al., 1995). An exchangeable correlation structure was specified, as it is considered more appropriate in situations in which data are cross-sectional and clustered within a particular organizational unit (in this case, neighborhoods) (Horton and Lipsitz, 1999). The ratio of the mean physical activity for the non-interested respondents over the mean physical activity for the interested respondents was calculated through the exponentiation of interest level coefficients.

In Model 1, we added interest in physical activity as a covariate to assess differences in physical activity between individuals with and without interest in physical activity. We subsequently generated six models (Model 2–7) that served to test whether interest level was associated with physical activity after controlling for potentially important correlates, at both individual and environmental levels, and which variables changed that association. In Model 2, we assessed whether the association between interest level and physical activity was independent of individual level demographics, health-related indicators, neighborhood SES, and residential area density. All of these were kept in the subsequent models to control for their effects. In Model 3, objective neighborhood features derived from the Google Street View audit were added. In Model 4, perceived neighborhood features from the survey questionnaire were included. In Model 5, other lifestyle behaviors were added. In Model 6, perceived barriers towards physical activity were included. In Model 7, all the variables that were significantly associated with physical activity in previous models (3-6), plus the

variables of Model 2, were included. The difference in the coefficient of interest in physical activity between Model 1 and the subsequent models was interpreted as the contribution of each block of covariables to the differences in physical activity between participants with and without interest in physical activity.

As a sensitivity analysis, analyses were repeated on a non-imputed dataset.

All statistical analyses were conducted in SPSS version 22.0. Significance was interpreted as a two-sided p-value of <0.05.

Results

Overall sample characteristics have been described elsewhere (Lakerveld et al., 2015). In brief, more than half of the respondents from the overall sample were female (55%), with a high education level (54%), and currently employed (58%). The mean (sd) age of the sample was 52.2 (16.3) years and the mean BMI was 25.2 (4.5) kg/m^2. Mean participants' self-rated health was 69.7 (19.5).

In total, 47% of the sample reported that lack of interest (herein considered as the group of non-interested individuals) prevented them from regularly engaging in physical activity. Of these, 27% reported to be active less than 150 minutes per week (Cohen's *d*, 0.33; p<0.001). Differences in characteristics between individuals interested and not interested in physical activity are shown in Table 1.

Table 2 shows the multivariable associations between interest in physical activity and actual physical activity level, controlling for key correlates at the individual and environmental levels. Participants who were not interested in physical activity on average had lower levels of physical activity (B = -0.38, 95% CI = -0.45; -0.31) than those showing interest in it (Model 1). This means that the group of non-interested respondents is expected to report about 30% less physical activity than the group of interested respondents (i.e., approximately 206 minutes less per week, on average). This coefficient was attenuated by 3% (B = -0.37, 95% CI = -0.44; -0.29), after adjusting for demographic variables, health indicators, neighborhood SES and residential area density (Model 2). The addition of objectively assessed environmental features (Model 3) did not alter the coefficient for interest level (B = -0.37, 95% CI = -0.44; -0.29), while the inclusion of perceived environmental features attenuated Model 2 coefficient by 3% (Model 4; B = -0.36, 95% CI = -0.44; -0.29). The

inclusion of lifestyle behaviors (Model 5) attenuated the coefficient of Model 2 by 16% (B= -0.31, 95% CI = -0.38; -0.23). In model 6, the association between (lack of) interest in, and physical activity was attenuated by 11% after the addition of perceived barriers towards physical activity (B= -0.33, 95%CI = -0.40; -0.26). The final model (Model 7) including only the significant correlates identified in previous models attenuated the coefficient of Model 2 by 19% (B= -0.30, 95% CI = -0.38; -0.22).

Analyses with non-imputed data led to similar results (see Supplementary Material 1).

