Self reported physical activity, public health, and perceived environment: results from a comparative European study

A Rütten, T Abel, L Kannas, T von Lengerke, G Lüschen, J A Rodríguez Diaz, J Vinck, J van der Zee

Abstract

***Study objective*—The focus of physical activity promotion is moving from methods for increasing health enhancing physical activity on the individual level to higher level strategies including environmental and policy approaches. Scientific inquiry, traditionally related to individual-based strategies, requires adaptation and refinement when environmental and policy changes become more relevant. The objective of this study is to investigate the significance for behaviour and health of community-based environments that encourage physical activity.**

***Design and setting*—The article presents data and results from a cross sectional comparative survey of the general population in six European countries (Belgium, Finland, Germany (East and West), Netherlands, Spain, Switzerland). Specifically, the relation between perceived community-based opportunities for physical activity, self reported physical activity, and self rated health status is investigated.**

***Participants*—Representative samples of general populations (adults 18 years or older). Overall response rate: 53.5%. Sample sizes realised: Belgium: n = 389; Finland: n = 400; Germany (East): n = 913; Germany (West): n = 489; Netherlands: n = 366; Spain: n = 380; Switzerland: n =406.**

***Main results*—Analyses show that best opportunities are reported by people who are lightly to moderately physically active. People's self rated health is moderately, but significantly associated with both perceived opportunities, and physical activity itself. These predictors interact in that especially for women, the health impact of physical activity is more pronounced in case of good opportunities.**

***Conclusions*—The paper shows the potential of opportunities within residential and community environments with regard to physical activity, both for behaviour and health. Opportunities may enable the population, especially women, to develop an active lifestyle, and thus improve their health. Future studies with objective indicators for physical activity related environments should test the findings that are based on perceptions.**

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Technical University of Chemnitz, Germany
A Rütten
T von Lengerke

University of Berne, Switzerland
T Abel

University of Jyväskylä, Finland
L Kannas

University of Alabama at Birmingham, United States of America
G Lüschen

University of Barcelona, Spain
J A Rodríguez Diaz

Limburg University Centre, Belgium
J Vinck

Netherlands Institute of Primary Health Care, the Netherlands
J van der Zee

Correspondence to:
Professor Dr Rütten, Technical University of Chemnitz, Sport Science III, Research Centre for Regional Health Promotion, D-09107 Chemnitz, Germany
(alfred.ruetten@phil.tu-chemnitz.de)

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Towards a paradigm shift in physical activity research

The benefits of physical activity for public health are widely accepted by both experts and lay people. There are few other issues where policymakers, scientists, and the population are so congruent in their belief that "it's good for your health". Specifically, physical activity can be related to health promotion, disease prevention, and rehabilitation. It has a positive impact on traditional public health indicators such as mortality and morbidity as well as on psychosocial well being and quality of life.[1–4]

While in the past, major health enhancing effects have been related to rather specific, vigorous, and continuous exercise, recent investigations and statements emphasise the health benefits of moderate increases in daily activities and the development of active lifestyles.[3 5–7]

During the past decades, discussions were dominated by medical approaches and by methods to influence physical activity on the individual level.[2 8–11] Although some large datasets and surveillance systems such as the Behavioral Risk Factor Surveillance System (BRFSS) in the United States showed significant results regarding social conditions and physical activity,[12 13] sociological evidence has been widely neglected. In particular, there is a "scientific lag" in developing policy and environmental approaches to physical activity.[14–16]

Recently, however, leading public health authorities such as the US Surgeon General in his report on *Physical Activity and Health*[3] have highlighted the necessity to go beyond traditional efforts—that is, among other things—to develop and evaluate the effectiveness of interventions that include policy and environmental support.[3 7] With regard to the future of public health, such statements may indicate a "paradigm shift" away from the individual oriented approaches towards a more expanded model of health behaviour change that includes higher levels of impact.[17 18]

One important reason for public health authorities to consider a paradigm shift is related to the effectiveness and efficiency of different intervention strategies.[3] For example, compared with individual or target group oriented intervention strategies, community and environmental approaches may increase the chance of affecting a greater percentage of the underactive population with potentially lower costs per person. This focus becomes especially relevant with regard to the new public health

targets mentioned above (for example, increasing moderate daily activities).[19]

