UNIVERSITY OF ICELAND

Activity Spaces II:

impact of mobility patterns on wellbeing

Project report for Vegagerðin

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Höfundar skýrslunnar bera ábyrgð á innihaldi hennar. Niðurstöður hennar ber ekki að túlka sem yfirlýsta stefnu Vegagerðarinnar eða álit þeirra stofnana eða fyrirtækja sem höfundar starfa hjá

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Project goals

Rapidly growing urban populations are one of the biggest contributors to climate change. Thus, it is crucial that urban areas support a good quality of life while reducing greenhouse gas emissions. It has been shown that dissatisfaction with the urban environment, along with e.g. densification, can lead to increased emissions from various compensatory behaviours (i.e. long-distance travel or increased consumption of goods). Studies have noted these patterns in the Nordic context, including in Iceland. It has also been noted that it is not just enough to provide a certain urban form, but a city should rather meet the needs of people holistically. A significant aspect of building a quality urban environment is the wellbeing of people living in it, neighborhood by neighborhood rather than only as a whole. After all, Iceland has been named as one of the happiest places on Earth. That is why we wanted to know how everyday mobility forms activity spaces and how they connected to people's life satisfaction.

How is life satisfaction distributed across space in Reykjavik and how does this connect to neighborhood qualities and locations? Are there any "happiness hotspots" and if so, where are they and what might be driving them? The study was conducted using GIS mapping tools, quantitative and qualitative analysis. We utilised softGIS survey data collected in the Reykjavik Capital Area.

The aim of the project was to investigate how life satisfaction is distributed across the urban space in the Reykjavik capital area and how it connected to neighbourhood qualities. The project continued the work of the previously funded project "Activity spaces: a novel approach to describing urban mobility and designing low-carbon development" where activity spaces were mapped for the first time in Reykjavik and connected to GHG emissions from leisure travel (Raudsepp et al., 2023). Now, the mapped activity spaces were used to assess mobility, interaction with the urban environment and the connection to wellbeing.

The project set out the following goals:

1. To map "happiness" in the Reykjavik Capital Area and identify areas of high and low "happiness"
2. To gather observational fieldwork data and analyse the identified high and low "happiness" areas qualitatively
3. To investigate the connections between mobility in the form of activity spaces and "happiness"
4. Based on the previous points, suggest improvements for urban planning

The project goals were well aligned with Vegagerðin's strategy (Vegagerðin & KPMG, 2019). It contributed to information and knowledge (Upplýsingar og þekking) about urban mobility patterns in Reykjavik and its association with wellbeing. Furthermore, thanks to the academic collaboration, the results of the project can be disseminated and used as educational material for university students. The project aligns with the following UN SDGs: 11.6, 13.2, 13.3, 17.16, 17.17. The project also aligns with the Icelandic government's climate goals in section "Land transport" (A1-A3) as it studies the connection between mobility and wellbeing in the Icelandic context (Umhverfis- og auðlindaráðuneytið, 2020). The project contributed to a more holistic understanding of the Reykjavik urban environment, how it might be impacting wellbeing, and how it all relates to mobility.

1 Background

Climate change has become an existential threat to our living environment, vastly due to anthropogenic impact on global systems (*IPCC 1.5° Report*, 2018). We have already crossed the threshold of several planetary boundaries, indicating the urgency of climate change mitigation efforts to maintain favorable living conditions on our planet (Richardson et al., 2023). Some of the biggest environmental impacts come from the transportation sector, particularly in populated areas (IPCC, 2021). Within this context, cities are crucial components in climate change mitigation (Bai et al., 2018; Hertwich & Peters, 2009; IPCC, 2021).

A commonly utilised strategy in urban planning has been densification, with the aim of reducing emissions, mainly via reduction in car use and daily travel distances, living space and infrastructure needed per capita (Ewing & Cervero, 2010, 2017; Glaeser & Kahn, 2010). However, smaller living spaces in dense areas typically have more services around them, leading people to consume more goods and services outside of the home (Heinonen et al., 2013), if their economic status supports it. Furthermore, higher emissions from air travel have been noted as an unintended side effect of densification (Holden & Linnerud, 2011; Holden & Norland, 2005). Although people living in central densely built urban areas might use less cars (Heinonen et al., 2021), they partake in more long-distance leisure travel compared to residents of other areas (Árnadóttir et al., 2019; Czepkiewicz, Heinonen, et al., 2018), counteracting the emissions reduced from daily travel (Czepkiewicz et al., 2019; Czepkiewicz, Ottelin, et al., 2018; Ottelin et al., 2014, 2017). Previous studies have shown that even those who have pro-environmental attitudes take several long-distance leisure trips, increasing their GHG emissions (Árnadóttir et al., 2019; Czepkiewicz et al., 2019). A common reason for travelling is to improve one's wellbeing (Raudsepp et al., 2021).

Wellbeing and life satisfaction have been identified as influencing factors of personal GHG emissions for people living in urban areas. Urban form and land use impacts wellbeing (Badland et al., 2017; Olsen et al., 2019; Perchoux et al., 2013), but is dependent on context (Kyttä et al., 2016; Mouratidis, 2019). What is more, compact cities can increase wellbeing if people's needs are understood and met (Kyttä et al., 2016; Mouratidis, 2019). It would therefore be insightful to explore how the city in its current form is impacting its citizens. Indications of wellbeing being affected by wider environmental exposure in urban environments, particularly related to daily mobility, has also been noted in Reykjavik (Raudsepp et al., 2021).

Reykjavik urbanites have been found to be highly mobile, resulting in high average emissions (Czepkiewicz et al., 2019) due to the high rates of deeply rooted car-ownership and car-use for daily travel (Heinonen et al., 2021). The issue needs a multi-

faceted solution focused on behavioral and technological changes. The energy grid in Iceland is sustainable, but it is not enough to curb the emissions of Icelanders today (Dillman et al., 2021).

The aim of urban planning should be to encourage walkability and using public transport because these have a lower environmental impact than commuting long daily travel distances by car (Abastante et al., 2020; Ewing et al., 2006). Increased active mobility and public transit can also impact one's health positively, both mentally and physically, through reducing stress, creating a cleaner living environment and encouraging a more active lifestyle (Frank et al., 2006). Although people tend to choose their modes of transport based on convenience and travel time, rather than the environmental or health benefits related to them (Næss et al., 2018), if neighbourhoods were structured to support walking or cycling, people would follow suit and walk or cycle more (Tijana et al., 2023).

What is more, urban planning in the Reykjavik Capital Area has received criticism recently, raising concerns regarding reduction of green spaces (Logadóttir et al., 2020), pedestrian safety on streets (Ragnarsson, 2024), lack of light in apartments (Logadóttir et al., 2020; Pálsdóttir, 2022; Reynisson, 2022) and overall densification reducing the quality of life (Logadóttir et al., 2020). It is important, therefore, to examine the satisfaction with urban planning in the Capital Area and what might be influencing it in different locations. Sustainable urban planning can have an impact of the wellbeing and happiness of urban residents (Baschera & Hahn, 2023).

Unpacking human mobility with activity spaces

Activity spaces describe the spatial and temporal dimensions of locations which people visit regularly (Golledge & Stimson, 1997; Schönfelder & Axhausen, 2004). They provide an understanding of which urban spaces an individual interacts with on a regular basis (Järv et al., 2014), especially outside of the person's residential environment. Activity spaces can be defined by home location, number of activity locations near the home, duration of living at home location, trips within the neighbourhood (that is the immediate environment), travel to and from regularly visited locations, and travel between and around centres of daily life (work, school, etc.) (Schönfelder & Axhausen, 2016). Activity spaces consider a wider spatial dimension which enables researchers to take a look at daily mobility and the broader range of environments a person interacts with regularly (Perchoux et al., 2013).

Activity spaces enable urban planners to consider the wider impact of the city on its residents (Holliday et al., 2017; Li et al., 2018) and to respond to residents' needs in both their immediate and broader living environments. Activity spaces have been used

in a variety of domains, including research in health sciences (Holliday et al., 2017; Laatikainen et al., 2018; Vallée et al., 2011), epidemiology (Perchoux et al., 2013), urban planning (Parthasarathi et al., 2015), transportation planning (Tribby et al., 2016), and society (Silm & Ahas, 2014; Wong & Shaw, 2011).