Discussion

We used data from a survey conducted in a relatively large sample of European adults to examine characteristics of individuals not interested in physical activity, and to explore whether interest level was associated with current physical activity, controlling for other important factors at the individual and environmental levels. A main finding is that lack of interest in physical activity was associated with lower levels of self-reported physical activity and that these results remained largely unaltered after adjusting for a number of potentially relevant correlates. This suggests that the interest-behavior association, which has been previously reported (Brownson et al., 2008; De Bourdeaudhuij et al., 2005), is a robust finding. This, and also the fact that interest and value are core components of the most adaptive and sustainable forms of motivation (Deci and Ryan, 2000; Kwasnicka et al., 2013), suggest that people reporting little interest in physical activity have characteristics which make them less likely to engage in physical activity in a sustained way.

Identifying these characteristics constituted a main goal of the present study. Results showed that the largest share of individuals who were not interested in physical activity had a higher BMI and a lower self-rated health, were less educated, and to a smaller extent female and less frequently employed (very small effect sizes). These indicators were also largely identified as correlates of current levels of physical activity, in line with prior research reporting associations between regular physical activity and demographic characteristics such as male gender and self-rated health (Bauman et al., 2012; Oppert et al., 2006).

Taking indicators from the built environment into account did not substantially change the interest-behavior association observed in this study. In addition, our

univariate analyses showed only minor (albeit significant) differences between the two groups: the non-interested were slightly more likely to live in neighborhoods objectively assessed as being less aesthetic and containing more destinations, and to perceive them as less functional, safe, and aesthetic than those interested in regular physical activity. Favorable perceptions of the local environment (e.g., traffic safety, neighborhood aesthetics, proximity/accessibility to recreation facilities and locations) have consistently been associated with higher levels of physical activity (Bauman et al., 2012; Heath et al., 2012; Owen et al., 2004), and could be important to stimulate interest in physical activity. Yet, our findings seem to suggest otherwise. There is evidence that environment-physical activity associations are domain- and context-specific (Arango et al., 2013; Bauman et al., 2012). It is possible that environment-interest associations are also specific to certain contexts and domains. In high-income populations or countries (as the ones analyzed in this study), perceptions of safety and aesthetics typically influence leisure-time physical activity (Bauman et al., 2012). This physical activity domain has also been linked to perceived neighborhood safety, while the transport domain is more related to street lighting (Arango et al., 2013). Although evidence is weaker, residential self-selection might also attenuate environment-physical activity associations (Boone-Heinonen et al., 2010), for instance, by shaping individuals' perceived barriers towards physical activity (e.g., having friends to exercise with; exercise facilities nearby), interest in physical activity and, subsequently, physical activity levels.

Lifestyle behaviors were also identified as correlates of current physical activity, attenuating the interest-behavior association by 4%. Participants who showed little or no interest in physical activity were more likely to eat less fruits/vegetables and to have daily breakfast than the interested respondents (small effect sizes). This is in line with previous research showing a clustering of unhealthy lifestyle behaviors (Blakely et al., 2004; De Vries et al., 2008; Emmons et al., 2005; Fine et al., 2004; Mawditt et al., 2016; Poortinga et al., 2008; Roda et al., 2016; Schneider et al., 2009).

As expected, the group of non-interested respondents also presented higher scores on a variety of perceived barriers towards physical activity (medium effect sizes in general). Moreover, some of these barriers (i.e., lack of time, and lack of an exercise partner) attenuated the association between interest level and physical activity by 11%. This is in line with prior research showing that barriers perceived by Belgian and

Portuguese adults (lack of time, external obstacles, health problems, and psychological problems) were significant correlates of recreational physical activity, which usually predominates in high-income countries like those analyzed herein (De Bourdeaudhuij et al., 2005). In addition, Brownson et al. (2008) observed that, among US adults, the most commonly reported barriers were lack of time, feeling too tired, and obtaining enough exercise at one's job, besides having no motivation.