Results of previous studies

During the past decades it became increasingly evident that the spatial and social environment are particularly relevant factors within the "web of causation" of chronic diseases.[20] For example, within the emerging context of health promotion, the development of socially oriented lifestyle models led to a new focus on living conditions and resources as determinants of health behaviour and health outcomes.[21–25] In addition, an expanding research agenda on social relation/social support and epidemiological studies such as the Alameda County Study and its successors[26–28] provided for a "substantial body of evidence" regarding the role of the social environment in health promotion.[26 29–32] With the Ottawa Charter[33] at the latest, the development of "healthy living and working conditions" became a core issue of health promotion. This whole issue of "healthy environment", earlier defined by Lindheim and Syme ([30], page 338) as "...one that provides a range of opportunities for its inhabitants to shape the conditions that affect their lives...", has an essential political dimension as well. It is especially related to the development of "healthy public policies" that emphasises the combination of multiple approaches and of joint coordinated actions that contribute to healthier goods, services, and environments.[33–37]

The negative impact of "unhealthy environments" such as environments interrupting supportive ties among people and discouraging meaningful participation, sense of coherence, and control over living conditions have been widely demonstrated by previous studies.[26 30 32 38 39] While some of the earlier results focus on the work environment,[40] more recent evidence is provided by studies of residential environment (as concrete context of physical, social, economical, and political conditions) and its impact on health status and health behaviour.[41–43]

However, less evidence exists with regard to the specific issue of physical activity, public health, and the environment. Most previous results are related only to single dimensions of the environment such as educational/economic resources and social relations in their effects on participation, intensity, form and social context of physical activities.[44–46] Beyond that, as King and others ([16], page 508) summarised, "Few studies have assessed the effects of environmental and policy intervention approaches on physical activity. Access to recreational facilities appears to increase leisure time physical activity,[47] and environmental measures have led to increased activity levels in a controlled community trial.[48] Increasing evidence shows that work-site physical activity programs increase activity levels and are cost effective.[49] However, currently we must rely to a large extent on what appear to be promising interventions and evidence from other areas of public health, such as tobacco control, to build a case for environmental and policy interventions to increase physical activity."

It may be added that while a recent study on attitudes towards policy related interventions aimed at increasing physical activity,[14] there is a particular lack of attempts to "contextualise" physical activity; that is, investigate the environmental and policy conditions under which physical activity can be preventive of diseases and promotive of health.[21 31]

Against this background, this paper presents first results of a comparative European study that investigated associations and possible effects of perceived supportive environments with and on physical activity and health status. It specifically focuses on the relation between perceived community-based opportunities for physical activity, self reported physical activity, and self rated health.

Methods

FRAME OF STUDY

This study was conducted as part of MAREPS, an international research project developing a Methodology for the Analysis of the Rationality and Effectiveness of Prevention and Health Promotion Strategies on behalf of the European Union. The project comprises policymaker and population studies conducted in Belgium, Finland, Germany, the Netherlands, Spain, and Switzerland. The project empirically examines different elements of health policy in general and analyses development, implementation, impact and evaluation of several policies. Considering aspects of both general relevance and international comparability, four policies were selected: (1) early detection of breast cancer, (2) prevention of smoking, (3) promotion of sports and physical activity, and (4) creation of healthy living and working conditions. This study reports only results for the issue of promoting sports and physical activity.

SAMPLE

The data come from a population survey in which a total of 6248 adults 18 years or older were contacted via a telephone administered semi-standardised interview schedule; depending on country/region, the survey language was Dutch, Finnish, Flemish, German, Spanish, or Swiss German. Respondents were asked about their behaviour, motivation and policy perceptions related to breast cancer, smoking, physical activity, and healthy living and working conditions. Simple random sampling was used in every country/region selected, resulted in the realised sample sizes shown in table 1.