2 Materials and methods

The project is based on softGIS survey (aka Public Participation GIS, or PPGIS) data gathered in 2017 in the Reykjavik Capital Area. PPGIS joins traditional surveying methods with online mapping, allowing people to answer questions by marking locations on a map (Brown & Kyttä, 2014; Czepkiewicz, Jankowski, et al., 2018). The method has been used in urban environment research, providing insights for improved urban planning (Hasanzadeh, 2021). The survey asked respondents about their residential location, travel habits, attitudes, life satisfaction, and socio-demographic background. The target group of the survey were 25-40-year-old residents of the Capital Area. Total number of respondents was 706, with usable responses for spatial analysis from 667 respondents in total. The full questionnaire is available for viewing at https://app.maptionnaire.com/en/2294/.

The focus of this project was on studying well-being in the form of life satisfaction, and how that relates to people's activity spaces. Life satisfaction variables used for this purpose are described in section 2.1. Initial activity spaces were mapped within a previously funded project ("Activity spaces: a novel approach to describing urban mobility and designing low-carbon development" (Raudsepp et al., 2023)) using GIS and the quantitative data from the softGIS survey. The activity space mapping was based on the individualized home range model developed by Hasanzadeh et al. (Hasanzadeh et al., 2017). The process of activity space modeling will therefore not be described in detail here, but we will provide an overview of activity space related variables used in this project in section 2.2.

2.1 Life satisfaction variables

The wellbeing concept considers the quality of life and the ability to participate in the world with purpose. It should consider social, economic and environmental conditions (WHO, n.d.). In literature, wellbeing has been broadly divided into subjective and objective, with the former focusing on self-reported wellbeing and the latter on more independent ways of measuring wellbeing (Voukelatou et al., 2021). A big part of subjective wellbeing is eudaimonic wellbeing which is related to the value a

person places on something and their sense of purpose (Ryan & Deci, 2001; Veenhoven, 2009; Voukelatou et al., 2021).

In this project we focus on subjective wellbeing to study the perception of people living in the Reykjavik Capital Area about their urban environment. This will be examined using life satisfaction scale as a measure. Life satisfaction is considered to be a component of wellbeing (Huta & Waterman, 2014; Lucas et al., 1996; Ryan & Deci, 2001; Veenhoven, 2009) and has been widely used in studies on subjective wellbeing (Charlemagne-Badal et al., 2015; Oishi, 2010). However, it is important to acknowledge that life satisfaction does not necessarily result in happiness or vice versa (Ruggeri et al., 2020). Life satisfaction changes over time and is influenced by cultural context, individual values, socioeconomic factors, mood, order of survey questions, and comprehension or interpretation of survey questions (Diener et al., 2013; Huta & Waterman, 2014; Pavot & Diener, 2008; Ruggeri et al., 2020; Ryan & Deci, 2001; Veenhoven, 2009; WHO, n.d.).

It has been reported that Nordic countries have overall high to very high life satisfaction compared to global means, averaging at 7.5 out of 10 (Ziogas & Ballas, 2024). This will be our reference point within this project. Simply put, when we talk about low satisfaction within the Icelandic context, globally that might be considered as medium satisfaction levels.

The PPGIS survey included 10 questions, most of which can be classified as measuring eudaimonic wellbeing (Table 1). People could answer on a scale of 1-10 from “not satisfied at all” to “very satisfied”.

Table 1. Life satisfaction variables in the PPGIS survey

Satisfaction category	How satisfied are you with… ?	Wellbeing type
Total life satisfaction	your life as a whole these days	
Material standard of living	your material standard of living	material
Health	your current state of health	eudaimonic
Personal relationships	your personal relationships	eudaimonic
Engaging in community or society	feeling part of your community	eudaimonic
Local environment	the quality of your local environment	material
Job or studies	your main occupation such as job or studies	eudaimonic
Sense of achievement	things you are achieving in life	eudaimonic
Free time	the amount of time you have to do things you like doing	eudaimonic
Safety	how safe you feel	eudaimonic

2.2 Activity space variables

Activity spaces were calculated within the project “Activity Spaces I: a novel approach to describing urban mobility and designing low-carbon development” and are described in more detail in that report (Raudsepp et al., 2023).

Size

Activity space size in km^2 was used as a variable to gauge how vast of an urban area a person interacts with during their day-to-day mobility.

Centricity

Based on the number of activity clusters, that is clusters of activity locations in close proximity of one another, people’s activity spaces were characterized by their centricity. This parameter helps to assess whether a person leaves their home neighbourhood or moves only within it, and also hints at whether they are highly mobile within the city by visiting many activity clusters regularly. Centricity is split into monocentric, where activity points are clustered only within the vicinity of the home, bicentric, where there is one cluster outside of the home area and one within it, and polycentric, where there are multiple clusters outside of the home area.

2.2 Spatial analysis

Spatial analysis was conducted with ArcGIS Pro 2.9. After an initial assessment of life satisfaction variables, a select few are examined further spatially to spot broader patterns within the urban environment. The chosen variables (explained more in chapter 3) were extrapolated to a population grid, based on the average life satisfaction of people within each grid cell or closest to the grid cell. Then, using the Optimized Hot Spot Analysis geoprocessing tool, a hotspot analysis was conducted. As a result, we present maps of the spatial distribution of some life satisfaction categories of interest. Red areas on the maps we have named “happiness hotspots”, and blue areas as “happiness cold spots”. It should be noted that the analysis involves estimation based on a small portion of residents living in the Capital Area at the time. The spatial analysis is an estimation made based on a small portion of residents living in the Capital Area (Figure 1). The aim of the spatial analysis is to show some indications of areas with high or low satisfaction.

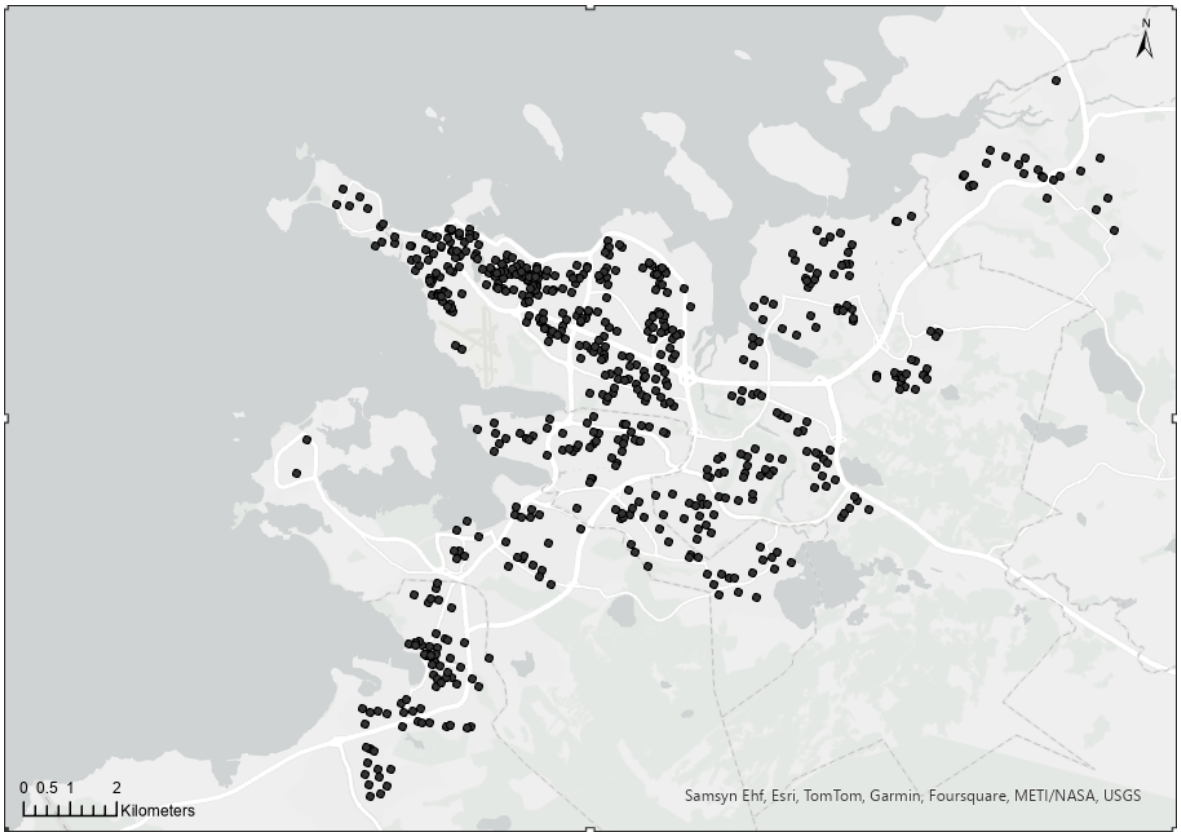

Figure 1. Spatial distribution of respondents in the PPGIS survey.