Lack of interest in physical activity can be explained by several factors. People may not value physical activity or its benefits enough to make it a priority in their daily lives when compared to other competing demands resulting from educational, career, and family obligations (Ryan et al., 2009). A recent study showed that the amount of time adults spend on major life domains (i.e., paid work, housework and caregiving, and personal care) is inversely associated with time spent on sports/fitness activities (Taniguchi and Shupe, 2014), highlighting the need to consider the trade-off between ideal and feasible time use for physical activity behaviors. As another important factor, some people may not feel sufficiently competent, skilled, physically fit, or healthy enough to be physically active. They may also fear getting injured (Eurobarometer, 2014). Finally, individuals can also be motivated *not to* be active, that is, they may hold strong and reflected motives not to invest time and effort in physical activity (e.g., because of powerful peer pressure, endorsing negative attitudes, etc.). This is different from merely not thinking about physical activity or not finding it interesting (Aelterman et al., 2016) and potentially harder to change.

As practical implications, it would be prudent for initiatives aimed at promoting physical activity to contemplate the assessment of individuals' interest in physical activity as well as the underlying goals and motives, and include effective strategies by which interest and value in being physically active can be fostered. A recent example from a UK "This Girl Can" campaign (2014) illustrates how that may be addressed at a broad population level, by celebrating active women who are performing the physical activities of their choice independent of how well they do it. At the level of the individual, research has now consistently shown that sustained adherence to physical activity is especially related to the process and quality of the participation experience, which rely on the endorsement of intrinsic or well-integrated motives to be active, which is usually associated with high level of personal interest and engagement (Hagger and Chatzisarantis, 2008; Wilson et al., 2008).

This study has several strengths, including the large sample across five European countries, the harmonized data collection across heterogeneous neighborhoods, the use of a validated tool to assess objective neighborhood features (Bethlehem et al., 2014) and the inclusion of a wide variety of potential correlates of physical activity behavior. Some limitations must also be acknowledged, including the cross-sectional design of the study, which makes it impossible to establish cause-effect relations; the low response rate observed (10.8%), which makes the sample less representative and is likely to reflect a selection bias towards more informed or motivated people; the collection of data in a sample of residents living in large urban areas, which limits the generalizability of the present findings to less urbanized or rural areas; and the use of self-report instruments to assess lifestyle behaviors, health-related variables and perceived barriers. Another limitation relates to the absence of a more specific and comprehensive measure to assess personal interest in a given activity, which would evaluate both its affective-related (e.g., joy, optimal arousal) and value-related valences (e.g., personal significance), therefore providing more information (e.g., an adapted version of the Study Interest Questionnaire by Schiefele et al., 1993). Finally, an important limitation refers to the non-existence of measures of psychosocial factors, which have been shown to play an important role in the prediction of physical activity behaviors (Anderson et al., 2006; De Bourdeaudhuij et al., 2005; Teixeira et al., 2012), as well as to have a substantially higher influence on behavior when compared to other factors, such as the environmental features (De Bourdeaudhuij et al., 2005). Previous studies have also revealed that neighborhood walkability and availability of facilities interacted with individual cognitions such as perceived social support and self-efficacy in predicting physical activity (Carlson et al., 2012). Thus, these factors might also help differentiating the non-interested in leisure-time physical activity from the interested individuals. Future research should address these limitations.

Conclusions

This study indicates that level of interest in physical activity, as reported by European adults, is an important correlate of self-reported physical activity. This association remained even after taking into account a large set of potential confounders such as perceived barriers towards physical activity, features of the physical environment, lifestyle behaviors, self-rated health, BMI, and demographics. Based on the current

results, future studies should explore the reasons underlying lack of interest in physical activity and explore ways in which interest and value in being physically active might be fostered in particular groups and in the population. Additionally, at risk groups identified in this study on the bases of their low interest in physical activity can be especially considered as potential targets in public health efforts to effectively promote health-enhancing physical activity.

Declarations

Acknowledgements

Authors would like to thank all participants enrolled in the SPOTLIGHT study.

