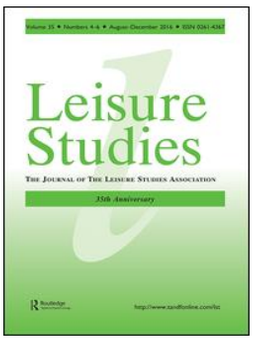

Leisure Studies

ISSN: 0261-4367 (Print) 1466-4496 (Online) Journal homepage: https://www.tandfonline.com/loi/rlst20

Sport participation and the social and physical environment: explaining differences between urban and rural areas in the Netherlands

Remco Hoekman, Koen Breedveld & Gerbert Kraaykamp

To cite this article: Remco Hoekman, Koen Breedveld & Gerbert Kraaykamp (2017) Sport participation and the social and physical environment: explaining differences between urban and rural areas in the Netherlands, Leisure Studies, 36:3, 357-370, DOI: 10.1080/02614367.2016.1182201

To link to this article: https://doi.org/10.1080/02614367.2016.1182201

LEISURE STUDIES, 2017
VOL. 36, NO. 3, 357–370
http://dx.doi.org/10.1080/02614367.2016.1182201

Routledge
Taylor & Francis Group

Sport participation and the social and physical environment: explaining differences between urban and rural areas in the Netherlands

Remco Hoekman[a,b], Koen Breedveld[a,b] and Gerbert Kraaykamp[b]

[a]Mulier Institute, Utrecht, The Netherlands; [b]Department of Sociology, Radboud University, Nijmegen, The Netherlands

ABSTRACT

In this study, we investigated the intensity of sport participation in the Netherlands comparing urban and rural areas. Using a socio-ecological theoretical model, we focussed on the extent to which the rural–urban divide in sport participation is explained by micro-level (socio-demographics), meso-level (safety and socio-economic status of neighbourhoods) and exo-level (variety and proximity of sport facilities) characteristics. We tested our theoretical expectations using representative data on 17,910 Dutch inhabitants between 6 and 79 years of age. Our study reconfirmed the importance of individual socio-demographics (micro-level), such as age, education and household income for sports participation. Furthermore, our results showed that weekly sport participation was more common in rural than in urban areas. This rural–urban divide in sport participation especially was attributed to social environmental factors (meso-level); physical conditions of the environment provided no explanation. Our findings should, however, not be taken as a denial of the importance of the physical environment (exo-level). This study was conducted in the Netherlands, a country with a high density, abundant sport facilities and a supportive sport climate. Moreover, variety of sport facilities nearby proved significant in explaining an individual's monthly sport participation. To conclude, this study enhances our understanding of the rural–urban divide in sport participation and highlights the importance of especially meso-level features in addition to the socio-demographics. It thus may inform policymakers to critically assess sport promotion policies.

ARTICLE HISTORY
Received 20 November 2014
Accepted 13 March 2016

KEYWORDS
Sport facilities; sport activity; socio-economic status; urbanity; socio-ecological model

1. Introduction

Numerous scholars have highlighted the importance of social position, education and socio-demographics to explain individual differences in sport participation (Downward, Lera-Lopez, & Rasciute, 2011; Wilson, 2002). This is understandable given that sport evidently is a social phenomenon that takes place and finds meaning in social interaction (Bourdieu, 1990; Shove, Pantzar, & Watson, 2012). Only few studies have focused on geographical aspects, such as the rural–urban divide in sport participation or on the importance of the physical and social environment. Still, the wide variety in

CONTACT Remco Hoekman r.hoekman@mulierinstituut.nl

popularity of different types of sport throughout the world and differences within a country suggests that socio-demographics may only partly explain differences and that geography matters as well. This is because beyond socio-demographics, differences in physical environment (e.g. climate, presence of natural elements and space available for sports) and, more importantly, differences in cultural (e.g. gaelic sports in Ireland) and social environments (e.g. safety, neighbourhood composition) also result in differences in sport participation around the globe (Bale, 2003; European Commission, 2014).

With regard to the physical environment, it is generally assumed that accessibility of sport facilities is, at least partly, responsible for observable differences in sport participation (Camy, Clijssen, Madella, & Pilkington, 2004). In the revised version of the European Sport for All Charter (Council of Europe, 2001), specific reference is made to the interdependence between sport participation and the extent, variety and accessibility of sport facilities. Several attempts, mainly using an economic approach or a constraints framework, have been made to include aspects of sport facilities in empirical research models to explain differences in sport participation (e.g. Casper, Bocarro, Kanters, & Floyd, 2011; Wicker, Breuer, & Pawlowski, 2009). These studies, however, have provided mixed evidence. Some studies showed clear evidence of positive influences of the supply of sport facilities on sport participation, when focusing on sport infrastructure per 1000 inhabitants (Hallmann, Wicker, Breuer, & Schüttoff, 2011; Wicker et al., 2009). Others, focusing on distance to a sport facility, hardly find any effects (Hoekman & De Jong, 2011) or find positive effects only for people with a positive attitude towards sports (Prins et al., 2010). Most of these contributions studied sport participation in a particular city or selection of larger cities and subsequently encountered difficulties in generalising their outcomes.

Furthermore, most studies have focused on either the individual or infrastructural level without including social environment in their analyses (e.g. socio-economic status and safety of the neighbourhood). The importance of the social environment is illustrated by the fact that individuals imitate or copy modelled behaviour by observing others in their environment (Bronfenbrenner, 1979). As a result, research showed that social differences are best marked by the environment where people live, more particularly the socio-economic status of the neighbourhood (Shildrick, 2006). In several studies, evidence was found for higher sport participation rates in neighbourhoods with a higher socio-economic status (Pinkster, 2007). In addition, the safety of the neighbourhood appeared to be an important aspect of the social environment in explaining differences in sport participation (Beenackers, Kamphuis, Burdorf, Mackenbach, & van Lenthe, 2011).