2.3 Qualitative analysis

The happiness hotspots and cold spots are analysed qualitatively with the help of online maps and fieldwork (photos of streets) with the aim of explaining what our spatial analysis is showing. We try to understand why certain areas are higher in satisfaction than others. The photos and fieldwork were used as a basis for a description of the areas. We also used the support of Google Maps and Já Kort to study the areas, their features, and transportation networks.

2.4 Statistical analysis

A comparison of means was made on the life satisfaction variables, providing a simple statistical overview of the distribution. To study the relationship between activity spaces and life satisfaction, we conducted a simple statistical analysis at first. Then, a bivariate analysis related to activity space size, centricity, and some transport and urban form variables was conducted to identify potential associations. Lastly, to look at the issue more in depth, we used an ordinal logit regression with life satisfaction as the dependent to examine in more detail what variables might be associated with

higher or lower satisfaction. In the regression setting, we control for sociodemographic background variables.

3 Analysis

It can be said that residents of the Capital Area are on average satisfied with their life (median ranging from 6-8 points) (Table 2), which follows previous studies about the Nordic countries (Ziogas & Ballas, 2024). A full statistical overview of the life satisfaction variables can be found in the Appendix (A.1).

The highest rated satisfaction categories were satisfaction with feeling safe (mean: 7.85), personal relationships (mean: 7.57) and things one is achieving in their life (mean: 7.29). On the other hand, lower mean satisfaction was related to the quality of the local environment (mean: 6.03), material standard of living (mean: 6.67) and feeling part of one's community (mean: 6.84) (Table 2).

Table 2. Short overview of wellbeing parameters in the PPGIS survey.

How satisfied are you with...?	N	Mean	Median	SD	25th	50th	75th
your life as a whole these days	667	7.35	8	2.2	7	8	9
your material standard of living	667	6.67	7	2.5	5	7	8
your current state of health	667	6.99	8	2.5	6	8	9
your personal relationships	667	7.57	8	2.3	7	8	9
feeling part of your community	667	6.84	8	2.6	6	8	9
the quality of your local environment	667	6.03	6	2.6	4	6	8
your main occupation such as job or studies	667	7.09	8	2.4	6	8	9
things you are achieving in life	667	7.29	8	2.1	7	8	9
the amount of time you have to do things you like doing	667	6.92	7	2.4	6	7	8
how safe you feel	667	7.85	8	2.2	7	8	9

We then decided to focus on four categories more closely. Firstly, total life satisfaction was examined as an overall measure of how people seemed to be doing in life. Secondly, the quality of the local environment, which was the lowest rated category, and which is of interest to us from an urban planning perspective. Thirdly, satisfaction with the material standard of living, which includes financial status, and which was the second lowest rated category. From literature, we also know that financial status can impact our general sense of wellbeing and thus how we perceive the urban environment around us.

Initially, we looked at the three variables of interest across postal codes in the Capital Area. For satisfaction with material standard of living, the lowest mean values were in 111, 108, 220, and highest values in 170, 210, 270. For satisfaction with the local environment, lowest values were in 102, 111, and highest values were in 104, 210, 270.

Overall, for total life satisfaction, lower values were noted in 108, 111, 220, and higher values in 201, 170, 104 (Table 3).

Table 3. Simple statistical overview of material, local environment, and total satisfaction with life across post codes in the Reykjavik Capital Area. Lowest values in blue, highest values in green.

		Material			Local Environment			Life (overall)		
Post code	N	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
101	75	6.91	8	2.45	6.92	7	2.235	7.6	8	2.144
102	8	6.75	7	2.493	**6.25**	6	2.493	7.38	8	2.669
103	33	6.67	7	2.78	7.18	8	2.27	7.7	8	2.172
104	42	6.76	8	2.658	**7.81**	8	1.55	**7.86**	8	1.788
105	72	6.92	7	2.419	6.93	7	2.334	7.25	8	2.55
107	35	6.83	8	2.584	7.17	8	2.595	7	8	2.859
108	69	**6.07**	7	2.642	7.23	8	2.224	**6.96**	7	2.047
109	23	6.61	7	2.589	7.35	8	1.991	7.09	7	2.151
110	35	6.71	7	2.383	7.29	8	2.023	7.23	8	2.184
111	17	**5.76**	6	2.562	**6.59**	7	2.476	**6.71**	8	2.568
112	39	6.31	7	2.83	7.28	7	2.212	7.23	8	2.334
113	20	6.95	7	2.164	7.3	7.5	1.75	7.45	8	1.986
170	9	**7.33**	8	1.871	7.33	8	1.936	**7.89**	8	1.167
200	46	6.67	8	2.565	7.43	8	2.115	7.28	8	2.363
201	21	6.9	7	2.406	7.52	8	1.632	**8.05**	8	1.774
203	15	6.87	8	3.461	7.53	8	3.044	7.27	8	3.035
210	25	**7.12**	8	2.603	**7.92**	8	1.681	7.32	8	2.036
220	49	**6.02**	7	2.57	7.14	7	1.926	**6.76**	8	2.521
221	25	6.72	7	1.948	6.96	8	2.282	7.44	7	1.981
225	2	7	7	1.414	7.5	7.5	0.707	8	8	1.414
270	23	**7.09**	8	2.627	**8.48**	9	1.123	7.65	7	1.465

3.1 Total life satisfaction

Mean of total life satisfaction was 7.35 (median: 8, stdv: 2.205) (Table 2).

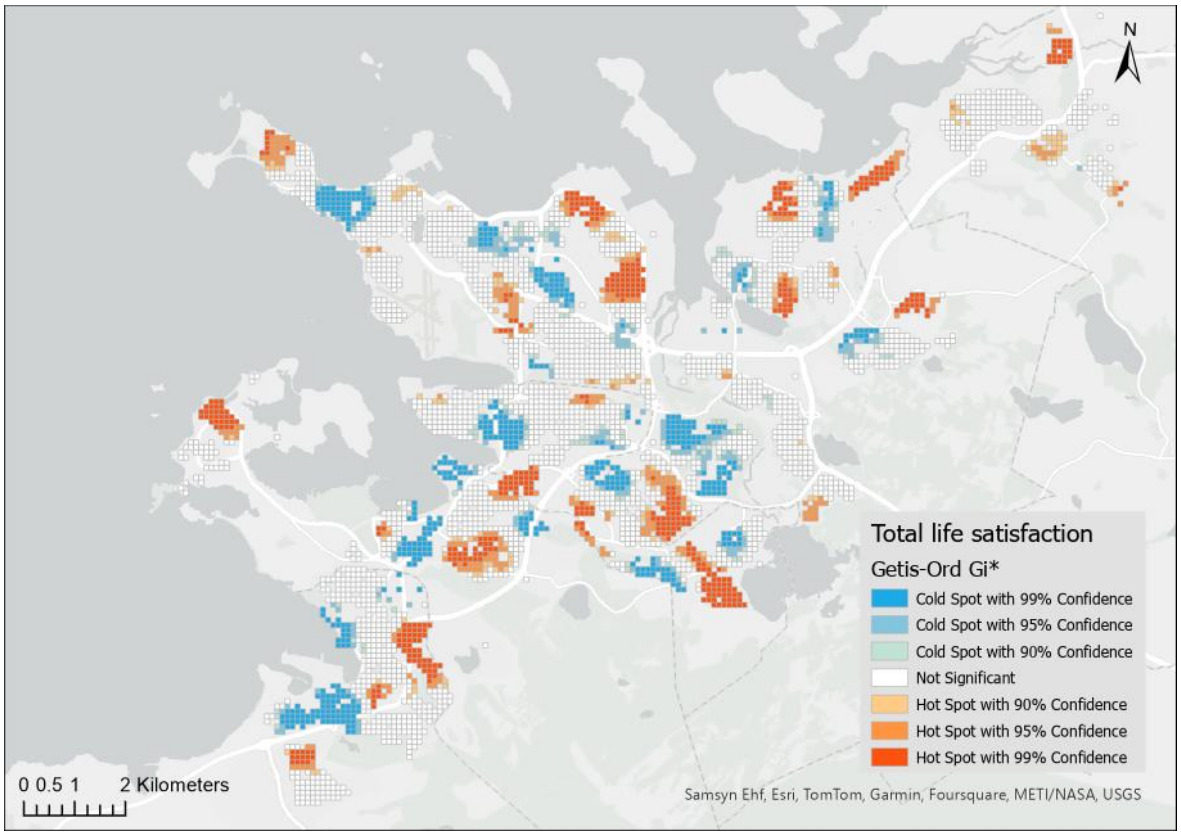

Figure 2. Total life satisfaction hot spots and cold spots in the Capital Area.