A total realised sample of 3343 adults completed the interview in an eligible manner across the surveyed countries and regions. Overall response rate with 53.5% is in line with experiences in other surveys, though higher rates have been obtained. However, it should be mentioned that not all those who could not be interviewed in the different countries are refusals: there are prolonged absences because of travel, for work reasons, or time spent in institutions; besides, respondents not able to

Table 1 MAREPS population survey, sample description

	Belgium (Flanders)	*Finland* (Pirkanmaa)*	*Germany Eastern part (Saxony)*	*Germany Western part (Northrhine-Westfalia)*	*Netherlands whole country*	*Spain† (Catalonia)*	*Switzerland (German speaking part)*	*Total*
Gross sample	1174	1100	2865	1403	1071	760	848	9221
Net sample	805	659	1676	963	872	545	728	6248
Realised sample	389	400*	913	489	366	380	406	3343
Response rate in %	*48.3*	*60.7*	*54.5*	*50.8*	*41.9*	*69.7*	*55.8*	*53.5*
Women								
N	209	211	548	270	217	206	240	1901
%	53.7	52.8	60	55.2	59.3	54.2	59.1	56.9
Men								
N	180	189	365	219	149	174	166	1442
%	46.3	47.3	40	44.8	40.7	45.8	40.9	43.1
Age								
M	43	54	48	46	48	40	46	47
SD	16.15	16.05	17.06	16.36	16.77	17.1	15.5	16.92
Income (gross yearly in 1000 ECU)								
M	34.86	25.87	23.89	31.7	28.86	23.35	57.46	31.76
SD	29.63	17.51	12.18	15.4	19.51	19.82	31.99	23.6

*In Finland, the net sample was determined excluding persons either (1) not listed in the telephone book or (2) not identifiable via last name and address. †In Spain, the survey was conducted by face to face instead of telephone interviews.

speak the survey language and therefore could not be interviewed for this reason are included in the selected samples.

Among those interviewed there are slight over-representations of women across all countries, somewhat pronounced in Germany, the Netherlands and Switzerland. Spanish respondents are on average young, while the Finns score comparably high. For education, considering the approximation method used to construct this parameter—the last school type visited was re-coded into years of schooling—, there are no notable variations across nations. Finally, regarding income, the rank distribution of the yearly gross income taken as a measure here is valid for the European situation.

MEASURES

Subjects reported whether and how they engaged in sports and physical activity, to what extent there were opportunities for physical activity in their community and residential area, and evaluated their own individual health status. Validity was established as far as possible by relating to previous studies using comparable instruments, reliability by internal consistency analysis for multi-item scales. Income was assessed as a household parameter by asking for the yearly gross income before taxes in national currency; before analysis, indicated figures were converted into European currency for comparability.

PHYSICAL ACTIVITY

An index of two items assessing respondents' physical activity behaviour was used. The first question was: "Do you do any gymnastics, physical activity, or sports?" (1: yes/0: no). This measure is comparable to that in the Lipid Research Clinics (LCR) questionnaire that has been found to be relatively valid and reliable in adults; the major difference is that the latter concentrates on strenuous exercise.[50]

The item following a "yes" to the first question was: "How vigorously do you participate in these activities?" (1: not vigorously at all/2: not vigorously/3: somewhat vigorously/4: vigorously/5: very vigorously), which has proved to be valid in cross national studies in a previous study.[51] The two item were combined so that a 6 point scale resulted in which "0" stands for no physical activity and "1" to "5" indicate different levels of vigorousness of reported physical activity. Of course, this is a very simple measure used in this explorative study. For example, an international consensus group attending a physical activity standardisation meeting in Geneva (Switzerland) in 1998 is currently developing International Physical Activity Questionnaires (IPAQ) considering—besides vigorousness—dimensions such as frequency and duration in work, transportation, household, and leisure settings.

OPPORTUNITIES FOR PHYSICAL ACTIVITIES

Regarding opportunities, different aspects of the environment for physical activity were assessed. Specifically, the situation in one's own residential area and community were chosen as indicators. For the latter, service providers and the community itself were differentiated as two actors that may create opportunities. Thus, the following 5 point Likert scale items were used with the categories definitely true/true/(partly)/not true/not true at all: "My residential area offers many opportunities to be physically active.", "Local clubs and other providers in my community offer many opportunities.", and "My community does not do enough for the citizens and their physical activities." These were submitted to tests of unidimensionality (principal component analysis) and reliability (internal consistency, Cronbach's α). As table A1 shows (see appendix), this analysis resulted in every country in identification of one factor, both for all respondents and when analysing physically active and inactive separately. The three items sum score scale constructed on this basis shows satisfactory statistical characteristic (Eigen value and Cronbach's α).

