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Perceived barriers to physical activity in the social spaces of low socioeconomic status suburbs

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ABSTRACT

The promotion of physical activity and well-being calls for sociological knowledge of the factors that constrain individual's activities, especially among disadvantaged populations. We investigated perceived barriers to physical activity and their associations with social background factors within the theoretical framework of social space. Survey data ($n = 302$) were collected from adult residents in two low socioeconomic status city suburbs in Finland and examined using binary logistic regression analysis, multiple correspondence analysis and variance analysis. The most prevalent barriers among adults were low mood, lack of time, health problems and lack of companions. A data-driven classification of the barriers showed that an accumulation of barriers was associated with nondomestic native language, single parenting, age 30–44 years and low household income. Perceiving personal barriers, as opposed to environmental barriers, was characterised by retirement, low household income, low physical activity level and domestic native language. The results support the following deduction: to reduce inequalities in access to physical activity, policies should focus on sports service delivery that aims at the removal of barriers to physical activity, especially social and personal barriers. Deepening this understanding requires not only further development of relevant theory and empirical research into the different social spaces of physical activity but also close dialog with welfare policy decision makers and sports service planners.

1. Introduction

Increasing the possibilities of physical activity (PA) and thus supporting the well-being of individuals and the adoption of a physically active lifestyle among citizens have been key objectives of European sport policy for some time (see e.g., European Commission 2018; Finnish Government 2018). In Finland, for example, this objective has been pursued through the development of municipal sports services whose responsibilities have included organizing physical activities for residents, supporting civic activity, and, in particular, building a network of sports facilities (Kokkonen 2015, pp. 354–355, 365–371). This emphasis has presumably improved and diversified the scope of possibilities for those who are active in sports, as well as for sports clubs. However, research results in different countries indicate that this kind of focus on sports service delivery has not produced the desired effects on PA participation at the population level and especially in certain population groups (e.g., people with low socioeconomic status and women) (Hoekman et al., 2011; Kuvaja-Köllner et al., 2022). It may even have contributed to an increase in PA-related inequalities between population groups at a time when societal development in general has led to an increase in well-being inequalities and social, economic, cultural and regional segregation among citizens (Nobis and El-Kayed, 2019; Seippel, 2015; Stappers et al., 2018). Altogether, it has remained unclear how sport policy has affected PA participation in different population groups (Hoekman and Scheerder, 2021). These findings call for a critical evaluation of sport policy priorities and an examination of factors affecting PA behavior and the use of sports services among various populations (Kokkonen and Kauravaara, 2020).

For quite some time, a perception has been strengthening among sport sociologists and experts in the field that sports services are not equally accessible to all populations—that is, that various factors have prevented the use of certain sports services and certain types of PA in certain populations (see e.g., Kokkonen 2015, pp. 365–371). Thus, measures have been developed and adopted in sport policy and public sports service delivery aimed at removing easily identifiable barriers, such as geographic and economic barriers and those related to physical disabilities (Finnish Government, 2018, pp. 6–7, 36–37). However, it is reasonable to argue that these measures have been unequally developed

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alongside the development of other sectors of sports services. This claim is supported not only by the understanding of the historical evolution of public sports services but also by critical research findings on the effectiveness of sports services, referenced above. These arguments give rise to the assumption that achieving the political objectives of increasing the PA of the population requires, above all, the development of new measures to remove various barriers affecting the PA behavior of individuals in different life situations (Stappers et al., 2018). To promote PA among disadvantaged populations, particular attention should be paid to the social accessibility of PA, which entails recognizing the social factors that are linked to poorer physical and perceived access to activities (Gomez et al., 2015; Koppen et al., 2014).

The development of such measures requires researched knowledge of the barriers experienced by residents of certain regions and effective operating models to manage these barriers, as well as application of this knowledge in decision-making and planning practices. One current research task is to deepen understanding of the complexity of the factors and issues affecting PA and, in particular, the interdependence of PA and sociocultural structures in diverse social spaces. The concept of social space refers to viewing material dimensions of human life, such as physical activities and their places, as connected to and formed by social relations and structures (Lefebvre, 2002; Massey, 2005), thereby drawing attention to the societal conditions of PA behavior. The goal should be knowledge production that responds to the following concern of researchers: if the impact of social structures in the PA of a population is disregarded in decision-making, this might lead to policies that exacerbate the negative impacts of social determinants of PA (see e.g., Bunds and Casper 2018; Williams and Gibson 2018).

In the current study, we approach social structures in PA by investigating barriers to PA as they are connected social background factors among populations in two socioeconomically disadvantaged Finnish suburbs. The framework presented in the following chapters is constructed from theoretical discussions related to the concept of social space. From this derives the hypothesis guiding the theoretical formulation of the research task, according to which social space is not only a structure of possibilities, but also a constraint of PA. The essential question is whether finding a place and time for PA is equally possible for all (Itkonen and Simula 2008, p. 202). Accordingly, the present study investigates 1) perceived barriers to PA among the suburban adults and 2) how social background is linked to these barriers and with interconnections between them. By examining the correlations between the barriers to PA experienced by individuals and their sociodemographic background, we aim to gain more comprehensive insights into constraints among disadvantaged populations and the structures of exclusion in the two suburban areas. The knowledge produced in this study is important for designing targeted policy efforts to remove barriers to PA and, further, reduce inequalities in well-being.

2. Background

2.1. Approaches to barriers to physical activity

Several studies have recently investigated perceived barriers to PA, identifying e.g. lack of time or motivation, fatigue, poor weather, having a health condition, and a non-supportive social environment as the prominent barriers among adults (Donnelly et al., 2018; Jones et al., 2021). These barriers have remained among the most reported during the COVID-19 pandemic (Farah et al., 2021). However, pandemic-related restrictions have resulted in a lack of motivation, inadequate facility access, anxiety, and lack of support becoming significantly more common than before, while lack of time has decreased in importance (Marashi et al., 2021). In Finland, especially time constraints and lack of motivation restricted adults' prepandemic leisure-time PA (Borodulin et al., 2016).

