

When home becomes a cage: Daily activities, space-time constraints, isolation and the loneliness of older adults in urban environments

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Abstract

The geography of ageing is addressed in this article by providing new empirical evidence about the significant role of daily activities on the perceptions of isolation and loneliness. The developed model of socio-spatial isolation is based on data from time-space diaries and questionnaires completed by older adults living in three cities in the Czech Republic. The study suggests that socio-spatial isolation is a multicomponent (consisting of passivity, isolation and loneliness components), place-dependent and gendered issue. The passivity is significantly associated with the income and leisure sport activities. The isolation can be well predicted by the age, gender and education, and the frequency of work and specific leisure activities, which are constrained by health conditions, financial opportunities and spatial mobility. Particularly trips to nature, sport activities, cultural events, get together with friends, and visits to restaurants have a positive effect on reducing isolation. Women, particularly those who raised more children, more likely feel lonely in old age when family contacts are reduced. Visits to restaurants, shopping malls and cultural events have a positive effect on reducing loneliness. A constrained mobility and higher time consumption for necessary activities also proved to be an age-related and gendered problem. In this respect, policy interventions should seek to improve flexible work opportunities, the digital skills of older people, and the accessibility and safety of public transport with regard to perceived constraints, which is gaining in importance in the Covid-19 era.

Keywords: ageing; socio-spatial isolation; loneliness; daily activities; constraints; Czech Republic

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1. Introduction

“The secret of a good old age is simply an honorable pact with solitude” (Gabriel Garcia Marquez)

The current Covid-19 global pandemic is considered a historical moment with an unprecedented challenge concerning the impacts of the infection and related restrictions on the use of public space and social contacts, for everyone, but especially for older adults, their health and well-being (Wu, 2020). The current situation gives new contexts and significance to social science research on isolation and loneliness, which are major risk factors that have been linked with the poor physical and mental health status of older persons (Hwang et al., 2020). While the place of ‘home’ is usually associated with positive attributes such as privacy, freedom, family, safety, and protective boundaries,

many people experiencing social and spatial isolation (such as, for example, people with disabilities, mothers with infants, especially in suburban areas, or older people) may perceive home as more a cage than a castle (Yantzi and Rosenberg, 2008; Quinn, 2010).

The issues of social relations, loneliness and isolation in old age have been the subject of scientific research since at least the 1960s (see for example: Munnichs, 1964; Woodford-Williams, 1966). Even the most recent studies have emphasised, however, that we still have a very limited understanding of the meanings that older people ascribe to loneliness and social isolation, and how they live through and cope with these problems (Neves et al., 2019). The phenomenon has been studied by a number of disciplines, producing dozens of distinctive and sometimes conflicting

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definitions, and the attempts at operationalising and measuring it have followed similar paths (Gierveld and Tiburg, 2006; Cornwell and Waite, 2009; Zavaleta et al., 2014; Newall and Menec, 2019). The obvious conclusion is that older people experience loneliness and handle their life situations in highly individualised ways (Cohen-Mansfield and Eisner, 2020; Kirkevold et al., 2013). At least, there seems to be a partial consensus in that social isolation and loneliness are relational and multidimensional phenomena, which are associated with both structural (i.e. living settings, norms, resources) and agentic (individual actions and choices) dimensions (cf. Neves et al., 2019).

Although there is a large amount of literature (particularly geographical) on the everyday activities and spatial behaviour of older adults from one perspective (see Section 2), other views with respect to subjective perceptions of isolation and loneliness (especially in the field of social and clinical gerontology) are common, but the two approaches are rarely combined to the best of our knowledge (cf., for example: Vine et al., 2012; Vidovićová and Petrová Kafková, 2012; Siren et al., 2015). The present paper contributes to existing research by offering an interdisciplinary, geographical-sociological perspective on the problem by assessing the interrelationship between perceived isolation and loneliness and real time-space behaviour patterns. Moreover, unlike the majority of studies, which investigated isolation and loneliness by applying qualitative research methods, this research is based on the time-geographical approach using methods of time-space diaries, questionnaires and statistical analyses of quantitative data. Thus, this paper is concerned with four research questions:

- How do the spectrum and frequencies of everyday activities differ between various groups of older people?
- What space-time constraints are considered by older people as primary?
- What is the subjective perception of socio-spatial isolation by older people?
- How strongly do sociodemographic characteristics and everyday activities affect the perceptions of socio-spatial isolation?

We attempted to develop the concept of socio-spatial isolation in this respect (see Frantál and Klapka, 2020, concerning the socio-spatial isolation of mothers on parental leave), and apply it to older people. The remainder of the paper is organised as follows. The next section discusses the contributions of a time-geographic approach to the issues of ageing, isolation and loneliness. The next section is concerned with the empirical data and methods of analysis and processing. Results are presented and discussed in the following section, including comparison to some previous studies, if appropriate. The concluding section highlights the main findings and proposes certain recommendations for practice and future research.

2. Ageing, isolation and loneliness: a time geographic approach

The demographic situation in many developed countries presents problems related to population ageing, which are subject to research by many disciplines, including geography (see for example reviews by Warnes, 1981; Harper and Laws, 1995; Schwanen et al., 2012; Skinner et al., 2015). Varieties of scholarship exist within the geography of ageing, including health, caring, demographic and social aspects, and new theoretical and conceptual backgrounds have been

recently introduced into the field, such as the relational approach (Hopkins and Pain, 2007) and non-representational theory (Andrews and Grenier, 2015). A growing body of literature is concerned with ageing, everyday life and its rhythms and activity time-spaces, bringing to the fore intertwined issues of spatiality and temporality.

Theoretical concepts and the methodological apparatus of time geography have been applied, though in some cases not explicitly, to a number of various studies related to the issues of ageing, and the tradition is quite extensive. Only a selection, mostly of recent literature, follows. Much work was carried out in mobility studies. Hanson (1977) examined the travel activity patterns in households of older people in comparison to non-elderly households. The everyday mobility of an older suburban couple and its development over time was evaluated by Stjernborg et al. (2015). Van den Berg et al. (2011) studied the travel of older persons in relation to leisure time and social contacts. Nordbakke (2013) aimed her attention at the everyday travel activities and the needs of older women in an urban environment. Shoval et al. (2011) tracked the movements of cognitively impaired persons using GIS technology. Another avenue of mobility inquiry includes the concept of well-being (Nordbakke and Schwanen, 2014). Siren et al. (2015) studied the relationships between out-of-home mobility activities and well-being among persons with mobility impediments. Using a quantitative approach, Cuignet et al. (2020) discussed the concepts of potential and actual mobilities in relation to well-being in an urban space, including feelings of happiness.