Based on a socio-ecological model (Bronfenbrenner, 1979) we here presume that features of both the social and the physical environment, next to socio-demographics, may explain differences in individuals' sport behaviour. To test this, this study focuses especially on differences between urban and rural environments given their obvious differences in physical and social characteristics. Urban areas generally offer a high variety in sport supply and present smaller travel distances compared to rural environments (Hoekman, Hoenderkamp, & Van der Poel, 2013). In contrast, rural areas, at least in the Netherlands, present favourable social environments in terms of higher socio-economic status and safer neighbourhoods (Steenbekkers, Simon, & Veldheer, 2006). This study builds on earlier work on the rural–urban divide (e.g. Hallmann et al., 2011; Wicker et al., 2009) and advances upon these works by employing a nationwide perspective. With this, we aim to provide a more complete picture of the role of sport facilities and of the social environment in explaining differences in sport participation between urban and rural areas. Our research questions are the following: (1) *To what extent do individuals living in urban and rural areas differ in their sport participation?* (2) *To what extent are these differences in sport participation explained by (a) features of the physical environment (e.g. sport facilities), (b) features of the social environment and/or (c) individual factors like age, gender and educational attainment?*

To answer these questions, we employed representative national population data for the Netherlands. We used secondary sources to add characteristics of the social and physical environment to these data at postal code level. The Netherlands provides an interesting and relatively strong test case for the influence of social and physical environment features on sport participation, as it has a high population

density, limited social differences and a well-developed sport infrastructure. That last being reflected in a high satisfaction among Dutch citizens regarding the opportunities to engage in sport in their residential area (European Commission, 2014).

2. Theoretical background and hypotheses

2.1. The socio-ecological model of Bronfenbrenner

We used Bronfenbrenner's socio-ecological model (1979) as a starting point to explain individual differences in sport participation. The main idea underlying Bronfenbrenner's socio-ecological model is that individuals are closely related to and influenced by their environment. Bronfenbrenner predominantly argues that individual behaviours may be understood by looking at four surrounding systems: the micro-, meso-, exo- and macro-systems. These different systems may be seen as nested layers (like a set of Russian dolls), with the innermost layer representing ego. First, the micro-level is made up of a complex of close relations, for example, those with family members, at the workplace, in class at school, in the neighbourhood and with one's peers. The meso-system represents the second layer. It is the context in which the micro-systems interrelate, such as the family home, the neighbourhood and the school. The meso-system, thus, refers to relationships between micro-systems. The exo-system is the third layer and refers to support settings in which individuals are not active participants. Exo-systems affecting sport participation include formal settings and physical attributes, such as sport facilities, parks, recreation centres, sport clubs and community centres. The fourth and outermost layer of Bronfenbrenner's model is the macro-system, defined as consistencies in the form and content of the lower order systems (micro-, meso- and exo-) at the level of society as a whole. Accordingly, the macro-system may not be perceived as a specific environmental context. Rather, it entails the overarching ideology, values and customs of cultures and societies, as well as general national socio-economic and cultural conditions.

The socio-ecological model explicitly focuses on the behaviours of individuals within a social and physical context (Bronfenbrenner & Morris, 2006). Its strength lies in its multidisciplinary approach (Damon & Lerner, 2008) and explicit focus on the environment as a series of nested structures (Keenan, 2002). The socio-ecological approach is widely used in community health promotion (Stokols, 1996; Van Lenthe, Brug, & Mackenbach, 2005). Furthermore, socio-ecological theory is known to explain differences in levels of physical activity and obesity by environmental attributes, such as community design, road connectivity and street design (e.g. Cochrane & Davey, 2008; Gebel, Bauman, & Petticrew, 2007), which are also important for access to sport facilities. The socio-ecological model was applied by researchers associated with the Active Living Programme in the USA to assess the impact of the built environment on physical activity (see, e.g. Brownson, Hoehner, Day, Forsyth, & Sallis, 2009). Our application of the socio-ecological model is more limited, as we employ it to individual sport participation, a segment of physical activity.

As yet, Bronfenbrenner's model has seldom been at the core of sport participation research. An exception is the study by Van Tuyckom (2011), who adopted the socio-ecological model in cross-national research. Van Tuyckom reworked Bronfenbrenner's model stressing the importance and relevance of the social and physical environment for the study of sport participation. Her research, however, investigated only the outmost layer of national characteristics (socio-economic and cultural conditions), in addition to individual factors. In our study, we mainly employ the socio-ecological model to identify the influence of the social and physical environment on sport participation within a country and by urbanity, in addition to individual characteristics.

2.2. Differentiation between urban and rural areas

Our study focuses on differentiation in sport participation between urban and rural areas, given the obvious distinctions in the social (meso-level) and physical (exo-level) features of these areas. Urban

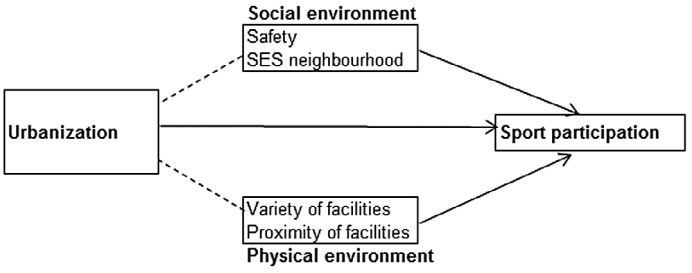

Figure 1. Conceptual model.
Notes: - - - The dotted lines are not tested in this article.

areas are in general characterised by heterogeneity, choice, density and proximity (Wilson & Schulz, 1978), whilst rural areas may be characterised by homogeneity, limited choice and dispersion over a wide area (Collins, 2003). Given our theoretical socio-ecological model, we expect differences in sport participation between people living in urban and rural areas. We furthermore presume that these differences are (partly) interpreted by the socio-economic status and perceived safety of neighbourhoods (meso-level) and by the variety and proximity of sport facilities (exo-level). Figure 1 presents our conceptual interpretation model.

First, starting from the perspective of the social environment, Castells (1977) noted that the bigger a city is, the wider its spectrum of individual variation and also the greater its social differentiation. This seems to be true for the Netherlands (Steenbekkers et al., 2006), with its segmentation of social relations and overrepresentation of low socio-economic status groups and neighbourhoods in urban areas. We presume this will likely result in lower sport participation rates in urban areas, as studies (at least in the Netherlands) have shown that people in lower socio-economic neighbourhoods participate less in sport than people from higher socio-economic status neighbourhoods (Kamphuis & van den Dool, 2008). In contrast, rural areas may be characterised as more homogeneous, with a stronger sense of group solidarity than urban environments (Castells, 1977), and this social context is more likely to generate higher levels of sport participation.