Importantly, the magnitude and relevance of barriers to PA vary according to sociodemographic and spatial differences. Barriers have been found to vary by socioeconomic status (Gray et al., 2016), family type, age (Borodulin et al., 2016) and PA level (Jones et al., 2021). In addition, studies have found that people living in low socioeconomic status neighbourhoods report barriers to PA more than the average (Fontán-Vela et al., 2021), especially social barriers in the use of public outdoor facilities (Rivera-Navarro et al., 2021). The barriers identified have been compared between population groups, such as gender groups (Thomas et al., 2019) or rural and urban residents (Pelletier et al., 2021), as well. Often, the research focus has been on narrower target groups, such as barriers of the elderly (Gothe and Kendall, 2016), students (Blake et al., 2017), mothers (Wittels et al., 2022) or parents (Harrington et al., 2017), among others.

From these findings and observations of research gaps, it is possible to deduct arguments for directing further research towards understanding how experiences and perceptions of barriers to PA vary across population groups. Thus, a targeted sociological analysis deepens our understanding of the social structuring of inequalities related to PA and participation in sports. Already, research evidence fairly clearly indicates that there is social stratification in PA participation in Finland (Borodulin et al., 2016b; Kari et al., 2020) as elsewhere in Europe (Beenackers et al., 2012; Mutz and Müller, 2021; Scheerder and Vos, 2011). Low socioeconomic status is a common factor associated with lower PA participation (Borodulin et al., 2020; Gidlow et al., 2021). Verifying the differences between population groups is important, but it does not produce enough information for designing policy measures aimed at reducing inequality. In addition, research is needed that observes barriers from different population groups' perspectives and produces an understanding of why PA and participation in sports vary among population groups. Specifically, examining the social mechanisms, structures, and processes as well as spatial features – that is, the characteristics of social spaces – that limit PA opportunities for marginalized groups is crucial (Kay, 2016; Schulz et al., 2020). This requires a comprehensive research program and mixed-method approaches.

Sport sociologists have an urgent task of deepening the understanding of the correlations and even dependencies between PA behavior and social spaces. We agree with Bunds and Casper (2018) that sport sociologists are "well-positioned to examine how [so-called] unhealthy decisions are not decisions at all" and how manifestations of inequality related to PA are socially structured. Based on research results, it is reasonable to argue that the differences in experiencing barriers to PA largely explain why the available sports services and PA environments in a residential area do not affect the PA behavior of all residents (Deelen et al., 2016; Kaufman et al., 2019). This argument can also be used to present a critical evaluation of the effectiveness of PA policy: common measures and interventions aimed at promoting PA in wider populations tend to increase PA mostly among the socioeconomically advantaged individuals (Stappers et al., 2018; Smith et al., 2017).

2.2. Social space in relation to physical activity

Our approach to barriers to PA contributes to the sport sociological study of inequality, where sport is viewed as a site of exclusion that reflects and reproduces broader hierarchical structures in the society as well as produces inequalities (Donnelly, 1996; Spaaij et al., 2015). In this article, we conceptualize the exclusion and its connection to the hierarchies by applying the framework of social space from human geography. It offers a suitable framework for understanding the multidimensional character of access to PA, as the framework includes both the material and sociocultural reality as well as acknowledges the connection between inequalities and individuals' social positions.

Developed by Harvey (1989), Massey (2005) and Lefebvre (2002), theories about the spatiality of society and the sociality of space open up a wide range of perspectives for research on inequalities in PA. Harvey described how production systems, political ideologies and social

relations in society are manifested in spatial-material reality and interpreted the effects of society's space production on thinking and behavior (Harvey, 1989). Massey (2005, 1999) formulated an understanding of the emergence of social space, that is, how the material environment, social relations and practices and cultural structures intertwine in interaction and negotiation situations associated with the production of space. In addition, Lefebvre (2002, pp. 11–26) developed a theory of social space that explains the interconnections between different dimensions of human life - physical, mental and social. Combining these conceptualizations, social space directs attention to the relationships between people, especially their societal positions and the places of PA, and views physical places as socially and culturally constructed spaces. Accordingly, access to PA opportunities is closely related to social structures, as spatial practices, social relations, cultural norms and physical features of places define the availability of space for different people's activity.

Theories of social space have been applicable while interpreting manifestations of inequality in society and in sports culture. Fuller and Löw (2017) concluded that social space is where social divisions and inequalities are rendered physical, and Soja (2010, p. 4) stressed the importance of looking at how practices that generate and sustain inequality and injustice manifest in producing and using space. Sport sociologists have referred to the core ideas of theories about the sociality of space when describing, for example, how relations between genders and ethnic groups are constructed (e.g., Atencio and Wright 2008; van Ingen 2003). In addition, recent studies in Finland have approached the spatiality of PA, first, from the perspective of a geographical area, when it has been considered which groups and uses of space are dominant in an area and how the use of space in that area is segregated among individuals with different sociocultural status (Itkonen and Simula, 2016, 2008). The second approach has focused on the perspective of a population group and its relations to the physical environment and sociocultural structures (Hasanen, 2017).