Apart from the mobility-related research, other less frequent topics are discussed. For example, Fortuijn et al. (2006) explored the activity patterns of older adults in six European countries with respect to their contributions to local economies after their retirement. Some authors aim at environmental context and place. Thus, Vine et al. (2012) assessed urban design and amenity accessibility for older people. Antoninetti and Garrett (2012) analysed the interaction of older adults with their residential settings based on the concept of body capital. Lager et al. (2016), Lee (2014) and Paiva (2016) studied elders' experiences of place and rhythms in an urban space. In contrast to out-of-home activities, Leonardi et al. (2009) aim at the domestic environment. Hardill and Olphert (2012) and Muliček and Stachoň (2019) studied how older people deal with information and communication technologies.

Many of the above-mentioned studies hint at the notion of loneliness. In order to foster the social contacts of older people, travel (Van den Berg et al., 2011) and communication technologies (Hardill and Olphert, 2012) are means to do that. Increasing age stresses the importance of the domestic environment and different meanings are assigned to it by ageing people (Leonardi et al., 2009). Easily accessible amenities can also increase the level of social contacts and participation of older people in the social life of a neighbourhood (Vine et al., 2012; Lager et al., 2015). On the other hand, the need for car use results in loss of social contacts in a suburban space (Stjernborg et al., 2015).

Time geographic research builds on a number of concepts (Ellegård, 1999). We stress the concepts of paths and constraints, in particular, for the purposes of this paper. According to time geography, each individual has a time at her or his disposal, which is bounded to a specific spatial location; hence, time geography is concerned with the grasp, analysis and interpretation of the four-dimensional dynamics. The nature of such dynamics comprises subjective

decision processes, anchored in an objective framework (activity time-space). The existence of an individual faces a system of space-time constraints, which can basically be divided into two groups: objective constraints and subjective constraints. As for the former, time geographical literature speaks of capability, coupling and authority constraints (e.g. Lenntorp, 1999; Frantál et al., 2012). As for the latter subjective constraints, almost all objective constraints can be seen subjectively by every individual. Altogether the system of constraints obstructs or impedes an individual in the execution of activities, fulfilment of projects, reaching demands and needs.

The research on everyday activities and social isolation in time geography builds upon the use of time-space diaries and time-space questionnaires (e.g. Gershuny and Sullivan, 1998; Vilhelmson, 1999; Timmermans et al., 2002; Horner et al., 2012), whose keeping, processing and visualisation remains a challenging task for researchers. Recently there is a growing role of geographical information systems (GIS), which help us to analyse the records in diaries and questionnaires (see for example: Kwan, 2004; Kwan and Lee, 2004; Lee and Kwan, 2011). Time space diaries have two compulsory items – time and space, and there are several possibilities for optional items concerned, for instance, with the emotive load of stations and paths (McQuoid and Dijst, 2012), and with ICT context (Schwanen and Kwan, 2008), to name two, which can be seen as the most original. A more detailed description of the methodology used in this study follows.

3. Methods and data

The Czech Republic is a Central European country with slightly more than 10,600,000 inhabitants (2020 estimates), where nearly three quarters of the population live in urban areas. The trend in ageing of the Czech population can be clearly seen in the population statistics. This is reflected in an increase in the proportion of people aged 65 and over (currently nearly 20%, which is almost five percent more than ten years ago), an increasing median age of the population (42.1 years), and the values of indicators such as the old age dependency ratio (29.6) and total age dependency ratio (53.8) (Eurostat, 2019). Life expectancy in the Czech Republic currently exceeds 78 years (76 for men/82 for women), which is slightly higher than most post-socialist countries but lower than most of Western and Southern Europe (World Bank, 2019). The retirement age in the Czech Republic depends on the year of birth and (for women) also on the number of raised children. The current retirement age for a person who entered the labour force at age 22 is about 63 years. The retirement age is gradually

increasing, however, by two months per birth cohort until reaching age 65 (which was set by the Czech government as an upper age limit for retirement for people born in 1965 and later) (cf. OECD, 2020).

The survey of older adults presented here was part of a wider project studying the time-space behaviours of specific population groups, such as students, mothers on parental leave, disabled persons and older adults living in large Czech cities (see Frantál et al., 2012; Frantál and Klapka, 2020). The sample included 100 older adults living in the cities of Brno (N = 32), Olomouc (N = 35) and Ostrava (N = 33) (see Fig. 1).

The questionnaires were distributed by students of geography at the cooperating universities, to their grandparents living in the studied cities. The authors are aware that with respect to the focus of research on large cities and the sampling method (resulting for example in a higher representation of people with university education), the results do not provide a representative profile of the Czech older population. Our survey also did not include seniors living in retirement homes and similar social facilities, which represent almost one tenth of the older population in the country. Nevertheless, the objective of the study was not to generalise results to the entire population but to explore specific relationships, particularly differences in the perception of social-spatial isolation with respect to socio-demographic characteristics and daily activities. The basic characteristics of the sample are found in Table 1. The sub-samples of respondents for individual cities did not differ significantly with regard to age, gender, number of children or the proportion of economically active people. In the city of Brno, however, there was a higher proportion of respondents with a university education, who reported slightly more working hours as well as higher household incomes. These differences, however, did not affect the results regarding the daily activities or the perceptions of socio-spatial isolation (as will be shown below).

We explored (using space time diaries and questionnaires) the daily activities of older people and their perceptions concerning isolation and loneliness over three days (Monday, Wednesday and Saturday) in the first week of October. Early October was chosen to avoid the more extreme weather conditions that can negatively affect the mobility of older people (and their ability and willingness to take part in out-of-home activities) during the summer and/or the winter periods (see for example: Böcker et al., 2017). The questionnaire consisted of three sections. The first included an assessment of the frequency of at-home leisure activities and their duration during a day, and the frequency of activities occurring out-of-home, including part-time work. The second section aimed at the subjective perceptions of space-time constraints of daily activities and perceptions of socio-spatial isolation, which was measured using a newly-developed (by the authors) scale consisting of 9 statements (see Tab. 5, items 1–9), with a 5-point Likert response format. The first 9 items (if aggregated as an additive scale) showed a coefficient of reliability (Cronbach's $\alpha = 0.685$), which can be considered as acceptable or satisfactory (see Taber, 2018).