Total life satisfaction hotspots were concentrated in Seltjarnarnes, Álftanes, Lækir (105), Sund (104), Hæðar (210)/Smárinn (201), Sel (109), Vatnsendi (203), Flatir, Búðir, Lundir, Miðbær in Garðabær (210), Setberg area in Hafnarfjörður (221), Vellir (221), and Foldir, Borgir and Staðir in Grafarvogur (112) (Figure 2).

Cold spots were located in Vesturbær (107), Holt (105), Tún (105), Háaleiti Norður (108), Bakkar and Efra-Breiðholt (109), central Kópavogur and Lindir (200), central Hafnarfjörður and Hvaleyrarholt (220), Hraunsholt in Garðabær (210) (Figure 2).

3.2 Satisfaction with material standard of living

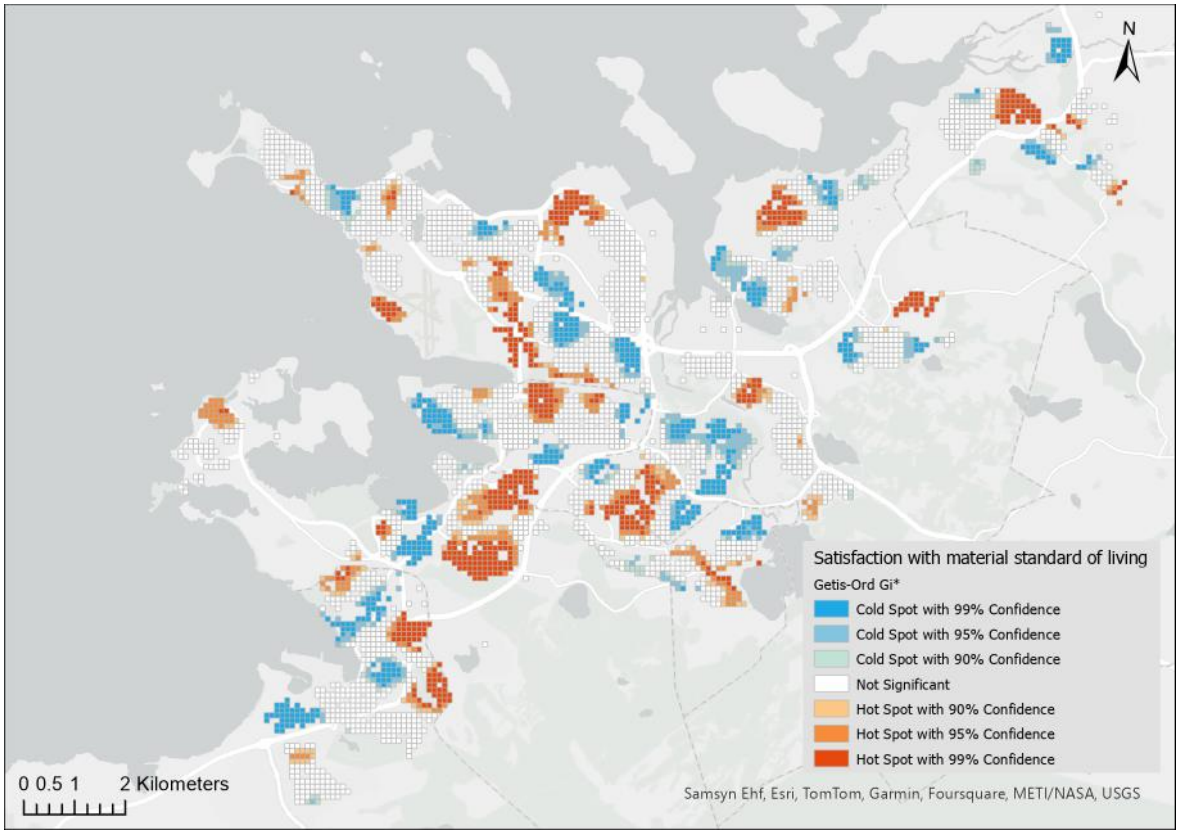

Figure 3. Satisfaction with material standard of living hot spots and cold spots in the Capital Area.

On average, the satisfaction with material standard of living had a mean value of 6.67 (median: 7; stdv: 2.525) (Table 2).

Hot spots were noted in areas like Garðabær (210), Kópavogur (Hamraborg, Smárinn, Grundir, Salir, Vatnsendi areas), in the Eastern parts of Hafnarfjörður, Álftanes, parts of Vesturbær, Skerjafjördur, Hlíðar, Lækir in Laugardalur, Sel in Hafnarfjörður, Borgir in Grafarvogur, and parts of Mosfellsbær (Figure 3).

Conversely, cold spots were spotted in Hafnarfjörður (center, Hvaleyri, Norðurbær), Hraunsholt in Garðabær, Kársnes (southern part), Efra-Breiðholt, Vesturbær near Grandar, Kringla, Háaleiti Norður, Gerði, Hamrar and Foldir in Grafarvogur (Figure 3).

3.3 Satisfaction with local environment

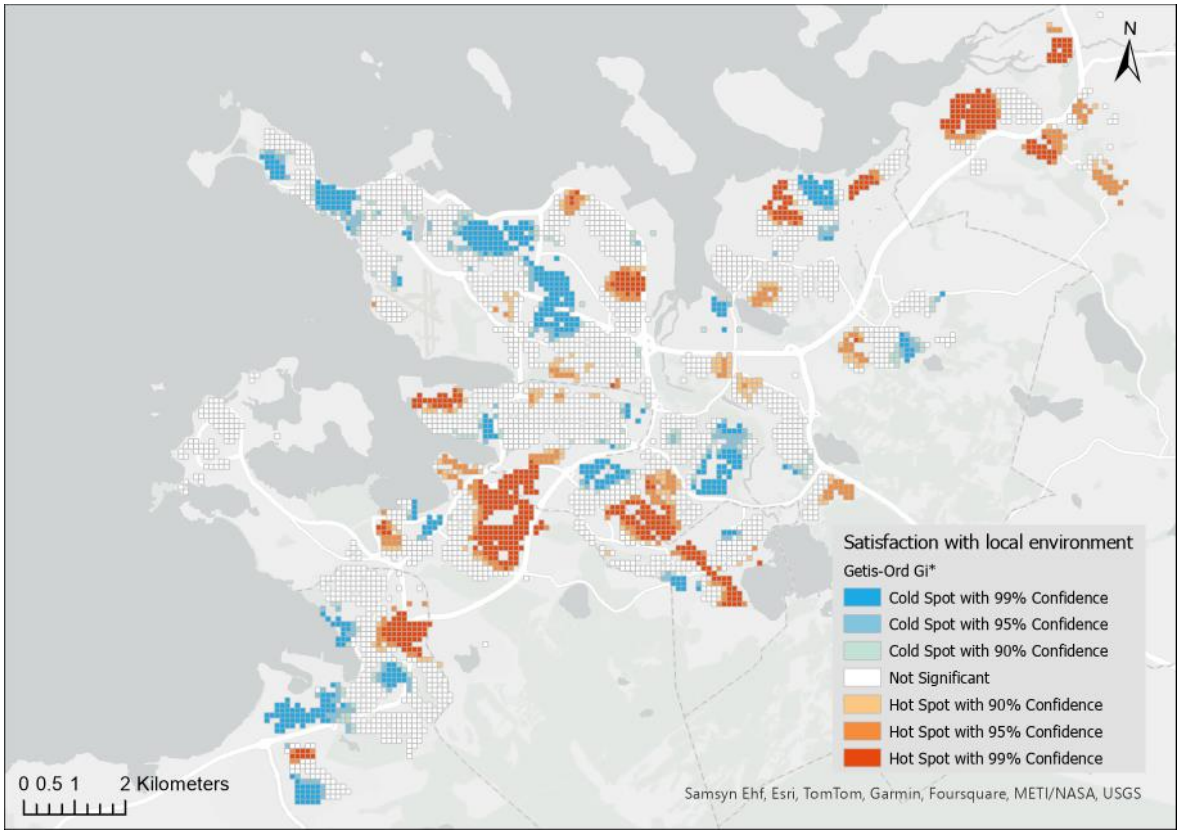

Figure 4. Satisfaction with local environment hot spots and cold spots in the Capital Area.

The mean satisfaction with local environment was 7.29 (median: 8; stdv: 2.107) (Table 2).