In general, there is a need to develop the use of spatial theory in sport sociology especially because of its suitability to unveil the various relations affecting possibilities for PA in various spaces (Friedman and van Ingen, 2011). For example, in both Itkonen and Simula's research on traditional rural villages (2008; 2016) and Hasanen's study on youth PA in different settings from rural to urban (2017), the framework of social space allowed for developing an understanding of the various sociocultural factors that have an influence on finding a place and time for PA. As a more concrete example, factors such as gender, age, sporting skills, belonging to peer groups, as well as physical features of the living environment and sport facilities, were found to play an important role in determining where and when a young person could engage in self-organised PA (Hasanen, 2017). In other words, the framework allows for explaining how a broad range of physical, social and cultural factors, that are both individual and societal, may contribute to the construction of sites of exclusion in PA. Further, acknowledging this kind of a spatiality in PA means acknowledging that access to PA is connected to social positions. The study of social spaces of PA is therefore connected to questions of social justice as they appear in the practices of everyday and their conditioning contexts (see e.g. Agyeman et al. 2016). From this point of view, it is also closely connected to questions of power, because it posits an unequal distribution of power and choice over the use of different environments in the everyday (see also Lehtinen 2003, pp. 26–31). Equitable policy requires insight on the inequalities deriving from social positions (Williams and Gibson, 2018), and finding out about the factors that are related to disadvantaged social positions in the spaces of PA is important for advancing both the sociological study of inequalities in PA and the study of accessibility of PA.

2.3. Suburban spaces and physical activity

This study focuses on the barriers of adult residents of two low socioeconomic status neighbourhoods in cities located in Finland and situated in the Nordic welfare state regime. The suburban environments were selected because we aim to gain a more comprehensive insight on the constraints among disadvantaged populations and how social positions affect opportunities for PA. The neighbourhoods are considered segregated suburbs in terms of socioeconomic and ethnic segregation, which is a main form of residential segregation in Finland (Stjernberg, 2019). Residential segregation is often viewed as an urban context based form of social inequality (Lobao and Hooks, 2007) and spatial injustice (Soja 2010, pp. 19, 54–56).

However, Finnish suburbs have special features what comes to the physical environment. The original idea of Finnish suburban policy was building "forest suburbs" that are good for the residents' wellbeing (Stjernberg, 2019). Consequently, it was considered important to both build outdoor sports facilities such as ball fields and to preserve unbuilt nature as a place of recreation and play (Saarikangas, 2003). Still, at present, Finnish suburbs typically have relatively much green area, and PA environments are typically well attended (Vehkakoski and Norra, 2017). This also means that international research investigating segregation-related disadvantage due to physical environmental factors (e.g., Cereijo et al. 2019; Rigolon 2019) has little relevance for this study. Finland's national sport facility database (University of Jyväskylä, 2023) shows that the target areas are not disadvantaged neighbourhoods in terms of PA facility provision.

Except for a few studies on barriers among minorities living in the Nordic region (Mickelsson, 2021; Nykänen et al., 2020), there is little research concerning suburban residents' PA barriers in the current Nordic welfare state regime. Moreover, there is no previous research on the barriers to PA among residents of segregated suburbs in Finland. Also, the social spaces in suburban PA environments are an understudied area compared to research on PA in urban public spaces (e.g. Aquino et al. 2020; Borgogni 2012). This study will address the gaps in research by selecting two suburban low-SES areas and investigating barriers in PA in connection to not only physical environment, but also to social background factors.

In sum, this study aims to broaden the understanding about the structural determinants of inequalities and exclusion in PA and hence the manifestations of barriers to PA within social spaces. We contribute to the development of a spatial analysis of PA - instead of a conceptual analysis of social space, our focus is on operationalising theoretical discussions on social space. As we identify barriers and examine how social background is related to them, we approach them as expressions of spatial exclusion in geographical areas, namely two Finnish suburbs. We hypothesize that the constraints on PA among the suburban residents might result from, for example, factors discussed by Itkonen and Simula (2016) such as spatio-temporal differentiation of weekly activities, poor physical access to PA environments, the cost of hobbies, life situation, family relationships, group memberships and related cultural traditions, and socioeconomic status. Within this frame, we view social space as, in many respects, not only an enabler of but also a constraint on PA.

3. Method and design

3.1. Research sites

We tested our theoretical framework in two low socioeconomic status areas in Finland, the suburbs of Kontula and Huhtasuo. Kontula, with 14 100 residents (Helsinki City Executive Office, 2021) and an area of 2580 km^2, is located in the north-eastern part of Helsinki, the capital city of Finland. Huhtasuo has 9330 residents (City of Jyväskylä, 2021) and a land area of 6240 km^2. It is located in the north-western part of Jyväskylä, a city in central Finland. Helsinki has 658 000 residents in total, and Jyväskylä 144 000 (Official Statistics of Finland, 2021). The sociocultural context in both suburbs is characterised by lower-than-average employment, income and education levels and a relatively high share of foreign language speakers (City of Jyväskylä, 2019; Official Statistics of Finland, 2020). An accumulation of risks for

poor well-being has made these suburbs a special target in local policies related to segregation (Ministry of the Environment, 2021). This is also why the suburbs were seen as an important target area of investigation in a larger research program on suburban segregation, that also this study is part of. In terms of the physical environment, both study suburbs have diverse PA environments, such as green areas, outdoor sports facilities, pedestrian streets, and light traffic routes (Open Street Map, 2022a, 2022b; University of Jyväskylä, 2023).

COVID-19-pandemic-related constraints on PA differed slightly between the two areas at the time of data collection in June 2021. At that time, the third wave of the COVID-19 pandemic in Finland was subsiding (Ministry of Social Affairs and Health, 2021). In Jyväskylä, restrictions on PA had recently been removed (Keskisuomalainen, 2021). In Helsinki, remaining restrictions concerned headcounts in sports facilities and adults' organised PA (City of Helsinki, 2021a, 2021b).

3.2. Data collection

The research was conducted as a cross-sectional study. Data were collected by phone survey in June 2021 as part of a wider survey pattern and required no formal ethics approval (Finnish National Board on Research Integrity TENK, 2021). The survey was available in Finnish, Swedish and English. By using information from Statistics Finland, a data company conducted a simple random sampling for representatives in the case study suburbs. Data were collected until there were more than 150 responses from both Kontula and Huhtasuo. To ensure that residents with low socioeconomic status were represented, an adequate share of respondents living in an apartment building was controlled. The final sample included adults who lived either in Kontula or Huhtasuo and gave their informed consent to participate. Hence, of the 379 survey answers, 302 were usable for further analysis.