The statements were defined considering previous studies and scales measuring isolation and loneliness among older adults: specifically, the 'social disconnectedness scale' and the 'perceived isolation scale' (Cornwell and Waite, 2009), 'scales for emotional and social loneliness' (Gierveld and Van Tilburg, 2010), and the 'UCLA loneliness scales'



Fig. 1: Case study areas

Indicator	Category	Share [%]		
		Males	Females	Total
		(N = 34)	(N = 66)	(N = 100)
Age (years)	less than 65	12	24	21
	65–69	40	38	39
	70–74	24	12	15
	75–79	6	14	12
	80 and more	18	12	13
Education	Basic or secondary without GCE	18	21	20
	Secondary with GCE	49	46	47
	Tertiary	33	33	33
Number of children	0	0	8	5
	1	19	22	21
	2	69	49	56
	3 or more	12	21	18
Household income (CZK)	less than 20,000	42	57	52
	20,000–29,000	39	27	31
	30,000–39,000	15	12	13
	40,000 and more	4	4	4
Living alone	yes	3	15	11
	no	97	85	89
Work during retirement	yes	36	30	32
	no	64	70	68

Tab. 1: Basic characteristics of the survey sample

Source: authors' survey

(Russell, 1996; Penning et al., 2014). Besides that, we have included statements related to the concept of active ageing (Rantanen et al., 2019). Another item (10) was added asking about attitudes to work during a retirement. The third part included socio-demographic characteristics.

The data were digitalised and analysed using SPSS software v.24, applying descriptive statistics, the Analysis of Variance (ANOVA) for different groups, Principal Components Analysis (PCA) for identifying specific components of socio-spatial isolation, a bivariate cross-correlation analysis of independent variables against values of extracted components (statistical significance was tested using Pearson's r correlation coefficient, and examining the p -value for each pair of variables), and finally the linear regression modelling for determining relationships between selected leisure time activities and sociodemographic indicators as independent (explanatory) variables and the components of socio-spatial isolation as dependent variables.

4. Results and discussion

The analysis and presentation of results is divided into four sections, following the research questions. First, the relative frequencies of work and leisure at-home and out-of-home activities of people are investigated. Second, the space-time constraints are explored and their relationship to specific daily activities and groups of older people are analysed. Third, subjective perceptions and attitudes of older people are explored, and specific components of social-spatial isolation are identified. Fourth, the relationships between sociodemographic characteristics and daily activity patterns

(as independent variables) and social-spatial isolation and its partial components (as dependent variables) are analysed and discussed.

4.1 Daily activity patterns

About one third (32%) of older people from our sample still work at least part-time. For this group, 44% worked less than 40 hours a month, 28% between 40 and 80 hours, and 28% more than 80 hours a month (5 people worked full-time). Working activity significantly negatively correlates with age ($r = -0.379$, $p < 0.01$). Two thirds of seniors under the age of 65 reported working, almost one third in the age group 65–69 years, but only one tenth among those older than 70 years. The proportions of working seniors in our sample are higher than those shown by national surveys (Czech Statistical Office, 2019), however, which is probably because our surveys were carried out in large cities, where there are more opportunities to obtain a job than in rural areas, and due to a relatively younger and more educated sample compared to general elderly population. Overall, nearly 10% of people aged 65 to 74 in the Czech Republic are economically active, which is about the EU-28 average (Eurostat, 2019). The share of economically active Czech older people is higher than in most South-European countries, but it is lower than in Scandinavian and Baltic countries or the UK (*ibid.*).

The frequencies of selected at-home and out-of-home leisure activities are presented in Figures 2 and 3. Figure 2 shows the average duration (estimated by the respondents themselves) of specific leisure activities during their typical day. The time spent watching TV represents the biggest part of older peoples' days (except for sleep time), on average

exceeding three hours. On average, older people spend slightly less than two hours per day in active rest (walks, exercises and the like), and reading books and magazines. Less than one hour per day is spent on the Internet and by calls with relatives and friends. As concerns the out-of-home activities, the most frequently performed activities (as reported by the respondents) are walks around the residence and shopping in the neighbourhood, which people do several times a week. Visits to the city centres, meeting friends and trips to nature are realised usually several times a month. The visits to shopping malls, restaurants and cultural events are realised on average just once a month or even less frequently.

There are very large variances between the frequencies of activities realised by different groups of seniors, however. In order to perform a deeper analysis of these differences,

we calculated the overall activity index (as the sum of the frequencies of all leisure time activities). The overall activity index could theoretically vary between 0 (minimum) to 60 (maximum). The mean value was 25.2 and median value 25.0. Three categories of activity rate (involving roughly the same number of respondents) were created for the purposes of subsequent analyses: low (less than 20), medium (20-29), and high (30 and more). Table 2 presents differences in the proportion of respondents in these categories in sub-sets of the sample.

We found significant differences in the level of activity according to age, work activity and income (Tab. 2). On the other hand, there are not significant differences in the frequency of activities according to gender and education (not included in the Table). The only specific activity that is significantly affected by education is the use of the Internet,

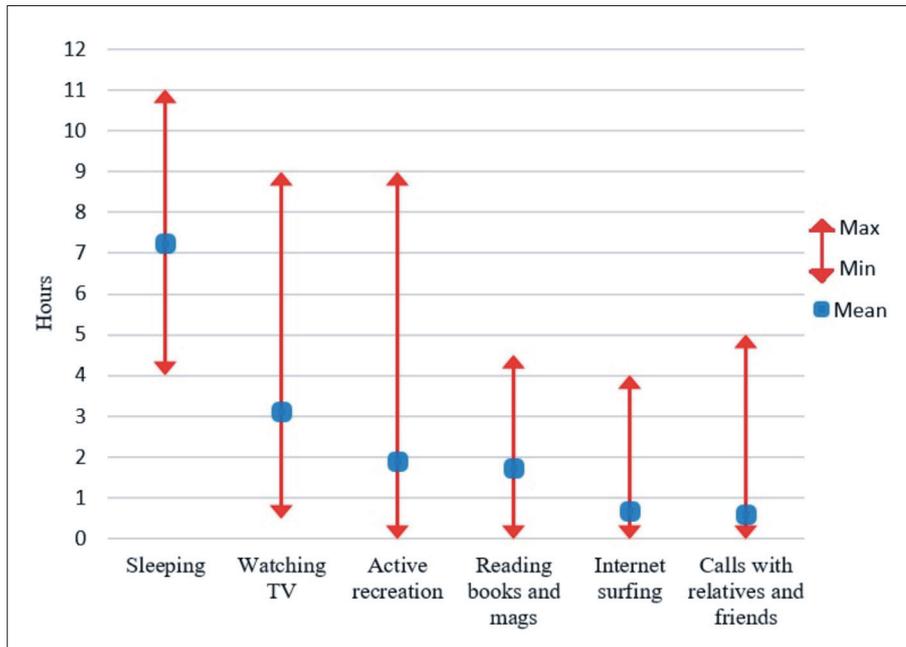


Fig. 2: Average daily duration of selected leisure activities. Source: authors' survey