For satisfaction with the local environment, hot spots were situated in Lækir, Heimar, Kársnes (northern shore), Árnarneshæð, Smárinn, Kórar, Þing in Kópavogur, almost the entirety of Garðabær, Mosfellsbær, Borgir and Stadir in Grafarvogur, Hraun and northern part of Vellir in Hafnarfjörður (Figure 4).

In contrast, cold spots for satisfaction with the local environment were in Vesturbær and downtown around Hlemmur and Tun, Háaleiti and Kringla, Efra-Breiðholt, Vikur and Engi in Grafarvogur, Lindir in Kópavogur, Hvaleyrarholt, part of central area, Vesturbær and southern part of Vellir in Hafnarfjörður (Figure 4).

3.4 Examples of happiness hotspots

Garðabær

Life satisfaction in different categories was consistently high in the Búðir and Flatir area in Garðabær (Figures 5-8). In this area there are mostly single-family homes, most with gardens and private parking spaces. One could spot a relatively high number of newer cars by the homes, hinting at the wealthiness of the area. On the streets, one could see both high- and low-level vegetation (Figures 5-8). The area is situated on a hill and has views of nature thanks to that. Upon investigating maps of the area, we could see several playgrounds around the neighbourhood and schools at all basic levels. Essential services are located in the downtown area of Garðabær. The main grocery store in the area, Hagkaup, reflects the overall wealth of the area. The central area, with stores and health services and more, is potentially a 15-20-minute walking distance away from both Búðir and Flatir, although we could not see many people walking on the streets.

Figure 5. Foldir in Garðabær (October 2023). High level vegetation was visible on all streets.

Overall, the streets were relatively quiet, and we noticed that the residential area has a lower speed limit than the main road (Vifilstaðavegur) (Figure 8). The sidewalks looked tidy and were separated from the road by grass patches about a meter wide,

thus feeling safer for pedestrians (Figure 6-8). Public transport is limited in the area – lines 22 and 24, of which only line 24 drives within the neighbourhoods. Both lines are scheduled to run about every 30 minutes and within just few minutes of each other. However, during the fieldwork in the area, we could not see people waiting for the bus, nor people walking. Mainly people seemed to be moving around with their car.

Figure 6. Flatir in Garðabær (October 2023). Quiet streets with private houses, pedestrian path separated from the road, lots of visible high level vegetation by the street.

Figure 7. Flatir in Garðabær (October 2023). Pedestrian paths and crossings clearly marked, vegetation visible at street level, giving also privacy to private homes.

Figure 8. Foldir in Garðabær (October 2023). Low speed limit within the residential area. Speed limit ends as you drive to a bigger road.

Heimar in Laugarás

Another “happiness hotspot” emerged in the total life satisfaction and local environment categories in Heimar in Laugarás. The predominant housing type in the area is low rise multifamily homes (Figure 9). Many of the houses had their own shared garden spaces as well (Figure 13). Although not as much as in Garðabær, the streets still had visible high- and low-level vegetation throughout the area (Figures 9-13). There are many schools and social activity places nearby. Grocery stores are somewhat easily accessible by foot or by bus. There are also some cafes or bakeries in the area. Lastly, Heimar is right by Laugardalur park, zoo and recreational areas. Within the residential area the traffic was limited to 30 km/h and the roads did not seem busy (Figures 11-12). Bigger roads surrounding the area had more traffic.

Figure 9. Heimar in Laugarás (October 2023). Low rise multifamily homes on a typical street.

Figure 10. Heimar in Laugarás (October 2023). One of the main streets running through the area has only one lane going in one direction. Some trees and low level vegetation visible from the street.

Figure 11. Heimar in Laugarás (October 2023). Many high trees in the area, and low speed limit set within the residential zone.

Figure 12. Heimar in Laugarás (October 2023). Different levels of vegetation visible on the street, and low speed limits set within the residential zone.

Figure 13. Heimar in Laugarás (October 2023). Many of the buildings in the area have a garden.

3.5 Examples of cold spots

Efra-Breiðholt

A low-rated area in the examined life satisfaction categories was Efra-Breiðholt. The area is characterised by low- and high-rise apartment blocks (Figures 14-17), ranging between 3-7 stories, including the most populous living area on the island (Figures 15-16). The residential areas are surrounded by a lot of pavement, roads and parking lots, with not many garden spaces in between (Figures 15-17). Row houses (i.e. on Vesturberg) have some vegetation around them, but there is much less vegetation

around apartment blocks, mostly limited to empty grass patches. Visually, the high apartment blocks block daylight (Figures 15-16).

Efra-Breiðholt has relatively good access to essential services (affordable grocery stores, health care centres, etc.). It also has at least three different bus lines running through the area with connection options in the central station in Mjódd. In the valley below, there are a lot of walking trails and people can access natural areas quite easily. Despite this, the satisfaction of people living in that area remains low.

Figure 14. Efra-Breiðholt (March 2024). A pedestrian walkway in the central area of Efra-Breidholt.

Figure 15. Efra-Breiðholt (March 2024). Biggest apartment block in Iceland which is a high rise building. Large parking lot in front.

Figure 16. Efra-Breiðholt (March 2024). High rise apartment block in and parking lots. Building is decorated with street art.

Figure 17. Efra-Breiðholt (March 2024). Low rise apartment block with parking. Some high trees or bushes are visible.

Hvaleyrarholt

An area with generally lower satisfaction was in Hvaleyrarholt in Hafnarfjörður. The area can be characterized by low-rise apartment blocks (3-4 floors), with a few high-rise blocks (Figures 18-20). Areas in front of and between the houses are mostly paved, with some grass fields, but there is not much low- or high-level vegetation (bushes, trees) (Figures 18 and 20). The area sits on a hill with views of the ocean and golf courses visible. The apartment blocks seem to be spaced out a bit more than in Efra-Breiðholt, which results in less daylight blocking. However, we did not notice any playgrounds for kids or usable outdoor/green spaces for the residents of the area.

The roads in the area were not busy at the time of the fieldwork. Public transport is scarce – one bus line (21) running once every half an hour (Figure 19). There are no services or places for social gathering nearby. Closest grocery stores are across the highway in Vellir or in downtown Hafnarfjörður. They are accessibly on foot in roughly 20 minutes, but it is likely that most people do not walk to Vellir because they would have pass the highway. Still, the pedestrian paths were separated with a strip of grass about 1m wide from the main roads, increasing pedestrian safety somewhat. We

observed some pedestrians in the area, but nobody waiting for buses at the time of the observations. The area was generally quiet, although you could hear the noise from the highway (Reykjanesbraut).

Figure 18. Hvaleyrarholt in Hafnarfjörður (October 2023). Low rise multifamily homes or apartment blocks with garages underneath.

Figure 19. Hvaleyrarholt in Hafnarfjörður (October 2023). Mainly low rise apartment blocks and few high rise apartment blocks. Pedestrian path separated from the road. Bus stop on the main street passing through the area.

Figure 20. Hvaleyrarholt in Hafnarfjörður (October 2023). Low rise apartment blocks. There is green grass around the buildings and many parking spaces. Not many bushes or trees.

Kringlan/Háaleiti

Lastly, we looked at the area surrounding Kringlan. The area is characterised by mid-rise apartment blocks (about 5 floors) with some grassy areas in between and also parking lots (Figures 24-25). There are many schools and kindergartens in the area, which also amounts to more play-areas for children (Figure 22). Because of the distance between the blocks and the positioning of them, there did not seem to be too much daylight blocking, but it was difficult to assess because it was cloudy at that point in the fieldwork. Between the houses, there were some green areas with vegetation and nice walkways (Figure 23).

The area is very well connected by public transport and there is good access to all kinds of essential and non-essential services in the Kringlan area. On the other hand, the area is dominated by big multi-lane roads in all directions, so the noise from traffic was quite considerable (Figure 21). However, the pedestrian paths are separated from the road with grass strips, and there are also marked paths for cyclists.

Figure 21. View of Kringlumýrabraut (October 2023).

Figure 22. Little playground between buildings around Kringlumýrabraut. Lots of trees in the area. (October 2023)

Figure 23. Vegetated area between buildings west of Kringlumýrabraut. (October 2023)

Figure 24. Typical housing type in the Kringlumýrabraut/Háaleiti area (October 2023).

Figure 25. Vast grassy areas between houses by Kringlumýrabraut (October 2023).