HEALTH STATUS

Health status was self rated by respondents by responding by one of the categories very good/good/satisfactory/not so good/bad to a single item "In general, would you say that your health is ... ?". This kind of operationalisation has been shown valid and predictive of health indicators in numerous studies.[52]

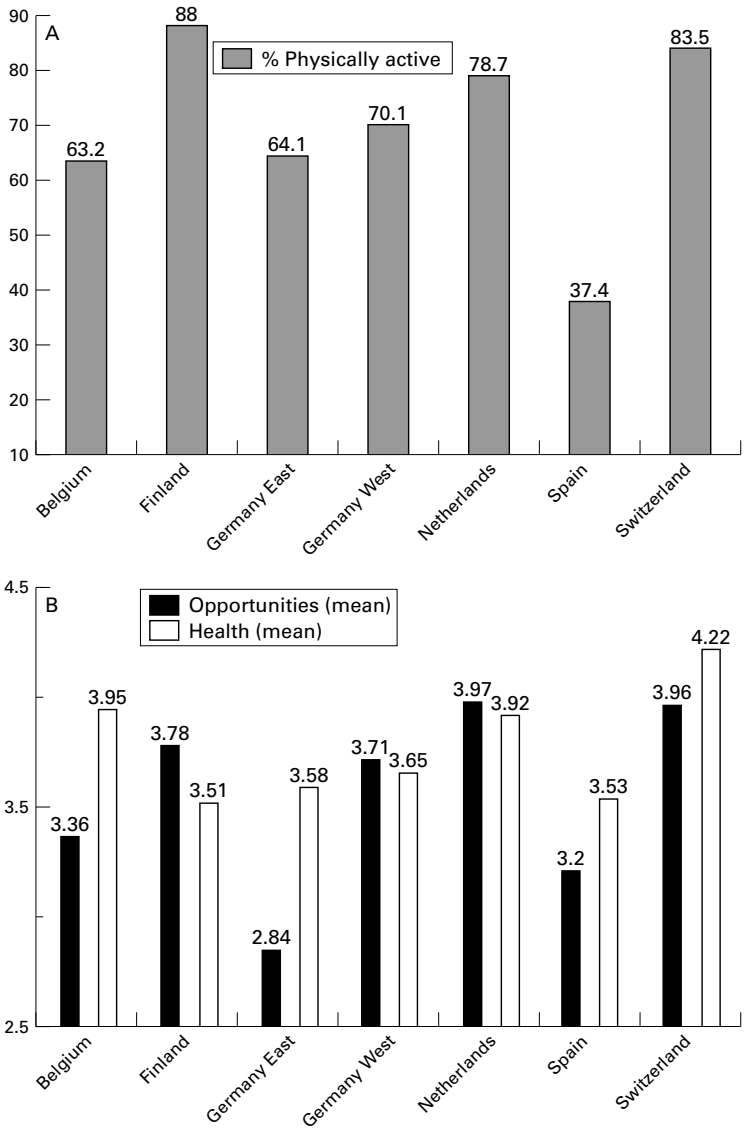

Figure 1 (A) Proportions of physically active respondents in %, and (B) quality of perceived opportunities and self rated health (mean ratings).

STATISTICAL ANALYSES

Firstly, descriptive distributions of self rated health, self reported physical activity, and the perceived opportunity scale were analysed for cross national variation. Secondly, zero order correlation analysis was conducted.

Thirdly, analyses of variance were performed to check for differences in perceived physical activity related opportunities between women and men reporting different degrees of physical activity.