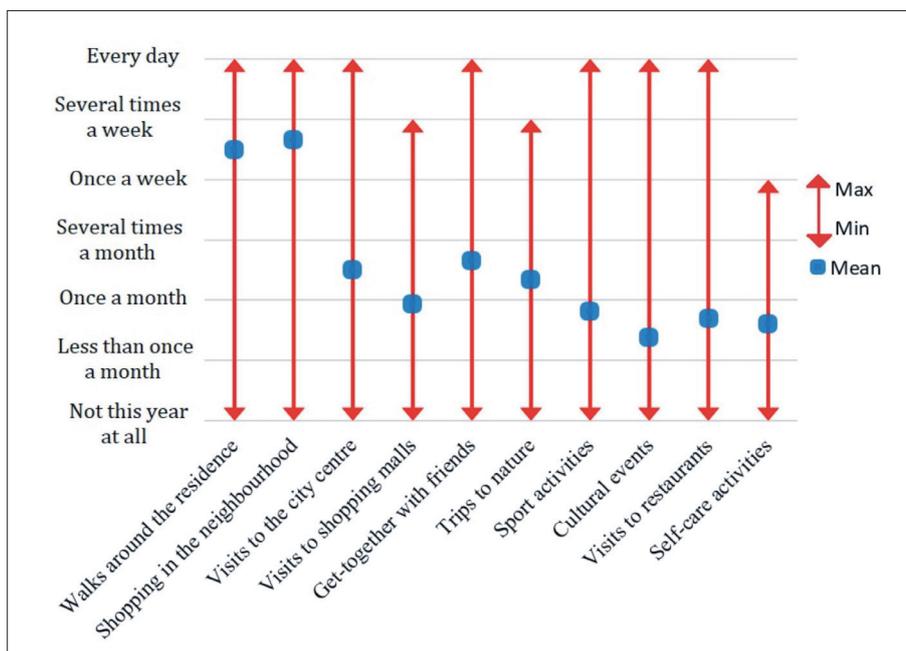


Fig. 3: Frequency of selected out-of-home activities. Source: authors' survey

Category		Activity Index			Kendall's tau-b ¹	ANOVA ²		
		Low (< 20)	Medium (20–29)	High (30+)		Mean	F	Eta
Age	Less than 65 years	22%	56%	22%	– 0.205*	25.2	3.584	0.365**
	65–69 years	13%	45%	43%		27.4		
	70–74 years	31%	44%	25%		25.4		
	75–79 years	37%	37%	26%		24.2		
	80 and more years	54%	46%	0%		20.0		
Work	Less than 40 hours	7%	64%	29%	– 0.220*	27.9	2.878	0.407*
	40–80 hours	11%	22%	67%		28.4		
	more than 80 hours	33%	67%	0%		23.3		
Household income (CZK)	Less than 20,000	27%	35%	39%	– 0.179*	25.5	1.353	0.201
	20,000–29,000	26%	48%	26%		25.3		
	30,000–39,000	8%	92%	0%		25.6		
	40,000 and more	100%	0%	0%		18.8		

Tab. 2: Differences in the levels of activity of older people

Notes: ¹The values of nonparametric correlations between categories of Activity Index and categories of age, work and household income. ²The result of the Analysis of Variance (ANOVA): mean values of the Activity Index for each group of seniors, F-test and Eta coefficients. The correlations/effects are statistically significant at *0.05 level.

Source: authors' survey

and the only specific activity that is significantly affected by gender is self-care (specifically visits to hairdressers and cosmetics, which are much more frequent for female respondents). The highest level of activity is shown by people aged 65–69, and with increasing age the frequency of activities decreases continuously. The level of activities is negatively correlated with working hours, which increase household income but probably reduce the amount of leisure time. This is also the reason why seniors under the age of 65, who have the highest working hours and thus have higher incomes, show a lower rate of leisure activities than seniors aged 65–69. The only specific activity that is significantly affected by education is the use of the Internet, and the only specific activity that is significantly affected by gender is self-care (specifically visits to hairdressers and cosmetics, which are much more usual for women). The only daily activity that showed significant differences in its frequency between the studied cities is the use of the Internet and social networks. Specifically, older people in Brno spend twice as much time (75 minutes per day) on the Internet as people in Ostrava (28 minutes per day) and Olomouc (32 minutes per day), which is probably due to a higher proportion of people with a university degree in the Brno sub-sample.

The differences in the level of activity according to age can be well illustrated also by the comparison of the measures of spatial mobility, particularly the number of paths made and stations visited per day, and the average distances travelled

per trips and per day (see Fig. 4 and Tab. 3). With increasing age, the number of stations visited during the day and the total distance travelled per day decrease significantly.

4.2 Space-time constraints

The daily activities of people are affected by many constraints. In total, both health conditions and financial opportunities were mentioned as fundamental constraints by nearly 60% of older persons. Family commitments and transport mobility are principal constraints for 25% and 22% respectively of older people in total. These results are in line with previous studies (see for example: Baltes et al., 1990; Izumiyama et al., 2007; Paiva, 2013). Among other specific constraints that limit the time that Czech older people spent for leisure activities were the weather conditions, the need to work in the garden and care for pet dogs. The importance of the last two-mentioned constraints can be considered above average in the context of Europe, as the Czechs are regarded as a nation of gardeners and breeders of dogs and cats (see e.g. FEDIAF, 2017). We can assume that working activities and leisure-time activities in particular are influenced by numerous other factors that are related more to the lifestyle of the individual, and by extension to the individual's cultural and social capital (cf. Vidovičová and Petrová Kafková, 2012).

The relative importance of specific constraints affecting the participation of older persons in daily activities, as perceived by different age categories, is presented in

Measures/Age category	Less than 65	65–79 years	80 and more
Number of paths made per individual per day	3.33	3.00	1.60
Number of stations visited per individual per day	3.75	3.05	2.25
Average distance travelled per individual per path (km)	7.05	5.13	5.26
Average distance travelled per individual per day (km)	23.50	15.40	8.40