Additionally, in the Netherlands, safety is generally perceived to be higher in rural areas than in urban areas, as crime rates are higher in cities, and people in the countryside typically feel more at ease in their surroundings (Oppelaar & Wittebrood, 2006). Several scholars have related safety of neighbourhoods to physical activity or sport participation, suggesting a positive relationship between safety and sport participation (Beenackers et al., 2011; Carver, Timperio, & Crawford, 2008).

All these arguments taken together lead us to expect people in neighbourhoods with a high socio-economic status and less crime to be more active in sports. This suggests the following hypotheses: (1) *Sport participation is lower in urban areas compared to rural areas.* (2) *This lower sport participation is partly explained by a less favourable social environment (lower socio-economic status and safety) in urban areas compared to rural areas.*

A second line of reasoning dealing with the physical environment leads to contradictory expectations. Urban areas offer a greater variety of sport facilities and shorter travel distances to sport facilities than rural areas (Hoekman et al., 2013). Several studies indicate that the variety of sport facilities in a person's proximity may influence their sport participation (e.g. Karusisi, Thomas, Méline, & Chaix, 2013; Limstrand & Rehrer, 2008; Wicker et al., 2009). Proximity of sport facilities seems particularly important as several studies have found that the distance to sport facilities does matter (Prins et al., 2010; Steinmayr, Felfe, & Lechner, 2011). Evidence for a positive association between urbanisation and sport participation was provided by Hovemann and Wicker (2009) and by Van Tuyckom (2011) for Europe, and Garcia, Lera-Lopez, and Suarez (2011) provided such evidence for Spain. Consequently, we hypothesise that a greater variety and closer proximity of sport facilities in urban areas compared to rural areas result in higher sport participation in urban areas. Our hypotheses read as follows: (3)

Sport participation is higher in urban areas than in rural areas. (4) *This higher sport participation is partly explained by a greater variety of sport facilities and a closer proximity of sport facilities in urban areas compared to rural areas.* Note that hypotheses 1 and 3 are contradictory.

2.3. Socio-demographics

Obviously, research relating sport participation to features of the social and physical environment must adequately control for relevant individual characteristics. Disregarding these features may cause biased estimations in our modelling. In the Netherlands, as in other countries, sport participation declines with increasing age (see, e.g. Engel & Nagel, 2011; Hoekman & Breedveld, 2013; Hovemann & Wicker, 2009). We therefore include it in our modelling. Regarding gender, research has shown that in most European countries, men are more likely to participate in sport than women (Hartmann-Tews, 2006). The Netherlands, however, is one of the few countries with a gender-neutral participation profile; we thus expect no large gender differences in sport participation. Regarding educational level, there is consensus that a higher educational level is associated with greater participation in sport (Breuer & Wicker, 2008; Hovemann & Wicker, 2009). Furthermore, a high income seems to increase the probability of an individual's sport participation (Downward, 2007; Hovemann & Wicker, 2009), whereas belonging to a large family household is negatively associated with sport participation (Scheerder, Vanreusel, & Taks, 2005).

3. Data and measurements

3.1. Data

We tested our hypotheses using data derived from the 'Injuries and Physical Activity in the Netherlands' survey (further OBiN). The OBiN is a large-scale population survey in the Netherlands geared to measure levels of physical activity, sport participation and injury proneness among different social groups. It is a mixed-mode survey, using both an Internet questionnaire as well as telephone interviewing of respondents. Sixty per cent of the respondents filled in the questionnaire online (via Internet), and forty per cent completed the questionnaire through computer-assisted telephone interviewing.

In line with common practice in sport participation research, we selected respondents from 6 to 79 years (see, e.g. Tiessen-Raaphorst, Verbeek, De Haan, & Breedveld, 2010). We merged the 2011 and 2012 OBiN data sets resulting in a total of 17,910 respondents. The year samples of the OBiN surveys were drawn from the InterviewBase panel of IPSOS (the market research company), consisting 230,000 respondents in total. Quota sampling was performed to explore sample representativeness with respect to age, gender, educational level, household composition and area of residence. Accordingly, the OBiN survey was found to produce high-quality data on both sport participation and individual characteristics.

3.2. Measurements

Sport participation was measured as taking part in a sport activity according to the rules of the sport sector (e.g. football, swimming, fitness, running and tennis), excluding sport activities during classes at school. For the analyses, we used the frequency variable of sport participation as a dependent variable, representing the number of times a respondent had practised sports in the past twelve months. Because this variable is highly skewed, as all non-participants score null, normality may not be assumed. We therefore recoded yearly participation frequencies into three categories: 0–11 times, 12–39 times and 40 times or more. Based on policy standards in the Netherlands, people were classified as participants if they took part in sports at least 12 times a year (Ministry of VWS, 2009; NOC*NSF, 2009). Therefore, we defined the first category as 'non-participants'. The second category is considered as 'monthly sport participants' (12–39 times a year), and participants with a sport frequency of 40 times or more were

considered 'weekly sport participants', corresponding with the sequence of a regular sport season in competition sport (Tiessen-Raaphorst et al., 2010).

Social environment characteristics were available from secondary sources and included by linking four-digit postal code data to our OBiN respondents. Socio-economic status scores of the neighbourhoods were based on an aggregate indicator of educational level, position on the labour market and income level of neighbourhood residents (Knol, 2012). Neighbourhood safety was obtained by aggregating information from the 'Level of Living Barometer' (Van der Reijden, Van Woerkens, Leidelmeijer, Marlet, & Schulenberg, 2013), which includes criminogenic aspects such as vandalism, nuisance, violation of public order, violent crime and theft.

Physical environment measures were obtained from the Facility Monitor Sport (FMS). The reputed FMS provides geographical information on (nearly) all sport facilities in the Netherlands (more than 14,000). Particular dimensions of the physical environment that we included in our modelling were proximity and variety of sport facilities. We explicitly used information on distance to the nearest sport facility and the number of different types of sport facilities within 1000 m. We distinguished the following facility types: (1) sport fields, (2) sport halls, (3) swimming pools and (4) fitness centres.