Study measures consisted of two kinds of variables: socioeconomic background and barrier categories. The inquired sociodemographic background variables were the respondent's living area, gender, age, residential status, education level, main current employment status, household income and native language, here following the classifications of the Official Statistics of Finland (2022). Another background characteristic was PA level, as indicated by the number of times they engaged in different forms of PA during the previous seven days. Physical activity in the survey referred to sports, exercise, recreation, leisure-time PA, active travel and active everyday chores.

The categories of barriers to PA were developed based on the findings of previous studies on barriers (e.g. Gothe and Kendall 2016) and social spaces of PA (e.g., Itkonen and Simula 2016), as well as existing barrier classifications (see e.g. Deelen et al. 2016), taking into account physical, economic and sociocultural contexts of PA. The categories for the survey round in June were supplemented based on responses to open questions in a pre-survey round ($n = 352$). Consequently, the following 13 barriers formed the survey set: '*lack of time*', '*lack of money*', '*suitable places for PA are too far away or are difficult to access*', '*poor condition of the places for PA*', '*lack of information on possibilities for PA*', '*lack of sport instruction or guided exercise classes*', '*lack of sporting skills*', '*problems with my physical or mental health*', '*low mood or general tiredness*', '*I feel that sport facilities are not meant for people like me*', '*lack of people to do PA with*', '*going to the places for PA or being there is not safe because of other people*', '*my family or close friends have a negative attitude towards me being physically active*' and '*other reason*'. The barriers were presented to the respondents, who were asked which ones prevented or reduced their PA. Answer options were '*preventing my PA*', '*reducing my PA*', '*no effect*', or '*I can't say*'.

3.3. Data analysis

In the first step of the data analysis, we examined the shape and normality of the distributions of the background variables. To ensure the generalizability of the data, weight coefficients were calculated for age and gender in the target areas. Second, we used descriptive statistics to determine the characteristics of the study population and cross-tabulations to determine the relationships between the barriers and background factors. Considering the sample size and study interest, several variable categories were reclassified or combined. Age was presented as a four-class variable according to the respondent's self-reported year of birth. Residential status was captured using a question concerning housing partners, including children who spent at least 50% of their time at the respondent's address. Those living in the same household with their parents were categorised as 'other' and excluded from further analysis. A five-level education variable was collapsed into three categories: low, secondary and tertiary education. Native language was coded into a dichotomous variable: Finnish/Swedish and other. Employees in senior positions, lower-level employees and entrepreneurs were categorised as employed. Stay-at-home parents were categorised as 'other' and excluded from further analysis. A 10-level monthly household income variable was collapsed into a dichotomous variable, with 2000 euros as the boundary. The scale for barrier effects was reduced to a two-class variable: no effect (value=0) and barrier to PA (value=1).

Third, we conducted a binary logistic regression (BLR) analysis, multiple correspondence analysis (MCA) and variance analysis. BLR analysis was used in separate regression models to investigate the background factors determining the probability of perceiving each barrier to PA. For clarity, only variables contributing significantly to the model were retained (with 0.05 the cut-off value). In addition, the interactions between the variables were analyzed. Accordingly, MCA was used to synthesize the responses to several questions and identify underlying associations existing among the barriers. By replacing nine categorical variables with a few scales, it was possible to further explore the associations in a variance analysis and find the structural factors that explained the dimensions. Because no missing values in any measures were accepted, the variance analysis comprised 247 participants. All analyzes were conducted using IBM SPSS Statistics (version 26). The results are presented as an odds ratio (BLR) or mean (variance analysis) with a 95% confidence interval.

4. Results

The sample consisted of 302 people, of whom exactly half lived in Kontula (in the city of Helsinki) and half in Huhtasuo (in the city of Jyväskylä). After weighting, the distributions of age and gender groups followed the population distributions in the study areas. Descriptive characteristics of the participants are presented in Table 1.

Among these suburban residents, the most prevalent of the barriers was low mood or general tiredness, with 47% of the respondents ranking it as a factor reducing or preventing their PA (Fig. 1). This barrier was followed by lack of time (41%), problems with health (29%) and lack of company (25%). In contrast, no more than 10% of the respondents reported negative attitudes of close relatives, lack of sporting skills, feeling of not being an intended user of sports facilities, or poor condition of the places for PA as a barrier.

4.1. Binary logistic regression analysis

The three barriers reported most often were low mood, lack of time and health problems. Low mood had a statistically significant association with native language; the likelihood of perceiving low mood was 2.3 times higher among speakers of a nondomestic language (Table 2). Lack of time was linked to two background factors: residential status and employment status. Residential status explained the barrier so that respondents living with housing partners had a significantly higher risk of experiencing time as a barrier compared with those living alone. The linkage with employment status was that lack of time was significantly less often a barrier among the unemployed and retired than the employed. The risk of perceiving personal health as a barrier to PA was, in turn, significant for low-income respondents and the retired.

Table 1
Descriptive characteristics of participants weighted by age and gender.

		n	%
Area	Kontula, Helsinki	151	50
	Huhtasuo, Jyväskylä	151	50
Gender	Male	148	49
	Female	154	51
Age group (years)	18–29	66	22
	30–44	79	26
	45–64	96	32
	65–79	61	20
Residential status	Not in relationship, no children (alone)	124	41
	Couple, no children	93	31
	Couple with children	58	19
	Single parent	13	4
	Other*	14	5
Education level	No vocational training	44	14
	Secondary education	159	53
	Tertiary education	100	33
Main current employment status	Employed	158	52
	Student	29	10
	Unemployed	21	7
	Retired	85	28
	Other*	8	3
Household income (gross)	Less than 2000 €/month	92	30
	≥2000 €/month	183	61
	Missing*	27	9
Native language	Finnish/Swedish	258	85
	Other	44	15
Physical activity level	0 times/week	64	21
	1–4 times/week	88	29
	5+ times/week	150	50
Total n (%)		302	100

* Excluded from analysis.

parents had higher odds of perceiving a lack of company, sports facilities or sporting skills as a barrier than their corresponding reference categories. Similarly, both lack of time and attitudes of close relatives were more likely to be barriers for single parents, but there were statistical differences between other residential status subgroups as well. Third, those living in Kontula, aged 30–44 years or living in a low-income household had an increased risk of perceiving particular barriers, such as lack of money. However, there were several background factors with statistically significant differences between the categories of variables, including gender, education level and PA level, which were each linked only with one of the barriers.