Tab. 3: Selected measures of daily mobility of older people in Brno city

Source: authors' survey

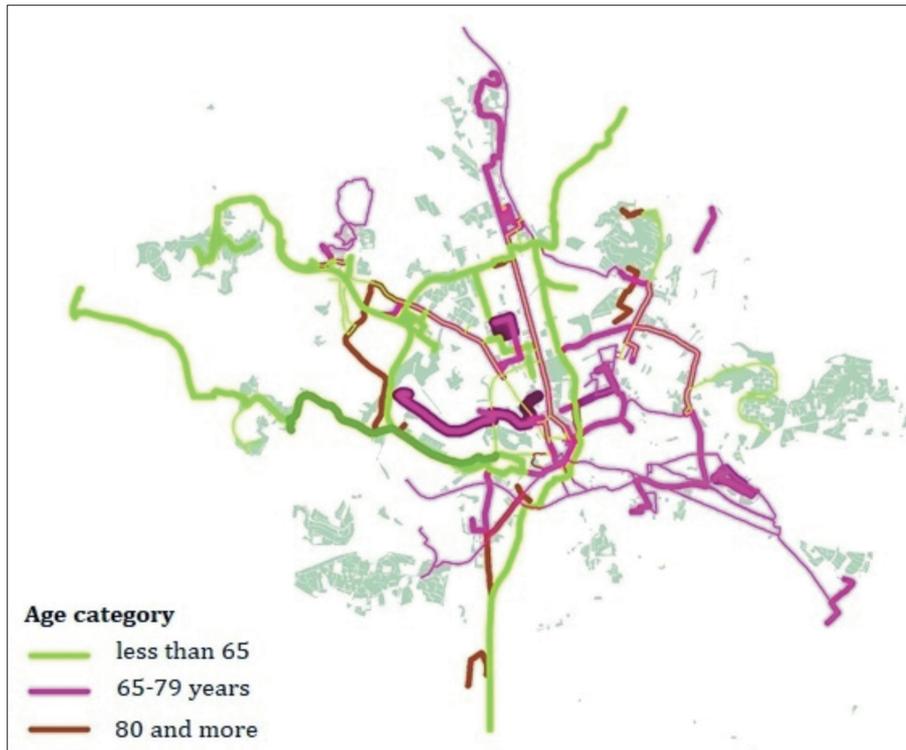


Fig. 4. Visualisation of paths of older people living in city of Brno per one weekday in October
Source: authors' survey

Figure 5. It is evident that the effect of health conditions and transport mobility increases with age, while the importance of family commitments (e.g. care for grandchildren or other family members) and work duties declines with age. The role of financial opportunities increases with age up to 74 years, but then it declines significantly for people over 75 years.

Older people who consider health conditions a primary constraint for their activities (given their age) reported more frequent reading books and magazines at home and shopping in the neighborhoods, while they showed lower frequencies of meeting friends at out-of-home places and they also reported significantly less work activities (see Tab. 4). Financial constraints significantly affect the frequency of using the Internet and engaging social networks as well as the frequency of visiting sport activities. In the city of

Olomouc, there is a significantly smaller proportion of older persons who perceive work duties as an essential constraint for their leisure activities, which is due to a significantly smaller frequency of people with a university degree in the group (also with fewer working hours). The people who work more (younger and more educated people) spend less time on watching TV and shopping in the neighborhood, while they devote more time to sport activities.

The family commitments are positively correlated with the number of children and negatively with age. The people who consider family commitments as principal constraints, however, more often get together with friends and visit shopping malls. Transport mobility significantly affects the frequency of visits to cultural events, shopping malls and restaurants, but also walks around the residence. Transport

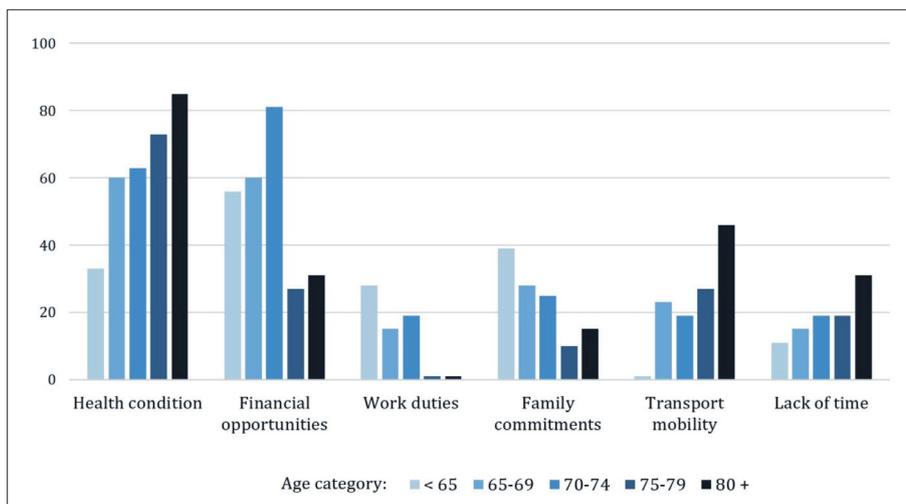


Fig. 5: The relative importance of specific space-time constraints
Note: Columns show percentage of respondents who consider the constraint primary for her/his daily activities
Source: authors' survey

Predictors/Constraints	Health conditions	Financial opportunities	Work duties	Family commitments	Transport mobility	Lack of time
Age	+		-	-	+	+
Gender (Female)					+	+
Education			+			
Place of residence			+			
Living alone						
Number of children				+		
Household income		-	+			+
Work activity	-		+	+		+
Active rest (walks, exercises)						
Reading books and mags	+					
Internet & social networks		-			-	
Watching TV			-	-	+	
Walks around the residence					-	
Trips to nature						
Sport activities		-	+			
Cultural events					-	
Get together with friends	-			+		
Visits to restaurants					-	
Shopping in the neighbourhood	+		-			
Visits to shopping malls				+	-	
Legend:						
		Correlation significant at 0.01 level				
		Correlation significant at 0.05 level				
	+/-	Positive/Negative correlation				
		Statistically non-significant correlation				

Tab. 4: Correlations between perceived constraints, socio-demographic characteristics and specific daily activities
Source: authors' survey

mobility is a primary constraint more likely for older persons and females. This result supports the theory that mobility is a highly gendered problem and space-time constraints operate differently in the everyday lives of men and women (see for example: Schwanen et al., 2008). The previous studies pointed out that female mobility is characterised by some specifics, such as trip-chaining, time poverty, less frequent use of the car, a lower number of stations visited per day and the uneven distribution of time among them (see: Nordbakke, 2013; Peters, 2013; Gauvin et al., 2020).

It may seem surprising that the older a person is, the greater the lack of time she/he perceives, even though being much less active as concerns the spectrum and frequency of activities (see Tab. 2). This perception of a lack of time, however, can be explained by the fact that older people often have physical difficulties, limited options for mobility, and lack of family support, which limit the time for leisure activities by increasing the time spent on daily mandatory activities (self-care, cooking, etc.) and travelling, and limits access to urban space and some activities to determined temporal periods (cf. Ohmori et al., 1999; Paiva, 2013). Paiva (2013, p. 7) speaks in this context about the “temporal convergence of activities”.

The level of activity or passivity of older people is also influenced by economic status. The effects of financial resources as a constraint on the participation in leisure

activities, however, loses its relevance for people older than 75 (and particularly for those older 80 years), when the relative role of health and mobility becomes essential. The other constraints that can significantly limit the participation of older people in leisure activities (as reported by existing literature) are perceptions of inhospitality or insecurity related to some urban spaces – areas of cities (Paiva, 2013), ways of travel (Sundling, 2015), and/or time periods during a day (e.g. fears of going out in the evening, which limits the possibility of leisure time activities, see also the paper by Šimáček et al. in this Special Issue).