Our measure of urbanity of the area of residence is derived from an address-density classification used by Statistics Netherlands which is based on the average number of addresses within a 1 km radius. The customary differentiation into five categories was used: (1) not urbanised, <500 addresses per km^2; (2) hardly urbanised, 500–1000 addresses per km^2; (3) moderately urbanised, 1000–1500 addresses per km^2; (4) strongly urbanised, 1500–2500 addresses per km^2; and (5) extremely urbanised, 2500 addresses or more per km^2. For the regression analyses, this urbanisation variable was dichotomised into rural (1–3) and urban (4 and 5).

Finally, we control for individual characteristics associated with sport participation. Age and household size were measured as continuous variables. Gender was dummy-coded with men as reference category. Educational attainment was measured in six categories ranging from no education or primary school only, to holding a university degree. Categories were recoded into three groups: (1) lower education, (2) middle education and (3) higher education. The income variable concerns a respondent's household income and was questioned in seven categories ranging from a minimum income to three times the national average income. Again, we recoded the categories into three groups: (1) lower income, (2) average income and (3) above average income. Table 1 presents the descriptive characteristics of our variables.

3.3. Analytic strategy

We conducted several analyses. First, we tested mean differences in aspects of the social and physical environmental by urbanity to justify the assumptions of mediation. Second, we employed multinomial logistic regression analyses to deal with the independent effects of urbanity, socio-demographics and the aspects of the social and physical environment on sport participation. Multinomial logistic regression is an extension of binary logistic regression and deemed an adequate procedure for testing the influence of several independent variables in a model with a dependent variable consisting unordered categories (Hosmer & Lemeshow, 2000). We tested for collinearity, and our measures proved fit for regression analysis; the highest variance inflation factor was 2.035. We preferred multinomial logistic regression over ordinal regression based on a test of parallel lines and a better fit of the multinomial logistic regression model. Furthermore, using ordinal regression would have hidden any potential nonlinearity. We ruled out multilevel analyses, which may seem appropriate given the hierarchical structure of the data and our theoretical framework, because of a limited number of cases per postal code. Only 14 postal codes had 25 or more cases, while 633 postal codes had only 1 case. Simply selecting postal codes with a relatively high number of cases would thus mean an overrepresentation of urban areas, as greater urbanity corresponds with a greater number of cases within a postal code.

As highlighted in Figure 1, we deal with the so-called interpretation model. Our aim is to look whether aspects of the social and physical environment may provide an explanation (interpretation)

Table 1. Descriptives of the variables.

Variable	Measurement	%	Min	Max	Mean	SD
Dependent variable						
Sport participation	0 = 0–11 Times	34.7	0	2	1.19	.92
	1 = 12–39 Times	11.7				
	2 = 40 Times or more	53.6				
Urbanisation	1 = Rural	57.3	1	2	1.43	.49
	2 = Urban	42.7				
Social environment						
SES neighbourhood	Score (linear)		−7.25	2.98	.05	1.16
Safety	Score (linear)		−5.00	4.92	.81	2.68
Physical environment						
Distance to facility	Distance to nearest sport facility (in kilometres)		.00	9.27	.70	.51
Variety in facilities	0 = No types of sport facilities within 1 km	19.4	0	4	1.46	1.06
	1 = 1 Type of sport facility within 1 km	35.7				
	2 = 2 Types of sport facilities within 1 km	27.7				
	3 = 3 Types of sport facilities within 1 km	13.8				
	4 = 4 Types of sport facilities within 1 km	3.4				
Personal factors – controls						
Age	Age (years)		6	79	40.77	19.66
Gender	1 = Male	50.3	1	2	1.50	.50
	2 = Female	49.7				
Educational level	1 = Low	36.8	1	3	1.90	.79
	2 = Average	36.4				
	3 = High	26.9				
Income (household net income)	1 = Below average	21.4	1	3	2.24	.78
	2 = Average	33.7				
	3 = Above average	44.9				
Household size	Number of persons		1	10	2.89	1.40

for urbanity differences in sport participation. We, however, do not test the indirect effect of urbanity on aspects of the social and physical environment, but rather assume that mediation exists if urbanity difference in sport participation is no longer significant. In logistic regression analyses, one cannot straightforwardly interpret and compare coefficients as is the case in linear regression. As a result, one cannot compare log odds ratios or odds ratios across models with different independent variables (see Mood, 2010) and provide no exact effect of the mediation. Multinomial logistic regression provides in this sense not the most robust test for indirect effects. However, using a stepwise approach with different models, with and without the mediating variables, it is possible to find proof for mediation and accept the hypotheses if the urbanity differences in sport participation are no longer significant.

In a first step of our multinomial logistic regression, we estimated a baseline model containing urbanity of a respondent's area of residence only. In a second step, we introduced individual variables (baseline and socio-demographics). This model allowed us to investigate whether there are influences of individual characteristics on the urbanity effect. In a third step, we included social environmental factors to investigate interpretation of the urbanity effect (baseline and socio-demographics and social environment), and in a fourth step, we took characteristics of the physical environment into account (baseline and socio-demographics and physical environment). In the fifth step, we estimated a full model with all characteristics included (total interpretation model).

4. Results

4.1. Difference in social and physical environment by urbanity

We first consider differences in aspects of the social and physical environment by urbanity. Table 2 shows variation between urban and rural areas in social and physical environment. Rural areas score higher on the social environmental variables (socio-economic status and safety), while urban areas

Table 2. Aspects of the social and physical environment by urbanisation (mean, *t*-test).

	Urbanisation	
	Rural	Urban
SES neighbourhood	.30	−.028***
Safety	2.42	−1.25***
Distance to sport facility	.73	.65***
Types of sport facilities within 1 km	1.85	1.98***

***$p < .001$.

score favourable on the physical environmental variables (distance to sport facilities and variety of sport facilities within 1 km). This is in line with our expectations and supports our assumption of mediation.