Fourthly, hierarchical regression analysis was carried out where self rated health was regressed on age, sex, income, nation, physical activity and opportunities. In regression, predictors were entered in a theory driven manner to determine which variables make unique contributions to variance, how much variance can be predicted, and whether predicted variances are greater than expected from chance alone. Specifically, age and sex were entered in the first step, income in the second, and nation in the third (in form of dummy variables, with Switzerland as ranked highest in self rated health as reference group), to control for these factors. In the next two steps, opportunities and physical activity were introduced, respectively. Finally, an interaction term was included in the sixth step, namely physical activity × opportunities, to check for possible moderating effects of these variables.[53]

Results

DESCRIPTIVE STATISTICS

Figure 1(B) shows the cross national distribution of reported physical activity. Whereas in all but one country physically active people form the majority, with the highest percentage in Finland (88%) and the lowest in East Germany (64.1%) and Belgium (63.2%), the situation is reversed in Spain, with only 37.4% active people. Not shown in the figure, the three countries with the least percentage of physically active, Spain, Belgium, and East Germany, show the highest vigorousness among those who are active.

Figure 1(B) shows the means of the Likert 3 item scale used to assess perceived opportunities, and the item for self rated health. Regarding opportunities, the East German respondents report the least supportive environments, followed by Spain and Belgium; most favourable environments pertain to the Netherlands, Switzerland, and Finland. Regarding self rated health, the Swiss have the only mean value exceeding 4 on the 5 point scale, while among the others, ratings vary from 3.51 to 3.95.

CORRELATIONS BETWEEN VARIABLES

Regarding the zero order associations of the investigated variables (Pearson coefficients), for self rated health they range from an non-significant relation with sex ($r = 0.03$) to significant relations with perceived opportunities (0.16), income (0.19), physical activity (0 = none to 5 = very vigorously; 0.20), and age (−0.29; see table A2). Furthermore, men and women do neither significantly differ in perceived opportunities nor in physical activity. Finally, in terms of a linear relation, physical activity is associated weakly but significantly with perceived opportunities ($r = 0.09$).

ANALYSIS OF VARIANCE FOR PHYSICAL ACTIVITY RELATED OPPORTUNITIES

To check for differences in perceived opportunities between different physical activity groups, subjects were categorised into inactive (no reported physical activity), light/moderately active (vigorousness = 1, 2, 3), vigorously active (vigorousness = 4), and very vigorously active people (vigorousness = 5). Means for both sexes are shown in figure 2. Analysis of variance shows that though small in magnitude, the overall effect of physical activity is significant. All active groups report significantly more opportunities than the groups with no physical activity; the highest mean values are found for the light/moderate active group. Also, the joint effect of activity and sex turned out to be significant. Figure 2 shows that while for women, all physically active groups differ from the inactive, but not from one another, a parabolic relation holds for men—that is, the

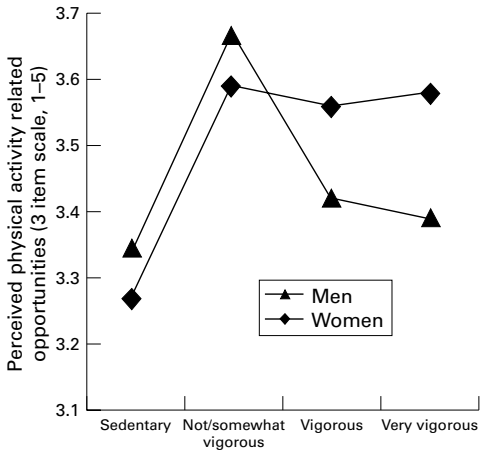

Figure 2 Quality of perceived opportunities (mean ratings) for physical activity in the residential area and community by vigorousness of physical activity.

light to moderate group significantly differs from the inactive group as well as from both the vigorous and very vigorous group.

This design of analysis was replicated for each of the national sub-samples to check for cross national differences. In North Rhine-Westphalia, Saxony and Switzerland, a similar pattern such as that found in the total sample emerged. In three other countries, Belgium, Finland, and the Netherlands, the picture paralleled the overall pattern in that inactive women reported worse opportunities for physical activity than inactive men, and vigorously active women reported better opportunities than vigorously active men. Only for Spain, a different pattern was found, namely that inactive, moderately active, and very vigorously active women reported better opportunities than men. However, in this sample also a extremely different frequency of physical activity has been found (see fig 1).

Analyses of factors possibly contributing to the pattern shown in figure 2 revealed that among both sexes, those reporting no activity reported lower income that those active; physical activity covaries positively with income. However, for the different patterns of vigorously active women compared with vigorously active men, no significant influence of income has been found that might explain this difference.