Funding

This work is part of the SPOTLIGHT project (www.spotlightproject.eu) funded by the Seventh Framework Programme (CORDIS FP7) of the European Commission, HEALTH (FP7-HEALTH-2011-two-stage), Grant agreement No.278186. The content of this article reflects only the authors' views and the European Commission is not liable for any use that may be made of the information contained therein. HR was supported by the National Institute for Health Research (NIHR), Collaboration for Leadership in Applied Health Research, and Care (CLAHRC) North Thames at Bart's Health NHS Trust. The views expressed are those of the authors and not necessarily those of the NHS, the NIHR or the Department of Health.

Competing interests

None to declare.

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Table 1. Characteristics of European adults participating in the 2014 SPOTLIGHT survey, according to their interest in physical activity

	Non-interested in physical activity (*N=2149*)	Interested in physical activity (*N=2453*)		
	Mean (Standard Deviation) or %		p-value[1]	Cohen's *d*[2]
Individual-level characteristics				
Age (years)	51.8 (16.2)	51.4 (16.0)	0.369	0.02
Gender (% women)	57.6	52.5	<0.001	0.10
Education (% college or university)	50.3	59.1	<0.001	0.18
Employment status (% currently employed)	54.1	57.9	0.003	0.08
Body mass index (kg/m^2)	25.9 (4.7)	24.5 (4.2)	<0.001	**0.31**
Self-rated health (range: 0-100)	65.9 (19.8)	73.4 (18.2)	<0.001	**0.39**
Neighborhood characteristics				
Neighborhood socio-economic status (% high)	49.7	53.0	0.027	0.07
Residential area density (% high)	52.4	50.2	0.132	0.05
Objective neighborhood functionality (%)	0.38 (0.15)	0.38 (0.15)	0.985	<0.01
Objective neighborhood safety (%)	0.27 (0.14)	0.26 (0.15)	0.064	0.05
Objective neighborhood aesthetics (%)	0.51 (0.13)	0.52 (0.12)	0.001	0.10
Objective neighborhood destinations (%)	0.03 (0.03)	0.03 (0.03)	0.034[3]	0.06
Perceived neighborhood functionality (range: 1-5)	3.44 (0.76)	3.51 (0.72)	0.003	0.10
Perceived neighborhood safety (range: 1-5)	3.15 (0.65)	3.22 (0.65)	0.001	0.11
Perceived neighborhood aesthetics (range: 1-5)	3.54 (0.88)	3.63 (0.89)	0.001	0.10
Perceived neighborhood destinations (range: 1-5)	1.19 (0.25)	1.19 (0.26)	0.822	0.01
Lifestyle behaviors				
Physical activity (minutes per week)	476 (481)	676 (550)	<0.001	**0.39**
Not meeting physical activity recommendations (%)[4]	27.0	13.2	<0.001	**0.33**
Total sitting time (minutes per day)	542 (228)	533 (215)	0.184	0.04
Daily breakfast (times per week)	6.04 (2.07)	6.35 (1.71)	<0.001	0.16
Average number of meals per day	2.73 (0.49)	2.79 (0.41)	<0.001	0.13
Fruit consumption (times per week)	6.33 (4.61)	7.50 (5.05)	<0.001	**0.24**
Vegetables consumption (times per week)	6.69 (3.47)	7.25 (3.78)	<0.001	0.15
Fish consumption (times per week)	1.18 (1.10)	1.30 (1.15)	0.001	0.11
Fast-food consumption (times per week)	0.65 (0.62)	0.60 (0.50)	0.005	0.09
Sweets consumption (times per week)	3.67 (3.20)	3.55 (3.21)	0.196	0.04
Sweetened beverages (times per week)	3.93 (4.86)	3.52 (4.38)	0.003	0.09
Alcohol (glasses per week)	4.31 (5.38)	4.25 (4.95)	0.706	0.01
Smoking (% currently smoking)	16.4	15.7	0.007	0.10
Barriers towards physical activity				
Lack of time (% yes)	72.3	60.9	<0.001	**0.24**
Lack of equipment (% yes)	38.6	18.6	<0.001	**0.46**
Lack of good weather (% yes)	62.5	44.1	<0.001	**0.37**
Lack of facilities (% yes)	35.4	18.3	<0.001	**0.39**
Lack of health (% yes)	43.4	23.6	<0.001	**0.43**
Lack of partner (% yes)	54.6	26.3	<0.001	**0.60**