4.2. Multinomial logistic regression

To further test our hypotheses, we consider whether the differences between urban and rural areas in sport participation might be explained (interpreted) by (1) individual characteristics, (2) the social environment (meso-level) and (3) the physical environment (exo-level). Table 3 presents estimates of a multinomial logistic regression analysis of sport participation. Exp(B) coefficients represent the effect size of the factors included in the model and give information about effect direction. An Exp(B) greater than 1 indicates a positive effect, while an Exp(B) less than 1 indicates a negative effect (Hosmer & Lemeshow, 2000). For both weekly and monthly sport participation, non-participation is taken as reference category.

Our baseline model (see Table 3) only includes urbanity and underscores that people living in urban areas were less likely to practise sport on a weekly basis than people living in rural areas. No urbanity differences were found for monthly sport participation. In the second model, it is confirmed that age, education and income are important in explaining differences in sport participation. Older people are less likely to practise sport on a monthly or weekly basis (Exp(B) = .98 for monthly sport participation and Exp(B) = .97 for weekly sport participation). Moreover, people with a higher educational attainment and a higher income are more likely to participate in sport on a monthly and weekly basis than people with a lower educational level and incomes. Gender and household size showed no significant effects. In model 2, urbanisation still is significant for weekly sport participation (Exp(B) = .87), indicating that frequent sport participation was more likely in rural areas, even when controlling for relevant confounders.

Next, in model 3, we included social environmental features to address the issue whether rural–urban differences in sport participation may be interpreted by social aspects of the neighbourhood. We found that socio-economic status of the neighbourhood mainly has a positive effect on the likelihood of participating in sport on a monthly basis (Exp(B) = 1.07) or a weekly basis (Exp(B) = 1.08). Safety of a neighbourhood seemed to be relevant only for weekly sport participation; thus, the safer a neighbourhood, the greater the likelihood for a person to sport on a weekly basis (Exp(B) = 1.05). Especially remarkable is that the effect of urbanisation previously found disappears after including these social neighbourhood features, indicating that the rural–urban divide in weekly sport participation may partly be understood looking at the social conditions of the neighbourhood a person lives in.

Our next model (4) dealt with the distance to and variety of sport facilities. Results indicated that indeed more types of sport facilities in a person's close proximity increases monthly sport participation (Exp(B) = 1.10). Contrary to our expectations, however, larger distances to a facility were positively related to monthly sport participation (Exp(B) = 1.21). No relationships were found for weekly sport participation. Regarding our hypotheses, we conclude that the rural–urban division in weekly sport participation remains significant; its influence is not interpreted by the physical aspects of the surroundings.

Table 3. Multinomial logistic regression of sport participation.

	Baseline model			Baseline model + socio-demographics			Baseline model + socio-demographics + social environment			Baseline model + socio-demographics + physical environment			Full interpretation model		
	Estimate	SE	Exp(*B*)	Estimate	SE	Exp(*B*)	Estimate	SE	Exp(*B*)	Estimate	SE	Exp(*B*)	Estimate	SE	Exp(*B*)
Monthly sport participation vs. non-participation															
Urbanisation	.000	.052	1.00	−.047	.065	.95	.019	.088	1.02	−.033	.066	.97	.021	.089	1.02
Controls															
Gender				.056	.065	1.06	.051	.065	1.05	.062	.065	1.06	.057	.065	1.06
Age				−.020***	.002	.98	−.020***	.002	.98	−.020***	.002	.98	−.020***	.002	.98
Education				.370***	.042	1.45	.366***	.042	1.44	.373***	.042	1.45	.368***	.042	1.44
Income				.178***	.044	1.20	.162***	.045	1.18	.179***	.044	1.20	.163***	.045	1.18
Household size				.024	.028	1.02	.019	.028	1.02	.023	.028	1.02	.019	.028	1.02
Social environment															
SES neighbourhood							.069*	.030	1.07				.070*	.030	1.07
Safety							.007	.017	1.01				.004	.017	1.00
Physical environment															
Distance to facility										.191**	.068	1.21	.205**	.072	1.23
Types of facilities										.093**	.035	1.10	.102**	.035	1.11
Weekly sport participation vs. non-participation															
Urbanisation	−.126***	.034	.88	−.144***	.043	.87	.073	.058	1.08	−.143***	.043	.87	.074	.058	1.08
Controls															
Gender				−.067	.042	.94	−.074	.043	.93	−.066	.043	.94	−.074	.043	.93
Age				−.027***	.001	.97	−.027***	.001	.97	−.027***	.001	.97	−.027***	.001	.97
Education				.205***	.028	1.23	.206***	.028	1.23	.205***	.028	1.23	.206***	.028	1.23
Income				.359***	.029	1.43	.336***	.029	1.40	.359***	.029	1.43	.336***	.029	1.40
Household size				−.033	.019	.97	−.041*	.019	.96	−.033	.019	.97	−.041*	.019	.96
Social environment															
SES neighbourhood							.078***	.020	1.08				.080***	.020	1.08
Safety							.048***	.011	1.05				.048***	.011	1.05
Physical environment															
Distance to facility										.008	.048	1.01	−.026	.051	.97
Types of facilities										.016	.023	1.02	.016	.024	1.02
Fit statistics	−2LL = 35836; $p < .001$			−2LL = 15132.788; $p < .001$			−2LL = 21305.160; $p < .001$			−2LL = 21399.552; $p < .001$			−2LL = 21290.646; $p < .001$		
Nagelkerke R^2	.001			.101			.106			.102			.107		

*$p < .05$; **$p < .01$; ***$p < .001$.

Finally, in a model with all factors, we found similar results as in a model with social neighbourhood conditions. Physical environmental characteristics seem to be of limited importance and are significant only for a person's monthly sport participation. Social environmental characteristics are important for both monthly and weekly sport participation. It also showed that the earlier found effect of urbanisation on a person's weekly sport participation is no longer significant; its influence is interpreted by the social aspects of a person's neighbourhood.