4.2. *Multiple correspondence analysis*

MCA summarised the 13 selected barriers into a two-dimensional cloud. Together, the barriers contributed the highest percentages of the overall variations in the data matrix (inertia of 24% and 11%, respectively), providing the best two-dimensional fit. Fig. 2 depicts the categories of the barriers in the coordinate system as defined by these two main dimensions.

The first dimension of Fig. 2 can be interpreted as measuring the number of barriers the respondent had. The figure shows that only the barrier concerning problems with physical or mental health did not comply with this distinction. In other words, those less likely to have many other barriers might have health barriers to PA.

The second dimension, in turn, can be interpreted as measuring the degree of personal or environmental characteristics in barrier perceptions. The positive end of the y-axis was characterised by personal barriers because the largest contributions were in lack of skills, health problems and feelings of not being the intended user of PA environments, followed by lack of companions, low mood and negation of lack of time. In contrast, the negative values in this dimension were associated with environment-related barriers: the condition of or distance to

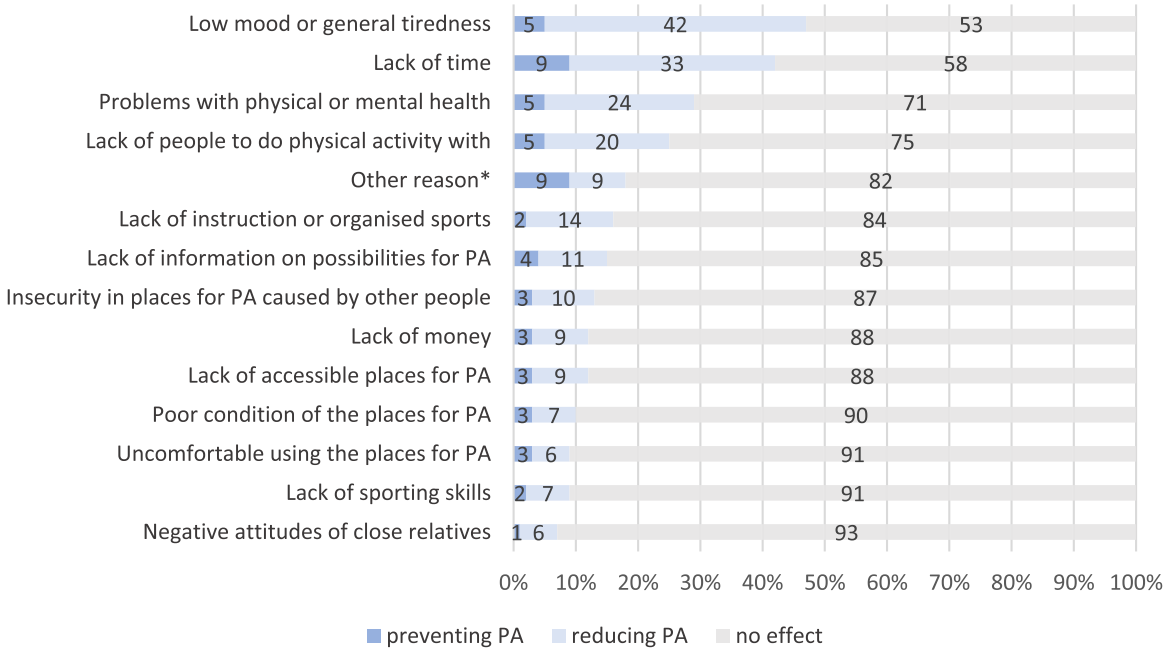

Fig. 1. Prevalence (%) of physical activity barriers experienced by suburban residents (preventing PA; reducing PA; no effect) (n = 302).
* Excluded from analysis.

When interpreting the models simultaneously, the following findings should be emphasised: First, most barriers had a statistically significant association with one background factor, that is, native language (see Table 2). For each such barrier, the respondents with a nondomestic native language had higher odds of reporting a barrier when compared with the Finnish- or Swedish-speaking participants. Second, single

[1] 'No' answers have been left blank; 'yes' answers have been filled.

Table 2
Odds ratios from binary logistic regression analysis (forward elimination modeling, 0.05 cut-off) for each barrier[1] predicting the likelihood of reported barriers to physical activity[2].