3.6 Relationship between life satisfaction and activity spaces

A weak negative relationship was observed between satisfaction total life satisfaction and activity space size, whereas a weak positive relationship was noted between satisfaction with the local environment and activity space size (Figure 26). Satisfaction in the three categories was lowest for people with monocentric activity spaces and highest for people with polycentric activity spaces, indicating a possible link between

mobility (and the ability to lead a mobile lifestyle) and happiness (life satisfaction) (Table 4).

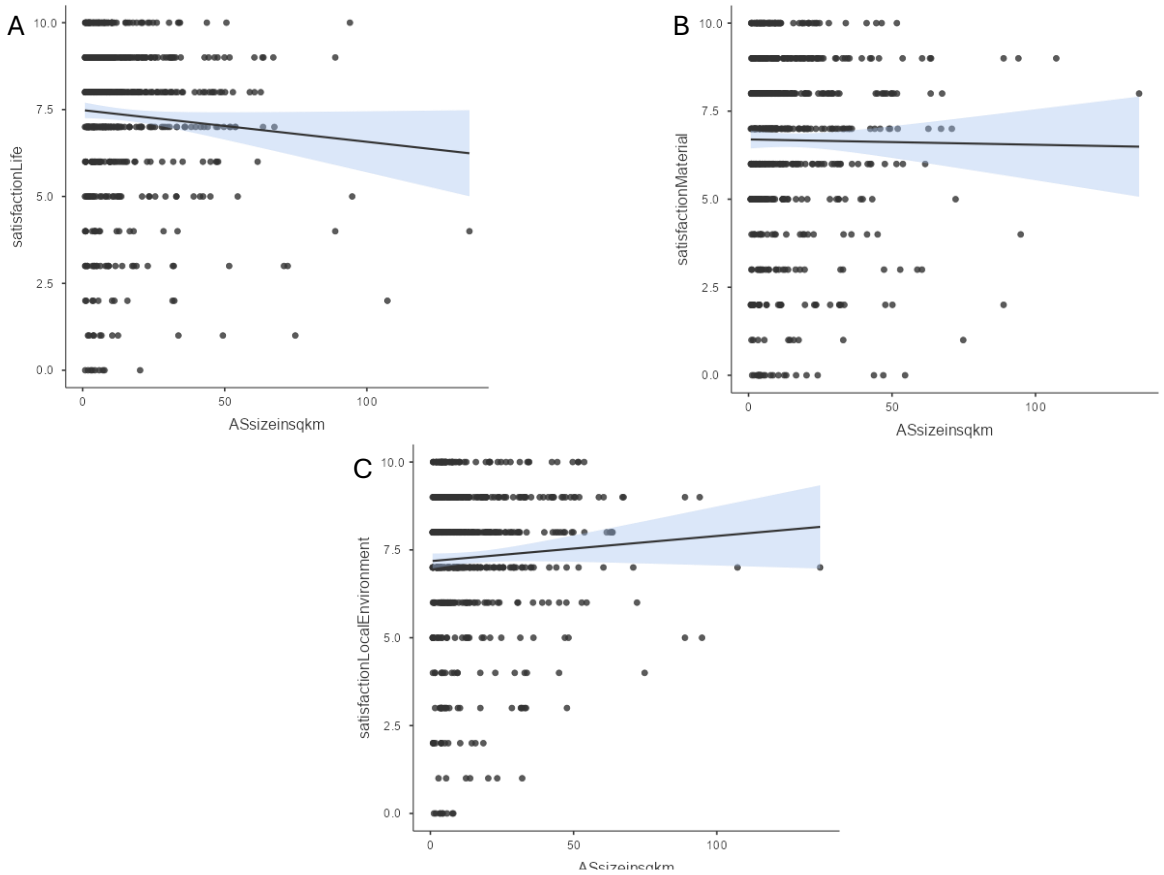

Figure 26. Relationships of life satisfaction parameters with activity space size in km^2. A) Total life satisfaction; B) Satisfaction with material standard of living; C) Satisfaction with the local environment

With that in mind, we also looked at car ownership and saw that people who do not own a car are less satisfied with their material standard of living, their local environment and with their life overall, by about one point less compared to those who have a car. Furthermore, living within walking distance of more public transport connections seemed to be related to somewhat higher satisfaction in the three categories, but all within a 1-point difference from most connections to least (Table 4). This indicates that having access to some forms of motorized transport could be important to happiness (higher life satisfaction).

Lastly, living closer to the city center was indicative of slightly lower satisfaction with the local environment (within 1-point margin) but slightly higher satisfaction with material standard of living and total life satisfaction (less than 0.5-points difference, however) (Table 4).

Table 4. Overview of averages of material, local environment and total life satisfaction for activity space centricity types, car ownership, distance of home to the city center, and public transportation zones based on departures.

			Material			Local environment			Total life satisfaction		
		N	Mean	Median	SD	Mean	Median	SD	Mean	Median	SD
Centricity	Mono	41	5.95	6	2.46	6.54	7	2.36	6.85	8	2.47
	Bi	133	6.47	7	2.67	7.07	8	2.38	7.23	8	2.62
	Poly	493	6.79	7	2.48	7.41	8	1.99	7.42	8	2.05
Car	No	75	5.95	7	2.92	6.63	7	2.58	6.87	8	2.63
	Yes	592	6.77	7	2.46	7.37	8	2.03	7.41	8	2.14
Distance to city center	Less than 1km	58	6.79	7	2.59	6.74	7	2.35	7.53	8	2.36
	1-3km	134	6.89	8	2.47	6.94	7.5	2.41	7.14	8	2.53
	3-7km	198	6.61	7	2.55	7.53	8	1.92	7.51	8	1.95
	7-12km	220	6.62	7	2.54	7.39	8	1.97	7.3	8	2.2
	Over 12km	57	6.51	7	2.52	7.44	8	2.11	7.25	7	2.09
Public transport zone	10+ departures	46	7.17	7.5	2.29	7.48	8	1.86	7.8	8.5	2.15
	4-10 departures	278	6.79	7.5	2.52	7.52	8	1.98	7.38	8	2.03
	under 4 departures	201	6.54	7	2.51	7.25	8	2.07	7.37	8	2.25
	no connections	142	6.48	7	2.62	6.82	7	2.4	7.1	8	2.48

The connections were also examined within an ordinal regression setting. All examined models were statistically significant, with R2 values ranging between 0.07 to 0.15. However, the assumption of proportional odds was not satisfied. Below we bring out some significant results at 95% and 90% confidence levels that were associated with the life satisfaction categories.

Total life satisfaction

People with very high incomes were more likely to have higher satisfaction with life overall. While being in a single-adult household (living alone) was indicative of the opposite. Also, as AS size increases, respondents were less likely to have a higher satisfaction with life overall (Appendix A1).

At a 90% confidence level, living further than 12km from the city center was associated with a lower likelihood of having higher satisfaction. While being female, working overtime and living in an intensive public transit zone (10+ departures within 5-min walking distance) were associated with higher likelihood of having higher total life satisfaction (Appendix A1).

Satisfaction with material standard of living

Low education level was associated with being more likely to have lower satisfaction with material standard of living. In contrast, having a high and very high income was

indicative of a higher likelihood of having a higher satisfaction with one's material standard of living (Appendix A2).

At a 90% confidence level, increase in age and living more than 3km from the city center were associated with a lower likelihood of having higher satisfaction with one's material standard of living. On the other hand, living in a medium intensive PT zone (4-10 departures within 5-min walking distance) and having a polycentric AS type were associated with a higher likelihood of having higher satisfaction with one's material standard of living (Appendix A2).

Satisfaction with the local environment

Female gender and having very high income were associated with a higher likelihood of having higher satisfaction with the local environment (Appendix A3).

At a 90% confidence level, high education level and working overtime were associated with a higher likelihood of having higher satisfaction with the local environment. While living in a shared household (that is a household with more than two adults, but no children) was associated with a lower likelihood of having higher satisfaction with the local environment (Appendix A3).

4 Discussion and conclusion

The project discussed the impact of one's local environment and mobility patterns on wellbeing in the Reykjavik Capital Area, using activity spaces as a novel method within this context. Below we will summarize and discuss the key takeaways of the project. The project set out to:

1. map "happiness" in the Reykjavik Capital Area and identify areas of high and low "happiness";
2. analyse the identified high and low "happiness" areas qualitatively;
3. investigate the connections between mobility in the form of activity spaces and "happiness";
4. suggest improvements for urban planning.