5. Discussion and conclusions

Studies have repeatedly found that individual socio-demographics, such as age, education and household income, are essential in explaining sport participation (e.g. Hovemann & Wicker, 2009; Scheerder et al., 2005). Few studies, however, have focused on the rural–urban divide and incorporated social and physical aspects of a person's close environment. Our study built on theoretical explanations derived from socio-ecological theory to explain urbanity differences in individual sport participation, by including socio-demographics, meso-level aspects (social environment) and exo-level aspects (physical environment). Our main results for the Netherlands indicated higher rates of weekly sport participation in rural areas than in urban areas (accepting hypothesis 1 and rejecting hypothesis 3), while no difference by urbanity was found for monthly sport participation. This contradicts research for the European Union as a whole (Van Tuyckom, 2011), that points to lower sporting activity levels for rural than for urban subjects. We can explain differences in sport participation between urban and rural areas by applying the socio-ecological model. The social environment is most important in this regard for our findings in the Netherlands. We presume, however, that this is also due to the observed macro-level and exo-level (physical environment) in the Netherlands as the levels of the socio-ecological model can be seen as a series of nested structures (Keenan, 2002). The Netherlands has roughly 500 inhabitants per km^2 while the European average is estimated on 117 inhabitants per km^2 (Eurostat, 2015). This density in the Netherlands in combination with the fairly evenly distribution of sport facilities throughout the country, irrespective of the local population size (Hoekman, Breedveld, & Kraaykamp, 2016), makes that the population has good access to sport facilities and consequently the highest satisfaction of the European population regarding the opportunities to engage in sport in their residential area: NL = 95%; EU = 75% (European Commission, 2014). With this, the physical environment within rural areas forms no constraint for sport participation in the Netherlands, in contrast to other countries. Studies that do find higher sport participation levels in urban areas, for instance also find that constraints, including lack of access to sport facilities, partially mediates the effect of urbanisation on sport participation (Liu & Walker, 2015).

Three additional conclusions may be drawn from our current findings. First, our study reconfirms the importance of individual socio-demographics for regular sport participation, but these socio-demographics provide no explanation for the rural–urban divide. Second, the rural–urban divide in weekly sport participation was explained by meso-level social environmental factors (accepting hypothesis 2). This supports the notion that socio-economic neighbourhood aspects mark social divisions and refer to differences in provision of social, instrumental and informational resources to promote sport participation (Cerin & Leslie, 2008; Shildrick, 2006). In particular, aspects of social status related to the social environment seem important to explain differences in sport behaviour as it relates to similar living conditions and (im)possibilities, shared experiences and corresponding sporting habitus (Bourdieu, 1990). Third, our results showed that exo-level aspects related to the physical environment (variety and proximity of sport facilities) could not explain the rural–urban divide in weekly sport participation (rejecting hypothesis 4). Probably, because even in rural areas, certain standard sport facilities are provided (Hoekman et al., 2016). Physical environment, however, does relate to differences in an individual's monthly sport participation, as a higher variety of sport facilities in a person's neighbourhood increases the likelihood of monthly sport participation. Contrary to our expectations, larger distances were associated with more monthly participation, and not with non-participation.

Although surprising, Ruseski, Humphreys, Hallmann, and Breuer (2011) also found in their study of a small town in Germany that travel distance is positively related to participation. Typical for that study, as well as our study, is that in general for the study population, the sport facilities are very well accessible regardless of where people live.

Even though in this study, aspects of the physical environment are hardly related to the rural–urban divide in sport participation, this should not be taken as a denial of its importance. As mentioned, this study refers to the Netherlands, a country with abundant sport facilities and a supportive sport climate. Moreover, variety of sport facilities nearby seems to be important in explaining individuals' monthly sport participation. This may be related to lower intrinsic motivations and willingness to travel to take part in sport for this more ad hoc sport participation of the monthly sport participants (Hoekman & De Jong, 2011). For weekly participants, being an active sport participant may be a part of daily or weekly routines. Likely they prefer certain sports and do not care about distance so much, or they may be willing to choose a type of sport based on the available supply (Teixeira, Carraça, Markland, Silva, & Ryan, 2012).

A limitation of this study is that it focussed on sport facilities and did not include the public space as part of the physical environment. It might be argued that a full picture only can be obtained by combining presence of sport facilities with opportunities to practise sport in the public space. Rafoss and Troelsen (2010), for instance, concluded that a smaller proportion of the rural population compared to the urban population exercises in organised sport facilities. This may be because of the ample alternatives for sport in the public space in rural areas, which partly reduces the relevance of the availability of organised sport facilities. A further limitation to this study refers to our measurement of characteristics of the physical environment. In this study, we only studied objective features. Measures could be improved adding more subjective measures of distances to sport facilities (e.g. perceived distances).

A few implications of our findings may be noted. First, our findings illustrate the usefulness of the socio-ecological model in explaining urbanity differences in sport participation. It especially underscores the importance of the social environment (meso-level) in explaining the rural–urban divide, in addition to socio-demographics. This highlights the importance to focus within sport promotion programmes on low socio-economic status neighbourhoods to overcome class-based inequalities. Policymakers and policy implementers should be aware of the importance of the social environment and may want to use the social networks in low socio-economic status neighbourhoods to successfully promote sport participation and sport attitudes. Second, this study brings up new research questions. The puzzling outcome in the Netherlands in contrast to Europe, of higher weekly sport participation in rural areas, illustrates the relevance of looking further into the rural–urban divide in other European countries. The issue is whether aspects of the social environment would provide comparable explanation for existing urbanity differences in sport participation in other countries, given for instance the differences between countries with regard to the macro-level and the exo-level. In addition, we have touched upon the alleged differences in willingness to travel for sports participation. We suggested that for people that are more motivated to participate, distances form less of a barrier. Still, this hypothesis requires further empirical testing.

To conclude, this study enhances our understanding of rural–urban divide in sport participation and may inform policymakers to critically assess sport promotion policies. Special attention is required for the social environment features and to the availability of various sport facilities for those less motivated to participate in sport.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This work was supported by the Netherlands Organisation for Scientific Research (NWO) under [grant number 328-98-008].

Notes on contributors

Remco Hoekman is a senior researcher at the Mulier Institute and a PhD candidate at the Department of Sociology, Radboud University Nijmegen, the Netherlands. His research interests include sport participation, sport facilities and sport policy, and he has published various book chapters, articles and reports on these topics. He is a member of the extended board of the European Association for Sociology of Sport (EASS).