Note: [1] p-values from Chi-squared tests for categorical variables and from independent t-tests for continuous variables. [2] Cohen's *d* were calculated to quantify the magnitude of the group differences (effect sizes above 0.20 highlighted in bold). [3]Extended mean and SD values for each group: Non-interested group: 0.0316 (0.0270); Interested group: 0.0299 (0.0264); p=0.034. [4] 150 minutes per week of physical activity.

Table 2. Multivariable Generalized Estimation Equations regression coefficients (95% CIs) for the association between interest in, and physical activity levels, controlling for factors at the individual and environmental levels, in European adults participating in the 2014 SPOTLIGHT survey

	Model 1 (N=5205)	**Model 2 (N=5205)**	**Model 3 (N=5205)**	**Model 4 (N=5205)**	**Model 5 (N=5205)**	**Model 6 (N=5205)**	**Model 7 (N=5205)**
		B (95%CI)	B (95%CI)	B (95%CI)	B (95%CI)	B (95%CI)	B (95%CI)
Lack of interest in physical activity	**-0.38 (-0.45; -0.31)**	**-0.37 (-0.44; -0.29)**	**-0.37 (-0.44; -0.29)**	**-0.36 (-0.44; -0.29)**	**-0.31 (-0.38; -0.23)**	**-0.33 (-0.40; -0.26)**	**-0.30 (-0.38; -0.22)**
Individual-level characteristics							
Age (years)		**0.04 (0.00; 0.08)**	**0.04 (0.00; 0.08)**	**0.05 (0.01; 0.09)**	0.02 (-0.02; 0.06)	0.02 (-0.01; 0.06)	0.00 (-0.04; 0.04)
Gender (female)		**-0.09 (-0.14; -0.04)**	**-0.10 (-0.15; -0.05)**	**-0.10 (-0.15; -0.05)**	**-0.12 (-0.18; -0.06)**	**-0.09 (-0.14; -0.04)**	**-0.12 (-0.18; -0.07)**
Educational level (high)		**-0.07 (-0.13; -0.00)**	**-0.07 (-0.14; -0.01)**	-0.06 (-0.13; 0.00)	**-0.11 (-0.17; -0.04)**	**-0.07 (-0.13; -0.00)**	**-0.09 (-0.16; -0.02)**
Employed (yes)		**-0.26 (-0.33; -0.19)**	**-0.27 (-0.34; -0.20)**	**-0.26 (-0.34; -0.19)**	**-0.25 (-0.32; -0.18)**	**-0.24 (-0.32; -0.17)**	**-0.25 (-0.33; -0.17)**
Body mass index (kg/m^2)		**-0.03 (-0.07; -0.00)**	**-0.03 (-0.07; -0.00)**	**-0.04 (-0.07; -0.01)**	-0.03 (-0.06; 0.00)	-0.03 (-0.06; 0.00)	**-0.03 (-0.07; -0.00)**
Self-rated health (Range: 0-100)		**0.05 (0.02; 0.08)**	**0.05 (0.02; 0.08)**	**0.05 (0.02; 0.08)**	**0.05 (0.02; 0.08)**	**0.05 (0.02; 0.08)**	**0.04 (0.01; 0.07)**
Neighborhood SES status (high)		-0.02 (-0.10; 0.06)	-0.02 (-0.10; 0.06)	-0.03 (-0.11; 0.06)	-0.02 (-0.09; 0.05)	-0.02 (-0.11; 0.06)	-0.02 (-0.10; 0.06)
Residential area density (high)		0.00 (-0.08; 0.09)	-0.01 (-0.10; 0.08)	-0.01 (-0.09; 0.08)	0.02 (-0.07; 0.10)	-0.00 (-0.09; 0.09)	-0.01 (-0.10; 0.08)
Objective environmental features							
Traffic safety			-0.28 (-0.71; 0.16)				
Aesthetics			-0.23 (-0.71; 0.16)				
Functionality			**0.53 (0.09; 0.93)**				0.24 (-0.03; 0.50)
Destinations			0.80 (-1.28; 2.88)				
Perceived environmental features							
Safety				**-0.09 (-0.16; -0.02)**			-0.03 (-0.07; 0.01)
Aesthetics				0.01 (-0.04; 0.05)			
Functionality				0.07 (-0.01; 0.15)			
Destinations				**-0.34 (-0.47; -0.21)**			**-0.33 (-0.46; -0.21)**