Table 2 Self rated health regressed on age, sex, income, nation, physical activity related opportunities, and physical activity, for total sample

Step	*Predictor*	*r†*	*β‡*	*r²*	*r² change*	*F change*
1	Age	−0.28	−0.27***	0.09	0.09	111.8***
	Sex (1 = male, 0 = female)	0.04	0.04(*)			
2	Income (in 1000 ECU)	0.05	0.05*	0.11	0.02	69.1***
3§	Belgium *v* Switzerland	−0.07	−0.09***	0.15	0.04	19.9***
	Finland *v* Switzerland	−0.15	−0.19***			
	Germany (East) *v* Switzerland	−0.12	−0.18***			
	Germany (West) *v* Switzerland	−0.13	−0.16***			
	Netherlands *v* Switzerland	−0.05	−0.07**			
	Spain *v* Switzerland	−0.15	−0.18***			
4	Opportunities	0.10	0.10***	0.16	0.01	23.2***
5	Physical activity	0.15	0.14***	0.18	0.02	52.4***
6	Opportunities × physical activity	0.05	0.05*	0.19	0.01	4.9*

n = 2357, (*)p<0.10, *p<0.05, **p<0.01, ***p<0.001. †r = Partial correlation coefficient. ‡β = Unstandardised regression coefficient. §Dummy variables (reference group is Switzerland). Overall equation: r^2 = 0.18, $F(12,2344)$ = 44.05, p<0.001). Following the procedure suggested by Aiken and West ([53], 43–44), both predictors and criteria were z standardised before regression analyses. Correspondingly, in the following, β coefficients are reported.

KEY POINTS

- Physical activity promotion is moving from methods on the individual level to higher level strategies of environmental and policy approaches.
- There is a lack of attempts to "contextualise" physical activity—investigate environmental and policy conditions rendering it healthy.
- For women, perceived community-based opportunities for physical activity make a difference not only regarding light/moderate but also vigorous activities.
- The effect of physical activity on self rated health is stronger when the residential environment is perceived as providing good opportunities.
- Policy and environmental approaches may increase effects on under-active people with greater public health outcomes.

HIERARCHICAL REGRESSION ANALYSIS FOR SELF RATED HEALTH

To check for significance of physical activity and opportunities for health, a hierarchical regression analysis was performed—that is, a check for those variables that might explain differences in health.

As table 2 shows, age proves to be a single predictor; the same holds for income to a much lesser extent. In other words, older and poorer people are less healthy than their young and richer counterparts. After further controlling for nation, both perceived opportunities and reported physical activity show specific significant effects. Firstly, opportunities positively covary with health—that is, those who reported good environments for physical activity were more likely to report good health than those with worse environments. Interestingly, this even holds after physical activity is controlled for, underlining the specificity of the effect. Secondly, reported physical activity as such also is positively associated to respondents' self rated health.

At the same time, the interaction—that is, the joint effect finally introduced in the model—is also significant: opportunities × physical activity. Specifically, analysis revealed that the effect of being physically active on health is moderated by opportunities in the sense that its influence is higher in case of better opportunities.

Against the background of the different kinds of association between physical activity and opportunities found in the preceding analysis of variance—that is, parabolic within men, linear within women—the pattern of interaction was calculated for both sexes, rendering the results shown in figure 3. Obviously, the effect does not hold significantly for men, as indicated in the rather similar simple slopes regression weights for activity given good compared with bad environments (0.17 *v* 15). In contrast, for women the effect is quite clear. Put differently, for women the health effect of physical activity—when compared with their unfavourable opportunities—is