Not owning a car and having poorer access to public transport were associated with lower satisfaction with life, material state and local environment. This was reflected also in relationships with activity spaces. People with monocentric AS were less happy than those with polycentric activity spaces. In a regression setting, it was evident that there is a likely concentration point to daily mobility patterns and happiness. Namely, as activity space size increased, the likelihood of being satisfied with life overall reduced (Appendix A1). At the same time, as activity space size increased, satisfaction with the local environment increased (Figure 26), indicating that the areas we interact with on a broader scale in the city can have some impact on how we feel about the area we live in (Raudsepp et al., 2021). Also, if people interact with a broad urban area, the feeling of satisfaction with the local environment might be dominated by our satisfaction with life more broadly, and that gets carried over into satisfaction with the local environment.

We also see a positive association between income and satisfaction with the local environment. It could be explained by better material standard of living leading to opportunities to choose where one lives, and thus being happier in that environment. In addition, the regression showed at a 90%-confidence level that having a polycentric AS was associated with higher likelihood of having higher satisfaction with one's material standard of living. This again could connect one's finances to the ability to make choices in mobility. For example, having higher income could enable a person to choose where they live, own a car, and thus have better access to opportunities like social interaction, work, and essential services.

The statistical analysis was also reflected in the qualitative analysis of hotspots. "Happiness hotspots" seemed to be likely strongly connected to wealth and the ability to choose one's home location more freely. They were also somewhat connected to

transport accessibility, but more so to service accessibility and availability in a 15-to-20-minute walking distance. These "happiness hotspots" were noticeably more green and more walkable. Houses were private homes or low-rise multifamily homes. In contrast, “happiness cold spots” were characterised by having more built-up area. Meaning that there were more apartment blocks, also higher than 4 floors. Between houses, there was a lot of pavement and asphalt, and a general lack of greenery. The green spaces that did exist within the residential areas were mostly empty grass fields. The transport accessibility in these areas was mixed, but it is evident from the infrastructure around the houses that these are car-oriented zones.

Suggestions for urban planning

Based on this analysis, we suggest some improvements in relation to the urban environment and transport. In our previous report, we showed that there are relatively few people living in functioning 15-minute neighbourhoods in the Capital Area (Raudsepp et al., 2023) and we know from previous studies that there is car-dominant culture in mobility in Iceland (Dillman et al., 2021; Heinonen et al., 2021). Essential services should be accessible within 15-20-mintues walking from the home, and alternatively there should be good active and public transport access to those essential services. When choosing activity locations, people consider the distance to the locations and aim to choose the best facility to meet their quality requirements and financial constraints (e.g. grocery shopping). (Næss et al., 2018). If a person is living in an area with low access to services, they might be “forced into” car ownership to reach locations that fit their needs and constraints (Mattioli, 2017). Therefore, areas that are less walkable could exacerbate the need for car ownership (Calafiore et al., 2022).

People will choose their transportation mode based on convenience, travel time and accessibility of modes (Næss et al., 2018). Therefore, if the local environment supports the use of active travel modes (or public transport), people will use those modes more (Tijana et al., 2023). However, planners need to be mindful of the usability of travel modes based on diurnal and seasonal changes in the local climatic context (Willberg et al., 2023). Active transport modes might not be feasible in deep winter in Iceland. Furthermore, active modes can be less accessible by older age groups and disadvantaged groups in society (Willberg et al., 2023).

In terms of urban planning and policy, the areas in the Reykjavik Capital Area which already have low satisfaction with both material standard of living and local environment (e.g. Efra-Breiðholt) should be focused on for transformation. It is important not to just focus on the easy target of making 15-or-20-minute neighbourhoods in areas that already almost “fit the bill”, but to make sure that the currently disadvantaged areas do not get left behind (Calafiore et al., 2022).

As a result of reducing car dependency, it would be possible to transform the paved areas into usable outdoor spaces which could bring more life back into the urban environment (Bertolini, 2020). For parking lots and walkways, where they are needed, permeable pavement solutions could be used, which have many benefits for the local environment (Kayhanian et al., 2015; Semeraro et al., 2021; Xie et al., 2019). The walkability and mixed-use of neighbourhoods can also encourage community building and increase social interactions (Leyden, 2003).

The usability and quality of green spaces is important, not just their existence (e.g. in the form of grass fields) (De Haas et al., 2021; Noël et al., 2021; Reyes-Riveros et al., 2021). Big green grassy areas in front of houses could have better use, either in the form of playgrounds and outdoor spaces for residents, or by planting more bushes and trees. Urban parks have been shown to increase the subjective wellbeing of urban residents (Kim & Jin, 2018). One option could be also to establish some community garden projects to beautify the space and to bring together the community (Kingsley et al., 2020; Koay & Dillon, 2020). Community gardens can have an added benefit of engaging and supporting vulnerable members of the population (e.g. refugees) by providing a place for social interaction with locals and building independence and personal control in a new environment (Malberg Dyg et al., 2020). Another bigger initiative would be to provide support for community-led projects in neighbourhoods that aim to improve the local living environment, or support participatory planning (City of Surrey, 2021; City of Tartu, 2024; Treija et al., 2021).

We also noticed a lack of colour when doing fieldwork for the qualitative analysis. In winter months, when vegetation is more brown than green, having some colour on the streets could support positive emotions in the local environment. For example, having colourful houses instead of white or grey. Bringing in colour can enhance the perception and quality of the urban environment (Gorzaldini, 2016).

Strengths and limitations

The study examined life satisfaction and their connection to mobility in the form of activity spaces for the first time. The study also examined the urban environment qualitatively, studying the housing, greenness, transport and services in residential areas.

The study is limited by the number of respondents (under 700). Although it can provide indications of what is happening in the urban environment, it does not provide full coverage of the urban area nor a representation of its population. In addition, the survey was aimed at residents aged 25-40.

It is also difficult to assess respondents' comprehension of the survey questions relating to life satisfaction. Distinguishing between questions, wording, mood and personality can influence how people interpret and respond (Diener et al., 2013; Pavot & Diener, 2008). We also might get different results when using a factor analysis and focusing more broadly on eudaimonic and material satisfaction. For the purpose of this study, it was necessary to look at the categories separately, however, to study the local environment in more detail.

Lastly, the qualitative analysis is based on fieldwork and the perception of researchers, therefore there is a risk of researcher bias.

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Appendix A1. Regression on total life satisfaction

		Estimate	Std. Error	Wald	Sig.	95% Confidence Interval	
						Lower Bound	*Upper Bound*
Threshold	[satisfactionLife = 0]	-4.640	1.011	21.068	0.000	-6.621	-2.658
	[satisfactionLife = 1]	-3.818	0.980	15.183	0.000	-5.739	-1.898
	[satisfactionLife = 2]	-3.356	0.971	11.954	0.001	-5.259	-1.454
	[satisfactionLife = 3]	-2.711	0.963	7.921	0.005	-4.598	-0.823
	[satisfactionLife = 4]	-2.390	0.961	6.188	0.013	-4.273	-0.507
	[satisfactionLife = 5]	-1.883	0.958	3.864	0.049	-3.762	-0.005
	[satisfactionLife = 6]	-1.398	0.957	2.136	0.144	-3.273	0.477
	[satisfactionLife = 7]	-0.579	0.955	0.367	0.544	-2.451	1.293
	[satisfactionLife = 8]	0.525	0.955	0.302	0.582	-1.347	2.397
	[satisfactionLife = 9]	1.994	0.960	4.317	0.038	0.113	3.875
Location	age	0.001	0.017	0.005	0.945	-0.032	0.035
	gender_female_yes	0.273	0.149	3.368	0.066	-0.019	0.565
	education_low_yes	-0.130	0.187	0.488	0.485	-0.496	0.235
	education_high_yes	0.181	0.160	1.278	0.258	-0.133	0.495
	income_low_yes	-0.131	0.317	0.171	0.679	-0.752	0.490
	income_high_yes	-0.016	0.200	0.006	0.936	-0.408	0.376
	income_veryhigh_yes	0.410	0.186	4.893	0.027	0.047	0.774
	hhtype_single_yes	-0.567	0.209	7.341	0.007	-0.978	-0.157
	hhtype_couple_yes	-0.249	0.193	1.665	0.197	-0.627	0.129
	hhtype_shared_yes	-0.482	0.458	1.111	0.292	-1.379	0.415
	workhours_parttime_yes	-0.145	0.193	0.563	0.453	-0.524	0.234
	workhours_overtime_yes	0.294	0.171	2.964	0.085	-0.041	0.628
	typeResidence_apartment	-0.095	0.153	0.390	0.532	-0.394	0.204
	carownership	0.067	0.249	0.072	0.788	-0.421	0.555
	PTzone_1_yes	0.561	0.333	2.840	0.092	-0.091	1.212
	PTzone_2_yes	0.140	0.217	0.415	0.519	-0.285	0.564
	PTzone_3_yes	0.235	0.216	1.188	0.276	-0.187	0.657
	distCC_1to3_yes	-0.491	0.316	2.423	0.120	-1.110	0.127
	distCC_3to7_yes	-0.474	0.349	1.847	0.174	-1.157	0.210
	distCC_7to12_yes	-0.602	0.372	2.619	0.106	-1.332	0.127
	distCC_over12_yes	-0.843	0.475	3.149	0.076	-1.773	0.088
	ASsizeinsqkm	-0.013	0.005	7.564	0.006	-0.023	-0.004
	ASCentricity15min	0.273	0.179	2.323	0.128	-0.078	0.625
	populationdensity1km	-0.005	0.011	0.201	0.654	-0.027	0.017
	open_sb1km	0.102	0.812	0.016	0.900	-1.489	1.692
	bluespaces1km	-0.184	0.748	0.061	0.806	-1.650	1.282

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	2663.130			
Final	2608.822	54.308	26	0.001

Link function: Logit.