	Model 1 (N=5205)	**Model 2 (N=5205)**	**Model 3 (N=5205)**	**Model 4 (N=5205)**	**Model 5 (N=5205)**	**Model 6 (N=5205)**	**Model 7 (N=5205)**
		B (95%CI)	B (95%CI)	B (95%CI)	B (95%CI)	B (95%CI)	B (95%CI)
Lifestyle behaviors							
Total sitting time (minutes per day)					0.00 (-0.00; 0.01)		
Number of meals per day					**-0.14 (-0.24; -0.04)**		**-0.13 (-0.23; -0.04)**
Daily breakfast (times per week)					**0.04 (0.02; 0.06)**		**0.04 (0.02; 0.06)**
Fruit consumption (times per week)					**0.01 (0.01; 0.02)**		**0.02 (0.01; 0.02)**
Vegetables consumption (times per week)					0.01 (-0.00; 0.02)		
Fish consumption (times per week)					**0.06 (0.03; 0.08)**		**0.06 (0.03; 0.08)**
Fast-food consumption (times per week)					-0.06 (-0.13; 0.01)		
Sweets consumption (times per week)					-0.00 (-0.01; 0.01)		
Sweetened beverages (times per week)					**-0.01 (-0.02; -0.00)**		**-0.01 (-0.02; -0.00)**
Alcohol (glasses per week)					-0.00 (-0.01; 0.01)		
Smoking (yes)					0.01 (-0.06; 0.09)		
Barriers towards physical activity							
Lack of time (yes)						**-0.11 (-0.16; -0.05)**	**-0.10 (-0.16; -0.04)**
Lack of equipment (yes)						-0.00 (-0.08; 0.08)	
Lack of weather conditions (yes)						-0.01 (-0.08; 0.06)	
Lack of facilities (yes)						-0.00 (-0.09; 0.09)	
Lack of “good” health (yes)						0.01 (-0.06; 0.08)	
Lack of partner (yes)						**-0.07 (-0.13; -0.00)**	-0.06 (-0.12; 0.01)

Bold values represent significant associations (p<0.05). Model 1: Interest in physical activity. Model 2: Interest in physical activity, age, gender, individual level of education, employment status, neighborhood socio-economic status (SES), neighborhood residential area density, body mass index and perceived general health. Model 3: model 2 + objective neighborhood features. Model 4: model 2 + perceived neighborhood features. Model 5: model 2 + lifestyle behaviors. Model 6: model 2 + exercise perceived barriers. Model 7: model 2 + all significant variables included in the previous models (3-6).

Highlights

Lack of interest prevented 47% of respondents from doing regular physical activity
Lack of interest in physical activity was related to lower physical activity levels
The interest-behavior association remained after adjusting for several correlates
The group of non-interested is expected to do about 30% less physical activity