4.3 Perceptions of socio-spatial isolation

Table 5 presents the distribution of responses for each scale item represented by statements about the perceptions of social isolation, loneliness, availability of time and activity. Almost one third of older respondents admit that they spend almost all their time at home since they retired, and slightly less than one third of respondents has often feelings of loneliness (specifically 12% strongly agree and 15% agree on ‘having often feelings of loneliness’). These numbers are hardly comparable with existing studies from other countries due to different methodologies and the measurement tools used. While some authors report up to 15% of older adults feeling often lonely (see for example: Pinqart and Sorensen, 2001; Tomstad et al., 2017), other studies report 20 to 40 percent feeling lonely (see the literature review in

Statement / Response [%]	Strongly agree (1)	Agree (2)	Neither (3)	Disagree (4)	Strongly disagree (5)	Mean	Std. Deviation	Variance
1) I spend almost all my time at home since I retired	10	21	16	18	35	3.47	1.41	1.99
2) I am actively involved in news from former work and work specialisation	42	27	8	15	7	2.17	1.31	1.74
3) I can spend a lot of time meeting my friends and acquaintances	37	33	16	9	5	2.13	1.16	1.34
4) I can spend a lot of time learning and increasing my professional skills	22	39	23	9	7	2.40	1.14	1.30
5) In retirement, I can focus more on my hobbies that I couldn't do before	23	41	17	12	7	2.39	1.17	1.37
6) I can make me happy by buying something nice for myself	39	30	15	12	4	2.12	1.17	1.38
7) I can talk and share my troubles and joys with my partner and family	42	27	19	9	3	2.05	1.12	1.25
8) Our children have their own worries and do not have much time to visit us	5	28	14	32	21	3.35	1.23	1.52
9) I have often feelings of loneliness since I retired	12	15	20	25	28	3.42	1.36	1.80
10) When retirees work, they cannot enjoy retirement so well	11	16	18	34	21	3.38	1.29	1.65

Tab. 5: Descriptive statistics of older people's attitudes
Source: authors' survey

Luo et al., 2012, p. 907). The aim of this study, however, was not to present absolute numbers but to explore specific relationships, particularly differences in perceptions with respect to socio-demographic characteristics and daily activities, which will be discussed in more detail in the following section.

In order to explore the structure of relations among specific statements and to find out if they can be divided into groups representing specific aspects (components) of social-spatial isolation, we applied a Principal Components Analysis (PCA). The results of PCA are presented in Table 6, and they were generated using the Varimax rotation solution with measures of the Kaiser-Meyer-Olkin test of sampling adequacy ($KMO = 0.620$) and Bartlett's test of sphericity ($p < 0.001$) confirming the relative appropriateness of the selected variables for the PCA. The first two components were much stronger (their Eigenvalues were 2.43 and 1.61) than the remaining one component, and account for 45% of the variability of item responses from the sample. The total variance explained by three extracted components is then nearly 61%.

The extracted components represent new variables, aggregate indices expressing weighted (according to the observed factor loadings of individual items) additive scores of the rate of agreement or disagreement of respondents with the original inter-related statements. In relation to their semantic meaning, we chose the following labels: (1) Passivity; (2) Isolation; and (3) Loneliness. Then we worked with these new variables, trying to identify differences in the perceptions of older people according to their sociodemographic characteristics and the share of time and frequency of daily home and out-of-home activities.

4.4 Relationships between daily activity patterns and socio-spatial isolation

We used a correlational analysis to examine the relationships between the component and the sociodemographic characteristics and daily activities of older people (see Tab. 7). Isolation is perceived more likely by people in older age groups (who spend most of their time at home and have less activities and social contacts), while loneliness is reported more likely by females. This is in line

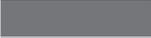
Statement	Components		
	Passivity	Isolation	Loneliness
I can spend a lot of time meeting my friends and acquaintances	0.841		
I can spend a lot of time learning and increasing my professional skills	0.800		
In retirement, I can focus more on my hobbies that I couldn't do before	0.589		
I spend almost all my time at home since I retired		0.746	
Our children have their own worries and do not have much time to visit us		0.659	
I am actively involved in news from former work and work specialisation	0.415	– 0.648	
I can make me happy by buying something nice for myself			0.727
I can talk and share my troubles and joys with my partner and family		0.344	0.699
I have often feelings of loneliness since I retired			– 0.683

Tab. 6: Principal components analysis of older people's attitudes

Notes: Varimax rotation solution; $KMO = 0.620$; $p < 0.001$. Only factor loadings over 0.3 are presented in this Table.
Source: authors' survey

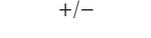
Predictors/Factors	Passivity	Isolation	Loneliness
Age		+	
Gender (Female)		+	+
Education		-	
Living alone			
Number of children			+
Household income	-	-	
Work activity		-	
Active rest (walks, exercises)	-		
Reading books and mags			
Internet & social networks	-	-	
Watching TV		+	
Walks around the residence	-		
Trips to the nature		-	-
Sport activities	-	-	
Cultural events	-		-
Get together with friends	-	-	
Visits to restaurants	-	-	-
Shopping in the neighborhood		+	
Visits to shopping malls			-

Legend:

 Correlation significant at 0.01 level

 Correlation significant at 0.05 level

+/- Positive / Negative correlation

 Statistically inconclusive correlation

Tab. 7: Correlations between sociodemographic characteristics, daily activities and socio-spatial isolation
Source: authors' survey

with existing knowledge (see for example: Pinquart and Sorensen, 2001; Perissinotto et al., 2012). It is interesting that we have also found a positive correlation between loneliness and the number of children. It can be hypothesised that people with more children, who were used to living in a large family, are more likely to suffer from the separation from children and lonely life in old age. While work activity and income negatively correlate with passivity and isolation, they have no effect on the perception of loneliness. More educated people are less likely to feel isolated.

Surprisingly, we found no relationships between whether a person lives alone or with a partner and the subjective perceptions of passivity, isolation and loneliness. This finding is in contradiction to most other studies, which reported living alone among the key determinants of loneliness (Cornwell and Waite, 2009; Tomstad et al., 2017; Igarashi, 2019). No significant differences in the perceptions (of space-time constraints and socio-spatial isolation) between three studied cities have been detected, which indicates a relatively similar quality of life of older people in the regional cities in this study.