Koen Breedveld is director of the Mulier Institute and professor of sport sociology and sport policy at the Department of Sociology, Radboud University Nijmegen, the Netherlands. His research interests include sport participation and sport policies, and trends and developments in sports. He has published numerous reports and articles on sports oriented towards a scientific audience, a professional audience or both.

Gerbert Kraaykamp is professor of empirical sociology at the Department of Sociology/ICS, Radboud University Nijmegen, the Netherlands. His major research interests include educational inequality, cultural capital and lifestyle differentiation. He has published widely on these subjects in international journals.

References

Bale, J. (2003). *Sports geography*. London: Routledge.

Beenackers, M. A., Kamphuis, C. B. M., Burdorf, A., Mackenbach, J. P., & van Lenthe, F. J. (2011). Sports participation, perceived neighborhood safety, and individual cognitions: how do they interact. *International Journal of Behavioral Nutrition and Physical Activity, 8*. Retrieved from http://www.ijbnpa.org/content/8/1/76

Bourdieu, P. (1990). *The logic of practice*. Stanford, CA: Stanford University Press.

Breuer, C., & Wicker, P. (2008). Demographic and economic factors influencing inclusion in the German sport system – a microanalysis of the years 1985 to 2005. *European Journal for Sport and Society, 5*, 33–42.

Bronfenbrenner, U. (1979). *The ecology of human developments: Experiments by nature and design*. London: Harvard University Press.

Bronfenbrenner, U., & Morris, P. A. (2006). The bioecological model of human development. In R. M. Lerner & W. Damon (Eds.), *Handbook of child psychology (6th ed.): Vol. 1, Theoretical models of human development* (pp. 793–828). Hoboken, NJ: Wiley.

Brownson, R. C., Hoehner, C. M., Day, K., Forsyth, A., & Sallis, J. (2009). Measuring the built environment for physical activity: State of the science. *American Journal of Preventive Medicine, 36*(Suppl. 4), S99-123.e12. doi:http://dx.doi.org/10.1016/j.amepre.2009.01.005

Camy, J., Clijssen, J., Madella, A., & Pilkington, A. (2004). *Vocasport – vocational education and training in the field of sport in the European Union: Situation, trends and outlook*. Lyon: Vocasport.

Carver, A., Timperio, A., & Crawford, D. (2008). Playing it safe: The influence of neighbourhood safety on children's physical activity – a review. *Health & Place, 14*, 217–227.

Casper, J. M., Bocarro, J. N., Kanters, M. A., & Floyd, M. F. (2011). Measurement Properties of Constraints to Sport Participation: A Psychometric Examination with Adolescents. *Leisure Sciences: An Interdisciplinary Journal, 33*, 127–146.

Castells, M. (1977). *The urban question: A marxist approach*. London: Edward Arnold.

Cerin, E., & Leslie, E. (2008). How socio-economic status contributes to participation in leisure-time physical activity. *Social Science & Medicine, 66*, 2596–2609.

Cochrane, T., & Davey, R. C. (2008). Increasing uptake of physical activity: a social ecological approach. *The Journal of the Royal Society for the Promotion of Health, 128*, 31–40.

Collins, M. (2003). *Sport and social exclusion*. London: Routledge.

Council of Europe (2001). *The European sport for all charter*. Strasbourg: Council of Europe.

Damon, W., & Lerner, R. M. (2008). *Child and adolescent development: An advanced course*. Hoboken, NJ: Wiley.

Downward, P. (2007). Exploring the economic choice to participate in sport: Results from the 2002 general household survey. *International Review of Applied Economics, 21*, 633–653.

Downward, P., Lera-Lopez, F., & Rasciute, S. (2011). The zero-inflated ordered probit approach to modelling sports participation. *Economic Modelling, 28*, 2469–2477.

Engel, C., & Nagel, S. (2011). Sports participation during the life course. *European Journal for Sport and Society, 8*, 45–63.

European Commission (2014). *Sport and physical activity. Special eurobarometer 412/Wave EB80.2*. Brussel: European Commission.