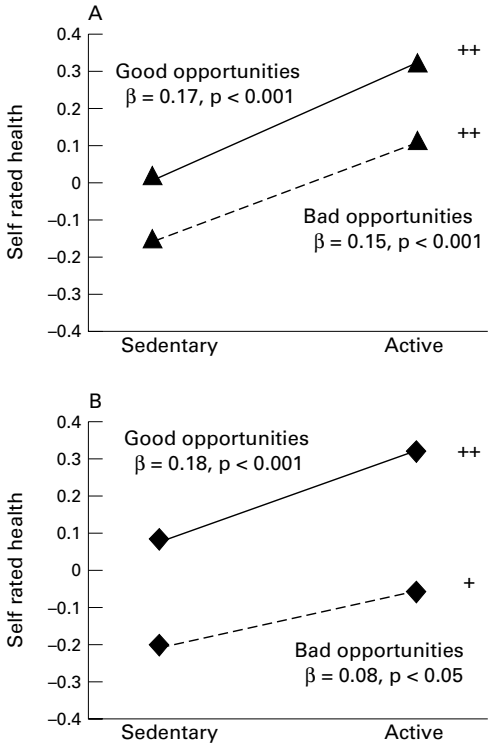

Figure 3 The effect of physical activity on self rated health under conditions of good and bad opportunities for (A) men and (B) women. Self rated health rescaled (z standardised) for technical reasons, original: 1–5).

significantly more pronounced when supportive environments are provided.

Discussion

Limitations of this study should be highlighted. Firstly, it does not contain objective measures of the environment, but rests on opportunities for physical activity as perceived by the population; future studies should try to replicate the findings with objective indicators for physical activity related opportunities. Secondly, a very simple indicator of physical activity has been applied in the study; issues such as public transportation and people's access to it have not been explicitly considered. Thirdly, no empirical account pertains to cross national differences in regulatory authorities responsible for sports infrastructures and their construction; in the MAREPS project such information has been obtained in a separate policymaker survey.[55] Fourthly, the use of cross sectional data limits any interpretation in terms of causality. Finally, most of the presented statistical analyses show low to moderate power and leave a comparably high percentage of variance unexplained; thus, further research with longitudinal data and specified models may complement the results presented here.

Keeping these limitations in mind, present analyses show significant differences in physical activity participation among the investigated countries. Compared with the high involvement in physical activity in Finland, Switzerland, and the Netherlands, the percentage of physical active people in Belgium, East Germany and especially Spain appears to be quite low. At the same time, Belgium, East Germany and Spain show the lowest rates of perceived opportunities for physical activity within the residential environment. This is a first indication that good opportunities may be an important determinant of the degree of physical activity within the population, especially with regard to low and moderate activities.

In line with our general assumptions about the relation of opportunities within the residential environment and physical activity, a first analysis of variance shows a higher degree of physical activities related to better perceived opportunities. Again, the light and moderate activity group is related to the highest value for this dimension. Thus, good opportunities for physical activity within the residential environment may be an important factor for involving people into low or moderate physical activities. Under other circumstances, these people may stay inactive.

The quality of the relation between perceived opportunities and self reported physical activity was specified for both sexes. Whereas significant differences in reported opportunities can be observed for men when comparing the light to moderate active group with the inactive and vigorously active groups, such contrasts for women exist between inactive women on the one and all different groups of active women on the other hand. Thus, perceived community-based and residential area-based infrastructure for physical activity for women—in contrast with men—makes the difference not only with regard to light and moderate activity, but also for more vigorous activities. This result indicates support for previous statements that such infrastructures are especially important for women.[54]

Moreover, this pattern holds for all but one country, Spain, where physical activity patterns and frequency are very different to begin with (see fig 1). Also, the pattern does not seem to be determined by parameters such as income; among both sexes, while those reporting no activity reported lower income than active respondents, income did not covary with different pattern in opportunities perceived by vigorously active women when compared with men.

The direct and indirect health effects of perceived opportunities for physical activity within the residential environment have been tested in a regression analysis. Controlled for age, sex, income and nation, the opportunity scale shows a significant main effect on self rated health. The introduction of physical activity within the next step of regression analysis slightly reduces the beta of the scale. The physical activity variable also shows a significant main effect on self rated health. Thus, physical activities seem to mediate only to some degree between perceived opportunities and self rated health. There is also a weak significant interaction effect. As presented in table 2 and figure 3, both overall and most notably for women is the effect of physical activity on self rated health stronger when the residential environment is perceived to provide for good opportunities. This result supports general

assumptions on the need to contextualise individual health behaviour; the opportunities for physical activities within the residential environment may be one important moderating factor to be taken into account.[31 56] At the same time, the fact that the result particularly pertains to women supplements this general inference in terms of possibilities for target group adaptation of respective interventions.