There are positive effects of the frequency of some leisure activities on the reduction of isolation and loneliness, particularly, trips to nature, sport activities, visits to cultural events, visits to restaurants and meeting friends. Also, work activity, which significantly affects the economic status of people, has a positive effect on increasing daily activities and decreasing isolation. These results confirm existing hypotheses that older people who are more active in everyday life activities or activities such as employment, are generally

happier and are more positive in current assessments of their lives (cf., Vidovičová and Petrová Kafková, 2012). The time spent on the Internet and social networks also has a positive effect on decreasing the level of isolation. In this respect, one issue is that many Czech seniors still have a lower level of digital literacy and relatively worse access to high-speed Internet (also due to financial opportunities) than their peers in Western and Northern European countries (Eurostat, 2020).

The time spent watching TV and shopping in the neighbourhood are associated with the perception of isolation. On the other hand, the frequency of visits to shopping malls and/or supermarkets in the city centres, have a positive effect on reducing the perception of loneliness. This difference well illustrates the significant role of 'place' in the realisation of a specific activity (e.g. shopping) in the perception of isolation. For socially isolated people, visits to supermarkets and shopping malls not only serve meeting basic needs (such as the purchase of food), but they constitute forms of recreational activities, entertainment, medical movement, strengthening social contacts, and a change in environment and 'escape from the stereotype' (cf. Vidovičová and Petrová Kafková, 2012; Křižan et al., 2018; Frantál and Klapka, 2020).

It is, however, more complicated to visit the shopping malls (most of which are located on the outskirts of the cities in this study) or other services and/or sport or cultural facilities for older people, who have limited transport mobility (no access to a car) and thus they have to spend more time travelling by public transport.

4.5 General linear model relationships

In order to provide a more general overview of these phenomena for older persons, we estimate a linear model accounting of the relations between the three components of socio-spatial isolation (from Tab. 6: Passivity, Isolation and Loneliness) and the socio-demographic characteristics of sample respondents and their activities, i.e. accounting for the interdependencies between the independent variables (compared to the simple correlations used earlier in the exploratory work). The analytical design, then, is as follows.

Three independent models, using Passivity, Isolation and Loneliness as dependent variables (DVs) and the selected sociodemographic and activity variables as independent variables (IVs):

$$DVs = \alpha + \{\beta_i \text{ Sociodemographic IVs}\} + [\beta_j \text{ Activity IVs}] + (\beta_k \text{ Interactions}) + \varepsilon,$$

where

- Sociodemographic IVs = gender; education; income (categorical); age (covariate);
- Activity IVs = trips to the nature; sport activities; cultural events; get together with friends; visits to restaurants; shopping in the neighbourhood (covariates);
- Interaction terms are limited to the sociodemographic IVs (e.g. gender*income); and
- $\beta_1 \dots \beta_k$ are the regression coefficients associated with terms in the models.

Estimation of these three models (using the General Linear Model procedure in SPSS v.27) proceeds as follows: at stage 1 all variables are entered into the equation and from the estimated model, the IV with the lowest level of significance ($\alpha = 0.05$) is then excluded from the model specification and the model is re-estimated. At stage 2, this is repeated and another IV is then excluded on the same basis ... until the model is stable with respect to significant IVs. For this analysis, the sociodemographic variables are included at all stages regardless of their significance levels (especially when they are reported in interaction terms). Finally, we note that the set of activity variables is a sub-set of all such variables, chosen partly on the basis of the simple correlations between activities and sociodemographic variables (Tab. 7), but also in this instance to retain the power of the model because of the limited sample size. The results of these analyses are interesting because of their independent nature (the DVs are independent of each other) such that interpretations of the model results are incremental and additive.

4.5.1 Model 1: Passivity

The final estimated model for Passivity is presented in Table 8. The omnibus model for Passivity ($p = 0.0001$) is very significant, with a R^2 of 0.343, indicating that slightly more than one-third of the variations in Passivity can be accounted for by the covariations and interactions between the IVs in this model. It is important to keep in

Source	Regression coefficient	df	Mean Square	F	Sig.
Corrected Model	–	12	2.634	3.479	.000
Intercept	– 0.45	1	1.385	1.829	.180
Age (covariate)	0.02	1	2.252	2.975	.088
Sport activities	– 0.18	1	9.274	12.248	.001
Gender (categories)	0.24 ¹	1	1.797	2.373	.127
Income (categories)	Main effect	2	3.181	4.201	.018
	Low vs. High Income ²	1			.002
	Medium vs. High Income ²	1			.036
Education (categories)	Main effect	2	1.861	2.458	.092
	Basic vs. Tertiary Education ³	1			.211
	Secondary vs. Tertiary Education ³	1			.004
Gender * Education	{see text}	2	1.697	2.242	.113
Income * Education	{see text}	3	4.145	5.474	.002

R Squared = 0.343

¹ baseline category is Female; ² baseline category is High income (> 30,000.00); ³ baseline category is Tertiary educational level

Tab. 8: Dependent Variable: Passivity

Source: authors' computations

mind that the effects of any one variable are estimated in holding constant the effects of all the other IVs in the final model. Interestingly, the principal effect in the model is Sport activities, which might be expected since the higher the levels of sport activities the lower the levels of Passivity (negative coefficient: -0.18 , $p = 0.001$). From the point of view of the sociodemographic variables, income has a strong effect ($p = 0.018$), largely driven by the higher income respondents (less passive), as well as the interaction between education and income ($p = 0.002$) as both more highly educated and higher income respondents reported

lower levels of Passivity. The gender effects point to higher levels of Passivity for females, and this is also important for the interaction between Gender and Education.

4.5.2 Model 2: Isolation

The final model for Isolation is presented as Table 9. The model for Isolation has a higher level of explanatory power than Model 1, with an R^2 of 0.521 ($p = 0.0001$), and with many more activities included in the final estimates. But the model appears to be driven primarily by gender ($p = 0.002$), as the negative regression coefficient indicates that females

Source	Regression coefficient	df	Mean Square	F	Sig.
Corrected Model	–	12	3.910	7.246	.000
Intercept	2.07	1	0.918	1.700	.040
Age	– 0.02	1	1.389	2.575	.113
Trips to nature	0.13	1	3.034	5.622	.020
Sport activities	0.12	1	4.194	7.772	.007
Get together with friends	0.13	1	2.244	4.158	.045
Shopping in the neighbourhood	– 0.19	1	3.122	5.785	.018
Gender (categories)	– 0.80 ¹	1	5.606	10.389	.002
Income (categories)	Main effect	2	0.809	1.500	.229
	Low vs. High Income ²	1			.200
	Medium vs. High Income ²	1			.860
Education (categories)	Main effect	2	2.010	3.724	.028
	Basic vs. Tertiary Education ³	1			.790
	Secondary vs. Tertiary Education ³	1			.000
Gender * Education	{see text}	2	1.725	3.196	.046

R Squared = 0.521

¹ baseline category is Female; ² baseline category is High income (> 30,000.00); ³ baseline category is Tertiary educational level

Tab. 9: Dependent Variable: Isolation

Source: authors' computations

are more isolated than males (in the context of accounting for the constant effects of all other variables in the model). Add the significant effect of education ($p = 0.028$) and the interaction between gender and education ($p = 0.046$) and the importance of these sociodemographic variables for Isolation is well established. In contrast, income does not appear to play an important role in accounting for variations in Isolation. As well, several of the activity variables are important in this model: Trips to nature, Sport activities, Get together with friends and Shopping in the neighbourhood. Compared to Model 1, then, Sport activities is joined by a number of other 'out-of-the-house' activities (positive regression coefficients, except for neighbourhood shopping) which reduce feelings of Isolation.