	Barriers reported												
	Low mood	Time	Health	Lack of company	Lack of organised sports	Lack of information	Insecurity	Money	Lack of places for PA	Condition of places for PA	Uncomfortable using the places for PA	Lack of sporting skills	Attitudes of close relatives
Area													
Kontula (ref.)	ns.	ns.	ns.	ns.	ns.	ns.	ns.	1.0*	ns.	ns.	1.0**	ns.	ns.
Huhtasuo								0.3			0.2		
Gender													
Male (ref.)	ns.	ns.	ns.	ns.	ns.	1.0*	ns.	ns.	ns.	ns.	ns.	ns.	ns.
Female						2.5							
Age													
18–29 (ref.)	ns.	ns.	ns.	ns.	ns.	1.0**	ns.	1.0**	ns.	ns.	ns.	ns.	ns.
30–44						2.8*		7.2*					
45–64						0.6		2.2					
65–79						0.4		0.3					
Residential status													
Alone (ref.)	ns.	1.0**	ns.	1.0***	ns.	ns.	ns.	ns.	1.0***	ns.	ns.	1.0*	1.0*
Couple, no children		3.2**		1.0					1.3			0.6	7.0
Couple with children		3.6**		1.3					1.3			0.8	12.3*
Single parent		4.1*		15.5***					14.0***			11.7*	36.8**
Education													
No vocational training (ref.)	ns.	ns.	ns.	1.0*	ns.	ns.	ns.	ns.	ns.	ns.	ns.	ns.	ns.
Secondary education				1.0									
Tertiary education				2.6									
Employment status													
Employed (ref.)	ns.	1.0***	1.0**	ns.	ns.	ns.	ns.	1.0*	ns.	ns.	ns.	ns.	ns.
Student		1.2	1.8					5.1					
Unemployed		0.3*	1.0					1.1					
Retired		0.1***	3.1***					7.1*					
Household income													
Less than 2000 €/month (ref.)	ns.	ns.	1.0**	ns.	ns.	ns.	ns.	1.0*	ns.	ns.	ns.	1.0*	ns.
≥2000 €/month			0.4					0.3				0.3	
Native language													
Finnish/Swedish (ref.)	1.0*	ns.	ns.	ns.	1.0***	1.0***	1.0***	1.0***	ns.	1.0***	1.0***	1.0*	1.0**
Other	2.3				4.1	5.5	6.0	6.3		11.6	7.6	5.4	6.3
Physical activity													
0 times/week (ref.)	ns.	ns.	ns.	ns.	ns.	ns.	ns.	ns.	ns.	ns.	1.0*	ns.	ns.
1–4 times/week											0.9		
5+ times/week											0.2*		
Nagelkerke R	0.026	0.373	0.147	0.140	0.070	0.254	0.113	0.363	0.119	0.263	0.220	0.310	0.298

[1] From the most common barrier to the rarest.
[2] Based on dichotomised variable with 0=no effect, 1=reducing or preventing PA. Odds values shown only for the variables statistically significant in the equation.
*** $p<0.001$;.
** $p<0.01$;.
* $p<0.05$.

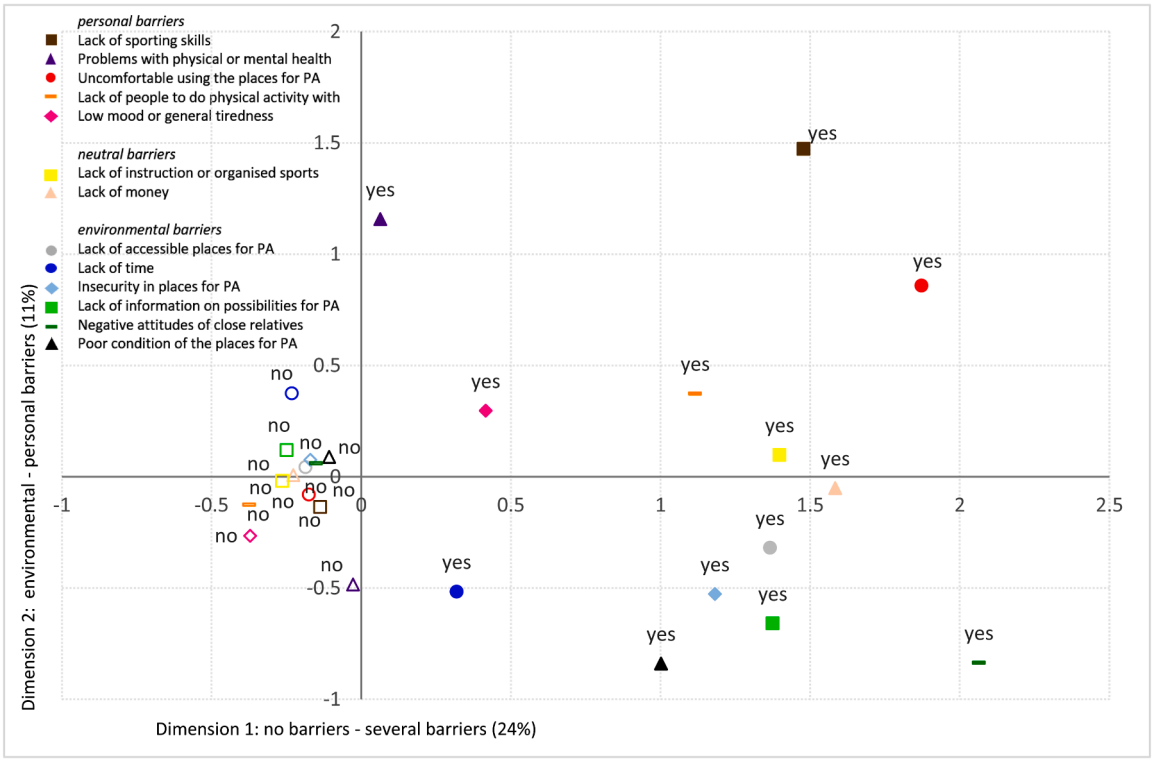

Fig. 2. Results of the multiple correspondence analysis as a cloud of the answers[1] of the 13 barriers reducing or preventing physical activity in principle planes 1–2.

PA environments, lack of information or time, perception of insecurity and attitudes of other people and their presence in PA places. In this dimension, lack of money and lack of instruction or organised sports were barriers not predominant in either the internal or external ends of the axis.

4.3. Univariate analysis

Finally, variance analysis revealed structural and individual background factors as predicting the occurrence of two main dimensions (Table 3). When looking at the first dimension, barriers accumulated, especially for 30–44-year-olds, single parents, people living in low-income households and those whose native language was not Finnish or Swedish. In contrast, there were often few or no barriers at all for people with good household incomes, native speakers of Finnish or Swedish, and elderly respondents. Contradictorily, the retired experienced more barriers than the employed, yet the difference was not statistically significant. However, cross-tabulation revealed that this experience was not reflected in the oldest age group.