To conclude, the results presented on physical activity, health and environment in six European countries may stimulate both scientific and policy discussions. In particular, they indicate the need of policy and environmental approaches to physical activity and health. Not only that we found a significant relation between the perceived residential environment and the self reported physical activity within the population; the quality of the environment in terms of opportunities for physical activity shows a direct effect on self rated health as well. In view of recent evidence regarding significant health benefits even from moderately intensive activity, the association of low to moderate activities with good opportunities found in this study seems to be of particular importance for future public health policy. This result supports the assumption mentioned above that providing for environmental support in terms of good opportunities in the community and residential area may increase the chance of affecting a greater percentage of the underactive population with potentially lower costs per person and greater public health outcomes.

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Conflicts of interest: none.

Appendices

Table A1 Scale characteristics of perceived opportunities

	Belgium (Flanders)			*Finland (Pirkanmaa)*			*Germany Eastern part (Saxony)*			*Germany Western part (Northrhine-Westfalia)*			*Netherlands whole country*			*Spain (Catalonia)*			*Switzerland (German speaking part)*			*Total*		
	PA	*no PA*	*both*	*PA*	*no PA*	*both*	*PA*	*no PA*	*both*	*PA*	*no PA*	*both*	*PA*	*no PA*	*both*	*PA*	*no PA*	*both*	*PA*	*no PA*	*both*	*PA*	*no PA*	*both*
My residential area offers many opportunities to be physically active	0.82	0.77	0.80	0.79	0.66	0.77	0.82	0.76	0.80	0.76	0.76	0.76	0.85	0.68	0.82	0.79	0.78	0.79	0.75	0.77	0.74	0.84	0.80	0.83
Local clubs and other providers in my community offer many opportunities	0.77	0.82	0.78	0.84	0.86	0.85	0.88	0.81	0.87	0.66	0.83	0.74	0.82	0.83	0.82	0.75	0.80	0.77	0.83	0.82	0.82	0.84	0.85	0.84
My community doesn't do enough for physical activities (recoded)	0.73	0.79	0.76	0.74	0.82	0.75	0.78	0.80	0.79	0.73	0.66	0.70	0.72	0.47	0.68	0.57	0.72	0.66	0.74	0.40	0.71	0.77	0.76	0.77
Factor Eigenvalue	1.8	1.9	1.8	1.9	1.9	1.9	2.1	1.9	2.1	1.6	1.7	1.6	1.9	1.4	1.8	1.5	1.8	1.7	1.8	1.4	1.7	2.0	1.9	2.0
% of variance	60	63	60	62	62	62	68	65	68	52	57	54	64	46	60	51	60	58	60	47	58	66	65	66
Scale Cronbach's α	0.67	0.70	0.68	0.70	0.67	0.69	0.76	0.73	0.75	0.54	0.61	0.57	0.74	0.34	0.65	0.50	0.65	0.59	0.66	0.41	0.63	0.75	0.72	0.74

For each analysis, "Factor Eigenvalue" refers to the total variance explained by the opportunity factor.

Table A2 Zero order correlations (with 95% confidence intervals in upper half)

	Age (y)	*Sex (1 male, 0 female)*	*Income (1000 Euro)*	*Physical activity*	*Perceived opportunities*	*Self rated health*
Age (y)	—	−0.03, 0.05	−0.18, 0.11	−0.11, −0.03	−0.02, 0.06	−0.33, −0.15
Sex (1 male, 0 female)	0.01	—	0.02, 0.10	−0.01, 0.07	−0.04, 0.04	−0.01, 0.07
Income (1000 Euro)	−0.15***	0.06*	—	0.09, 0.17	0.13, 0.21	0.16, 0.24
Physical activity	−0.07*	0.03	0.13***	—	0.05, 0.13	0.16, 0.24
Perceived opportunities	0.02	0.00	0.17***	0.09***	—	0.12, 0.20
Self rated health	−0.29***	0.03	0.19***	0.20***	0.16***	—

*p<0.01, **p<0.001, ***p<0.0001.

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