4.5.3 Model 3: Loneliness

The final model for discussion concerns Loneliness (see Tab. 10). This model is the least explanatory of those examined ($R^2 = 0.234$), while still significant ($p = 0.002$).

The main effect of Gender continues here ($p = 0.002$), indicating that females are more likely to express feeling of Loneliness than male respondents. Visits to restaurants also contributes significantly to this model ($p = 0.002$), but in a negative manner. The apparently weaker results from this model remind us that this is the third of the three Principal Component scores and hence has higher residual variance.

Overall, these three models point to some important aspects of the feelings of isolation and loneliness expressed by respondents in our sample. For Passivity, the income and education effects are primary, with an important contribution from sport activities. For Isolation, the gender effects are most important, as well as education and the interaction of gender and education. But added to this second model are several activity variables, including once again sports activities. The third model for Loneliness again highlights the importance of gender. Apart from some of the outdoor activities, the principal IVs affecting levels of the

Source	Regression coefficient	df	Mean Square	F	Sig.
Corrected Model	–	7	3.085	3.701	.002
Intercept	– 0.77	1	0.289	0.347	.558
Age	0.02	1	0.990	1.188	.279
Visits to restaurants	– 0.22	1	8.322	9.985	.002
Gender (categories)	0.66 ¹	1	8.297	9.956	.002
Income (categories)	Main effect	2	0.533	0.639	.530
Education (categories)	Main effect	2	1.696	2.035	.137

R Squared = 0.234

¹ baseline category is Female

Tab. 10: Dependent Variable: Isolation

Source: authors' computations

various indicators of loneliness are income, allied strongly with education, and gender. The latter factor appears to be most significant in this study: loneliness is gendered.

5. Conclusions and policy implications

The aim of this exploratory study was to provide new empirical evidence about the significant role of daily activities and ways of spending free time in older adults' objective behaviours and their subjective perceptions of socio-spatial isolation during their retirement. With respect to the issues raised in the introductory and theoretical sections, the current study contributes to the limited attention paid to the perception of daily activities in time-geographic research, including the design of time-use diaries. Such perceptions are also quantitatively assessed and compared to 'real' activities as recorded in time-use diaries. Our research further contributes to more general issue of quality of life in old age using the apparatus of time geography. From a methodological perspective, we tested a newly-constructed measurement scale consisting of nine items that can be used for measuring and analysing the subjective socio-spatial isolation of older adults. The Principal Components Analysis of data revealed that socio-spatial isolation consists of several components, specifically Passivity, Isolation and Loneliness, which are positively and negatively affected by different factors, the socioeconomic characteristics of people and their daily activities. The study results support the hypotheses that socio-spatial isolation is a multidimensional phenomenon and that isolation and loneliness are place-dependent and gendered issues.

This research project revealed that there is a considerable group of older people (about one third) living in Czech large cities who often feel being lonely and isolated, since they spend most of their time during retirement at home. Our empirical model supports the hypothesis that socio-spatial isolation is significantly affected by age and related health conditions, in particular, which affects the spectrum and frequency of participation in daily at-home and out-of-home activities. The activities which significantly help decreasing the perceptions of socio-spatial isolation include particularly trips to nature, sport activities, cultural events, get together with friends, and visits to restaurants. On the other hand, the frequency of watching TV and shopping in the neighbourhood are positively associated with isolation. Work activities, which significantly affect the economic status of people, have also a positive effect on reducing passivity and isolation of older people.

Almost one third of older people admit that their children and/or grandchildren have their own worries and do not have the time to associate with them. Our analysis detected that loneliness is more likely perceived by women than men, and by people who have more children. This suggests that people (particularly women) who lived in households with more children feel more loneliness in old age, when the frequency of personal contacts with children and grandchildren decline. Modern information and communication technologies, the Internet and social networks can play a very important role in this regard (particularly today in the Covid-19 era).

The participation of older people in daily activities is affected by many constraints, particularly health conditions, financial opportunities and transport mobility. The influence of health conditions and transport mobility as constraints increases almost linearly with age, while the importance of

economic status increases with age up to 74 years, but then its role significantly declines. Our data reveal that the older a person is, the greater the lack of time she/he perceives. This indicates that older people more likely have physical difficulties and limited options of mobility, which (together with lack of family support and other constraints) limit the time for leisure activities by increasing the time spent on daily mandatory activities and travelling. Transport mobility as an essential constraint of activities is more likely perceived by women, which confirms the theory that mobility is a highly gendered issue, as well as Isolation and Loneliness more generally (from the results of the general linear model).

What are the implications of this study for policy and practice? First, policy interventions should seek to improve the job offers and possibilities of flexible working, as well as motivational programs for older people to enable them to remain economically active, which would help both to raise their living standards and decrease their socio-spatial isolation. It is relevant in this respect that only about fourth of older people think that when retirees work (even part-time), they cannot enjoy retirement as well. Second, there is a need to focus on increasing older peoples' digital skills (including information literacy), which will allow a higher involvement of older people in Internet communication and social networks, but also the use of the Internet for education, work activities, shopping, et cetera, which have become significantly more important in the covid-19 era. Third, urban and transport planners should take better account of the specific needs of older people and improve the possibilities, accessibility and safety of public transport to places that are key stations and points of interest for the elderly.

Our analysis did not find any significant differences in the frequency of out-of-home work and leisure activities of older people living in the three investigated cities (Brno, Olomouc, Ostrava), nor in their perceptions of space-time constraints and socio-spatial isolation. It indicates a relatively similar level of the quality of life of older people in these three regional cities. It would be appropriate to focus future research on the comparison of cities of different order categories and spaces (urban, semi-urban, rural areas), using as representative population samples as possible. For example, a recent study by Lee (2020) reported that those who live in a rural area or village scored lowest on loneliness than people living in urban areas, which should be examined further. Further research should also turn its attention to other social groups, which are at risk of socio-spatial isolation and which are for the time being rather neglected by geographers, such as single mothers (and fathers), the long-term ill or disabled persons (Osman and Pospíšilová, 2019), for example.

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