When considering the second dimension, the results indicated that personal barriers were more typical for respondents with low household income and PA levels, while perceiving environmental barriers was associated with higher household income and PA levels. In addition, significantly more internal barriers were experienced by the retired and unemployed, whereas external barriers were typical for the employed and students. In all, the results suggested that groups with lower socioeconomic status (retired, unemployed, low-income households) and with low PA level more often experienced personal barriers, while higher socioeconomic status factors were associated with environmental barriers. However, those respondents who did not speak Finnish or Swedish as a native language faced environmental barriers significantly more often than the reference category.

5. Discussion

This study investigated barriers to PA among suburban residents, approaching barriers as expressions of spatial exclusion in the suburbs. The precise study objectives were to examine, first, the prevalence of barriers and, second, the connections between the barriers and social background. Based on a previous spatial analysis of PA in Finland, we hypothesised that the barriers might be connected to spatio-temporal factors, physical access, costs, life situation, family relationships, group memberships and related cultural traditions, and socioeconomic status. Of these, some turned out to be uncommon, some prevalent in the suburbs. Contributing to the development of the spatial analysis of PA, this study presents a view on the applicability of the framework of social space to investigating barriers.

5.1. Prevalence of barriers

The most prevalent barriers were low mood and lack of time, followed by health problems and lack of company for PA, which is mostly in line with recent studies (Jones et al., 2021; Pelletier et al., 2021). In contrast to some earlier studies, lack of financial resources was not a common barrier among the respondents (see Ashton et al. 2015), and neither were those barriers related to religion, family support, or urban structure (see Al-Hazzaa 2018; Donnelly et al. 2018). The absence of these barriers may be partially explained by the economic and social features of Finnish welfare society. For example, a PA policy exists offering low-cost services as a social policy, as well as a cultural emphasis on personal freedom of choice (see Coalter 2013). Unlike in some qualitative studies on barriers to PA (Rydenstam et al., 2020; Fontán-Vela et al., 2021), the feeling of insecurity as a barrier was not emphasized in this study. This may have been due to a limitation in the sample size of the study. However, it may also indicate that Finnish suburban PA environments have less social disorder compared to the suburban PA environments studied in other countries.

As lack of available sports facilities was not a key barrier, the effects

Table 3
Means and variations of dimensions 1 and 2 by respondent backgrounds. Univariate analysis.

	Dimension 1: no barriers – several barriers[1]				Dimension 2: environmental – personal barriers[2]			
	Mean	F-value	p-value	Effect size	Mean	F-value	p-value	Effect size
Area		2.54	0.113	0.011		3.36	0.068	0.014
Kontula	0.71				0.05			
Huhtasuo	0.52				−0.15			
Gender		0.02	0.965	0.000		0.31	0.578	0.001
Male	0.62				−0.02			
Female	0.62				−0.09			
Age		2.82	0.040*	0.036		1.60	0.192	0.020
18–29	0.54				−0.13			
30–44	0.98				0.02			
45–64	0.63				0.14			
65–79	0.32				−0.24			
Residential status		5.23	<0.001***	0.078		1.93	0.126	0.025
Alone	0.31				0.17			
Couple, no children	0.31				−0.05			
Couple with children	0.28				−0.22			
Single parent	1.57				−0.12			
Education		0.69	0.505	0.006		0.81	0.448	0.007
No vocational training	0.51				0.04			
Secondary education	0.61				−0.02			
Tertiary education	0.74				−0.17			
Employment status		2.57	0.055	0.033		4.69	0.003**	0.058
Employed	0.62				−0.32			
Student	0.65				−0.44			
Unemployed	0.16				0.08			
Retired	1.04				0.48			
Household income		4.72	0.031*	0.020		9.10	0.003**	0.038
Less than 2000 €/month	0.79				0.18			
≥2000 €/month	0.44				−0.28			
Native language		27.34	<0.001***	0.129		5.20	0.024*	0.022
Finnish/Swedish	0.06				0.15			
Other	1.17				−0.26			
Physical activity		0.11	0.900	0.001		4.39	0.013*	0.37
0 times/week	0.61				0.13			
1–4 times/week	0.65				−0.02			
5+ times/week	0.59				−0.27			

[1] Corrected model: F (17) = 6.00, $p < 0.001$; R-squared = 0.308, Adjusted R-squared = 0.256.
[2] Corrected model: F (17) = 7.32, $p < 0.001$; R-squared = 0.352, Adjusted R-squared = 0.304.

of the COVID-19 pandemic may not have been widely reflected in the PA barriers of the Finnish suburban respondents. This contradicts results from other countries (e.g. Marashi et al. 2021). The physical study context may partially explain the findings because both study areas were suburbs with versatile outdoor PA environments that are popular places for PA among Finns (Borodulin et al., 2011). During the pandemic, neighbourhood outdoor PA environments, such as green areas, had increased importance because of constraints on the use of indoor sports facilities (Porcherie et al., 2021; Virmasalo et al., 2023) as well as a general decrease in mobility and activity spaces (Toger et al., 2021).

In sum, the barriers related directly to the planning of PA environments or other customary policy measures in the sports sector remained on the margins in relation to the barriers concerning time constraints, low mood or poor health. In the light of previous studies and our results, we find that it is justified to take a broad view of the PA constraints associated with social spaces to build a perception of the various measures that increase equal accessibility to sports activities.

5.2. Accumulated and socially divided barriers

Concerning the second objective, our findings indicated polarization of the number and type of barriers among some population groups. First, language background was a social position connecting both to an accumulation of barriers and a perception of environmental barriers. The environmental barriers might partly have been caused by policymakers' unawareness of barriers to access, which were based on cultural background and its influence on PA practices, experiences and needs. Agreeing with Rönkkö (2015), we can assume that PA policies and practices favor culturally Finnish modes of PA and social interaction. Equal access to information might play a particularly important role. The accumulation of barriers, in turn, may partly explain earlier research results finding a correlation between PA level and language proficiency in ethnic minority groups (e.g., Langøien et al. 2017). Because ethnic concentration is a prevalent form of residential segregation in Finland, barriers to PA may accumulate in certain neighbourhoods, connecting PA disparities with these residential areas. In terms of social space, this speaks of a disadvantaged social position of people with a foreign native language in the spatially segregated suburban areas and of structures of exclusion that are attached to their PA.