Eurostat. (2015). Population density: Persons per km². Retrieved January 7, 2016, from http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tps00003&plugin=1
Garcia, J., Lera-Lopez, F., & Suarez, M. J. (2011). Estimation of a structural model of the determinants of the time spent on physical activity and sport: Evidence for Spain. *Journal of Sports Economics, 12*, 515–537.
Gebel, K., Bauman, A. E., & Petticrew, M. (2007). The physical environment and physical activity: A critical appraisal of review articles. *American Journal of Preventive Medicine, 32*, 361–369.
Hallmann, K., Wicker, P., Breuer, C., & Schüttoff, U. (2011). Interdependency of sport supply and sport demand in German metropolitan and medium-sized municipalities – findings from multi-level analyses. *European Journal for Sport and Society, 8*, 65–84.
Hartmann-Tews, I. (2006). Social stratification in sport and sport policy in the European Union. *European Journal for Sport and Society, 3*, 109–124.
Hoekman, R., & Breedveld, K. (2013). The Netherlands. In K. Hallmann & K. Petry (Eds.), *Comparative sport development: Systems, participation and public policy* (pp. 119–134). New York, NY: Springer Science+Business Media.
Hoekman, R., Breedveld, K., & Kraaykamp, G. (2016). A landscape of sport facilities in the Netherlands. *International Journal of Sport Policy and Politics*, *8:2*, 305–320. doi:http://dx.doi.org/10.1080/19406940.2015.1099556
Hoekman, R., & De Jong, D. (2011). Sport een stap te ver? In A. Elling & F. Kemper (Eds.), *Het kost veel tijd en je wordt er moe van: Verklaringen voor sportdeelname en inzichten in de leefwereld van niet-sporters* [It costs a lot of time and it makes you tired: explanations for sport participation and insights in the world of non-participants] (pp. 83–100). Nieuwegein: Arko Sports Media.
Hoekman, R., Hoenderkamp, K., & Van der Poel, H. (Eds.). (2013). *Sportaccommodaties in beeld* [Sport facilities in the picture]. Utrecht/Nieuwegein: Mulier Instituut/Arko Sports Media.
Hosmer, D. W. & Lemeshow, S. (2000). *Applied logistic regression* (2nd ed.). New York, NY: Wiley.
Hovemann, G., & Wicker, P. (2009). Determinants of sport participation in the European Union. *European Journal for Sport and Society, 6*, 51–59.
Kamphuis, C., & van den Dool, R. (2008). Sportdeelname [Sport participation]. In K. Breedveld, C. Kamphuis, & A.Tiessen-Raaphorst (Eds.), *Rapportage Sport 2008* [Report on sport 2008] (pp. 74–101). Den Haag/'s-Hertogenbosch: SCP/W.J.H. Mulier Instituut.
Karusisi, N., Thomas, F., Méline, J., & Chaix, B. (2013). Spatial accessibility to specific sport facilities and corresponding sport practice: The RECORD study. *International Journal of Behavioral Nutrition and Physical Activity, 10*. Retrieved from http://www.ijbnpa.org/content/10/1/48
Keenan, T. (2002). *An introduction to child development*. London: Sage.
Knol, F. (2012). *Statusontwikkeling van wijken in Nederland 1998–2010* [Development of socio-economic status of neighbourhoods in the Netherlands 1998–2010]. Den Haag: SCP.
Limstrand, T., & Rehrer, N. J. (2008). Young people's use of sports facilities: A Norwegian study on physical activity. *Scandinavian Journal of Public Health, 36*, 452–459.
Liu, H., & Walker, G. J. (2015). The effects of urbanization, motivation, and constraint on Chinese people's leisure-time physical activity. *Leisure Sciences, 37*, 458–478.
Ministry of VWS. (2009). *Uitblinken op alle niveaus. Kabinetsstandpunt bij Olympisch Plan 2028* [Excel at all levels. Government's position on the Olympic Plan 2028]. Den Haag: Author.
Mood, C. (2010). Logistic regression: Why we cannot do what we think we can do, and what we can do about it. *European Sociological Review, 26*, 67–82.
NOC*NSF. (2009). *Olympisch Plan 2028: Heel Nederland naar Olympisch Niveau. Plan van aanpak op hoofdlijnen* [Olympic Plan 2028: The whole of the Netherlands to Olympic level.]. Arnhem: Author.
Oppelaar, J., & Wittebrood, K. (2006). Sociale veiligheid [Social safety]. In A. Steenbekkers, C. Simon, & V. Veldheer (Eds.), *Thuis op het platteland. De leefsituatie van platteland en stad vergeleken* [At home at the countryside. A comparison of the living environment between rural and urban areas] (pp. 267–288). Den Haag: SCP.
Pinkster, F. M. (2007). Localised social networks, socialisation and social mobility in a low-income neighbourhood in the Netherlands. *Urban Studies, 44*, 2587–2603.
Prins, R. G., van Empelen, P., te Velde, S.J., Timperio, A., van Lenthe, F.J., Tak, N.I., … Oenema, A. (2010). Availability of sports facilities as moderator of the intention-sports participation relationship among adolescents. *Health Education Research, 25*, 489–497.
Rafoss, K., & Troelsen, J. (2010). Sports facilities for all? The financing, distribution and use of sports facilities in Scandinavian countries. *Sport in Society, 13*, 643–656.
Ruseski, J. E., Humphreys, B. R., Hallmann, K., & Breuer, C. (2011). Family structure, time constraints, and sport participation. *European Review of Aging and Physical Activity, 8*, 57–66.
Scheerder, J., Vanreusel, B., & Taks, M. (2005). Stratification patterns of active sport involvement among adults: Social change and persistence. *International Review for the Sociology of Sport, 40*, 139–162.
Shildrick, T. (2006). Youth culture, subculture and the importance of neighbourhood. *Young: Nordic Journal of Youth Research, 14*, 61–74.
Shove, E., Pantzar, M., & Watson, M. (2012). *The dynamics of social practice: Everyday life and how it changes*. London: Sage.

Steenbekkers, A., Simon, C., & Veldheer, V. (Eds.). (2006). *Thuis op het platteland. De leefsituatie van platteland en stad vergeleken* [At home at the countryside. A comparison of the living environment between rural and urban areas]. Den Haag: SCP.

Steinmayr, A., Felfe, C., & Lechner, M. (2011). The closer the sportier? Children's sports activity and their distance to sports facilities. *European Review of Aging and Physical Activity, 8*, 67–82.

Stokols, D. (1996). Translating social ecological theory into guidelines for community health promotion. *American Journal of Health Promotion, 10*, 282–298.

Teixeira, P. J., Carraça, E. V., Markland, D., Silva, M. N., & Ryan, R. M. (2012). Exercise, physical activity, and self-determination theory: A systematic review. *International Journal of Behavioral Nutrition and Physical Activity, 9*. Retrieved from http://www.ijbnpa.org/content/9/1/78

Tiessen-Raaphorst, A., Verbeek, D., De Haan, J., & Breedveld, K. (2010). *Sport: een leven lang. Rapportage Sport 2010* [Sport for life. Report on sport 2010]. Den Haag/'s Hertogenbosch: SCP/W.J.H. Mulier Instituut.

Van der Reijden, H., Van Woerkens, C., Leidelmeijer, K., Marlet, G., & Schulenberg, R. (2013). *Leefbarometer update 2012* [Level of living barometer update 2012]. Amsterdam: RIGO.

Van Lenthe, F. J., Brug, J., & Mackenbach, J. P. (2005). Neighbourhood inequalities in physical inactivity: The role of neighbourhood attractiveness, proximity to local facilities and safety in the Netherlands. *Social Science & Medicine, 60*, 763–775.

Van Tuyckom, C. (2011). *Sport for all: Fact or fiction? Individual and cross-national differences in sport participation from a European perspective* (Dissertation). Universiteit Gent, Gent.

Wicker, P., Breuer, C., & Pawlowski, T. (2009). Promoting sport for all to age-specific target groups: The impact of sport infrastructure. *European Sport Management Quarterly, 9*, 103–118.

Wilson, R. A., & Schulz, D. A. (1978). *Urban sociology*. Englewood Cliffs, NJ: Prentice-Hall Inc.

Wilson, T. C. (2002). The paradox of social class and sports involvement: The roles of cultural and economic capital. *International Review for the Sociology of Sport, 37*, 5–16.