Second, barriers accumulated for 30–44-year-olds, single parents and the retired, as well. Middle-aged adults were particularly affected by a lack of money, which might be explained partly by the fact that the consumption behavior of this age group has differed from that of other age groups, including in the consumption of sports and leisure services (Official Statistics of Finland, 2016). As for family type and employment status, earlier research in Finland found similar associations with barriers, especially with lack of time (Borodulin et al., 2016). Although barriers accumulated for the retired respondents, elderly respondents more often had few or no barriers at all. Thus, instead of old age, some other reason for the retirement, such as disability, was constraining adults' PA. Altogether, these associations are likely to be connected to how everyday life is differently structured, here depending on age, family structure and employment situation. All these affect an individual's resources, such as time, social relations and money, as well as choices. These circumstances, among others, shape the available time-spaces for PA and thus modify the residents' opportunities for PA.

Finally, barriers accumulated for people with low household incomes, which is in line with earlier research (Gray et al., 2016).

However, education level was not associated with barriers, with lack of time as an exception, and the association between employment status and barriers varied depending on the barrier. Therefore, the results do not directly suggest that socioeconomically disadvantaged people face more barriers in general. Earlier, Seippel (2015) noted a tendency among Norwegians that low socioeconomic status was connected to using local outdoor environments and that exercising locally in unorganized contexts appeared less dependent on material or cultural resources than being active in associational sports or fitness centers. This might also concern these respondents. Low socioeconomic status and low PA levels were, however, connected to perceiving personal barriers (e.g. health problems, low mood or tiredness, lack of skills). This seems to be in line with previous research suggesting that resilience in facing personal barriers caused by the COVID-19 pandemic was lower among low socioeconomic status residents (Carriedo et al., 2020). Versatile outdoor PA environments in the suburbs may play a significant role in why low socioeconomic status was not associated with perceiving barriers related to facilities, regardless of the pandemic (Virmasalo et al., 2023). In other words, suburban residents cannot be considered underserved in terms of physical PA spaces. However, there are other factors (e.g. social) in the suburban space that do not enable equal access to PA for all.

5.3. Towards equitable sport policy

The findings on societal divisions in perceived barriers are informative, although not comprehensive, for designing equitable sport policy that contributes to reducing inequalities in health. When aiming for equality of opportunities for PA, the focus in Finnish public sport policy has been on PA facilities and services for all user groups broadly (Vehmas and Ilmanen, 2017). However, our findings indicate that the most common barriers appear to relate primarily to fields other than the interest of public sport policy, differing socially and depending on residential and employment positions. This suggests that diversifying and increasing the supply of sports facilities and mitigating spatial and economic barriers are not sufficient measures to support people who do not have the time or energy to engage in PA, or social relationships that would activate them to exercise. In suburban areas, the current policy orientation appears to have been insufficient especially in removing the barriers to PA of foreign language speakers, low-income households, single parents, and middle-aged individuals.

In the light of our research findings, the following kind of deduction regarding recommendable policy measures is legitimate: the dismantling of barriers or, in particular, the prevention of the accumulation of barriers, requires measures from public sports service delivery focusing on the removal of social and personal barriers. The identification and development of these types of policies and measures requires not only cross-sectoral co-operation but also the establishment of a framework for co-operation. Based on theories of social space, developing a multidimensional framework for the accessibility of PA (see Virmasalo and Hasanen, 2022) provides a viable reference framework for designing co-operation muodels. All in all, we emphasize the importance of a holistic analysis of opportunities for PA. Citing Walker (2009, p. 621), 'proximity is only one dimension of spatialised narratives of difference and inequality'. We suggest focusing not only on physical space and material conditions and practices but also on other key features of social space, such as cultural interpretations and social interactions, that shape PA opportunities in neighbourhoods.

6. Conclusion

The current article produced knowledge on the accumulation and type of barriers to physical activity (PA) and their associations with sociospatial factors in PA participation, knowledge that can be utilised in repositioning evaluations of the effectiveness of public sector sport service delivery. The findings confirmed some earlier results regarding common barriers, strengthening understanding that a large part of the population experiences barriers to PA that no measures have been actively or consistently developed to overcome. In addition, becoming part of the research tradition of social space, the study provided new information on the applicability of the social space framework to investigating barriers and developing indicators that measure the barriers. The findings open up a wide range of opportunities for the development of sports service production related to the removal of barriers. However, deepening the understanding produced in this study requires not only further development of relevant theory and empirical research into the different social spaces of PA but also close dialog with welfare policy decision makers and sports service planners. The aim should be a scientific assessment of the impact of measures on the effectiveness of services and the well-being of residents.

In the current study, analysis was limited by a small sample size, which sometimes resulted in low frequencies per category, as in the case of single parents and unemployed individuals. Here, the results should be treated as preliminary, and more research on barriers in different population groups is needed. Also, it is essential to develop systematic measures of PA barriers that consider the impact of social and societal factors on PA and complete questionnaires and classifications used in this and in previous (see e.g. Eime et al. 2015; Gothe and Kendall 2016) studies. Particularly, future research should specify which activities or environments are perceived to be socially inaccessible and observe, with an intersectional approach, whether barriers accumulate for a specific population group with multiple risk factors. Finally, the geographically demarcated areas enabled us to interpret the impact of social factors as individual characteristics, but we cannot conclude about the disadvantages of the case study suburbs compared with other areas. To investigate the impact of geographical or individual factors, these findings must be replicated with other samples, comparing differences in barriers to PA between not only neighbourhoods but also wider regional areas.

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Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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