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	6505.108	6634	0.869
Deviance	2608.822	6634	1.000

Pseudo R-Square

Cox and Snell	0.078
Nagelkerke	0.080
McFadden	0.020

Test of Parallel Lines

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	2608.822			
General	2189.978	418.844	234	0.000

Appendix A2. Regression on satisfaction with material standard of living

		Estimate	Std. Error	Wald	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Threshold	[satisfactionMaterial = 0]	-4.271	0.974	19.242	0.000	-6.179	-2.362
	[satisfactionMaterial = 1]	-3.894	0.967	16.214	0.000	-5.789	-1.998
	[satisfactionMaterial = 2]	-3.196	0.959	11.097	0.001	-5.076	-1.315
	[satisfactionMaterial = 3]	-2.763	0.956	8.344	0.004	-4.637	-0.888
	[satisfactionMaterial = 4]	-2.457	0.955	6.623	0.010	-4.328	-0.586
	[satisfactionMaterial = 5]	-1.889	0.953	3.935	0.047	-3.756	-0.023
	[satisfactionMaterial = 6]	-1.234	0.951	1.684	0.194	-3.098	0.630
	[satisfactionMaterial = 7]	-0.422	0.950	0.197	0.657	-2.284	1.440
	[satisfactionMaterial = 8]	0.653	0.951	0.472	0.492	-1.210	2.516
	[satisfactionMaterial = 9]	1.855	0.955	3.771	0.052	-0.017	3.727
Location	age	-0.031	0.017	3.333	0.068	-0.065	0.002
	gender_female_yes	0.158	0.148	1.140	0.286	-0.132	0.448
	education_low_yes	-0.488	0.186	6.858	0.009	-0.852	-0.123
	education_high_yes	0.239	0.160	2.236	0.135	-0.074	0.551
	income_low_yes	-0.485	0.315	2.368	0.124	-1.103	0.133
	income_high_yes	0.571	0.200	8.141	0.004	0.179	0.962
	income_veryhigh_yes	1.386	0.190	53.080	0.000	1.013	1.759
	hhtype_single_yes	-0.017	0.207	0.006	0.936	-0.423	0.390
	hhtype_couple_yes	-0.080	0.192	0.175	0.676	-0.456	0.296
	hhtype_shared_yes	-0.494	0.455	1.175	0.278	-1.386	0.399
	workhours_parttime_yes	-0.115	0.192	0.361	0.548	-0.492	0.261
	workhours_overtime_yes	0.179	0.169	1.113	0.291	-0.153	0.511
	typeResidence_apartment	-0.123	0.152	0.657	0.418	-0.420	0.174
	carownership	0.096	0.247	0.151	0.698	-0.389	0.581
	PTzone_1_yes	0.539	0.330	2.671	0.102	-0.107	1.186
	PTzone_2_yes	0.395	0.216	3.342	0.068	-0.028	0.818
	PTzone_3_yes	0.145	0.214	0.456	0.499	-0.275	0.565
	distCC_1to3_yes	-0.215	0.313	0.470	0.493	-0.829	0.399
	distCC_3to7_yes	-0.672	0.347	3.758	0.053	-1.352	0.007
	distCC_7to12_yes	-0.662	0.370	3.203	0.074	-1.387	0.063
	distCC_over12_yes	-0.832	0.472	3.107	0.078	-1.757	0.093
	ASsizeinsqkm	-0.004	0.005	0.843	0.358	-0.014	0.005
	ASCentricity15min	0.337	0.178	3.567	0.059	-0.013	0.686
	populationdensity1km	-0.003	0.011	0.056	0.812	-0.024	0.019
	open_sb1km	-0.543	0.807	0.452	0.501	-2.125	1.039
	bluespaces1km	-0.347	0.743	0.218	0.641	-1.804	1.110

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	2891.063			
Final	2762.507	128.556	26	0.000

Link function: Logit.

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	6726.893	6634	0.209
Deviance	2762.507	6634	1.000

Pseudo R-Square

Cox and Snell	0.175
Nagelkerke	0.178
McFadden	0.044

Test of Parallel Lines

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	2762.507			
General	2435.4	327.107	234	0.000

Appendix A3. Regression on satisfaction with local environment

		Estimate	Std. Error	Wald	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Threshold	[satisfactionLocalEnvironment = 0]	-3.449	1.007	11.734	0.001	-5.423	-1.476
	[satisfactionLocalEnvironment = 1]	-2.860	0.983	8.472	0.004	-4.786	-0.934
	[satisfactionLocalEnvironment = 2]	-2.201	0.968	5.173	0.023	-4.097	-0.304
	[satisfactionLocalEnvironment = 3]	-1.599	0.961	2.773	0.096	-3.482	0.283
	[satisfactionLocalEnvironment = 4]	-1.260	0.958	1.730	0.188	-3.138	0.618
	[satisfactionLocalEnvironment = 5]	-0.859	0.956	0.806	0.369	-2.733	1.016
	[satisfactionLocalEnvironment = 6]	-0.189	0.955	0.039	0.843	-2.060	1.683
	[satisfactionLocalEnvironment = 7]	0.762	0.955	0.637	0.425	-1.110	2.635
	[satisfactionLocalEnvironment = 8]	1.910	0.958	3.977	0.046	0.033	3.787
	[satisfactionLocalEnvironment = 9]	3.342	0.964	12.007	0.001	1.452	5.232
Location	age	-0.009	0.017	0.270	0.603	-0.042	0.025
	gender_female_yes	0.516	0.150	11.880	0.001	0.222	0.809
	education_low_yes	0.125	0.187	0.451	0.502	-0.241	0.492
	education_high_yes	0.301	0.160	3.518	0.061	-0.014	0.615
	income_low_yes	-0.026	0.317	0.007	0.936	-0.647	0.596
	income_high_yes	0.262	0.201	1.709	0.191	-0.131	0.655
	income_veryhigh_yes	0.429	0.186	5.356	0.021	0.066	0.793
	hhtype_single_yes	-0.237	0.209	1.287	0.257	-0.646	0.172
	hhtype_couple_yes	0.056	0.193	0.083	0.773	-0.323	0.434
	hhtype_shared_yes	-0.828	0.457	3.281	0.070	-1.724	0.068
	workhours_parttime_yes	0.015	0.194	0.006	0.936	-0.364	0.395
	workhours_overtime_yes	0.284	0.170	2.776	0.096	-0.050	0.618
	typeResidence_apartment	-0.087	0.153	0.328	0.567	-0.386	0.212
	carownership	0.118	0.249	0.225	0.635	-0.370	0.606
	PTzone_1_yes	0.294	0.331	0.787	0.375	-0.355	0.942
	PTzone_2_yes	0.317	0.217	2.130	0.144	-0.109	0.742
	PTzone_3_yes	0.099	0.215	0.210	0.646	-0.323	0.521
	distCC_1to3_yes	0.020	0.314	0.004	0.950	-0.596	0.635
	distCC_3to7_yes	0.413	0.348	1.410	0.235	-0.269	1.094
	distCC_7to12_yes	0.098	0.371	0.070	0.791	-0.628	0.825
	distCC_over12_yes	0.051	0.474	0.011	0.915	-0.878	0.979
	ASsizeinsqkm	0.000	0.005	0.006	0.940	-0.009	0.010
	ASCentricity15min	0.115	0.179	0.414	0.520	-0.236	0.466
	populationdensity1km	-0.001	0.011	0.016	0.900	-0.023	0.020
	open_sb1km	0.405	0.813	0.248	0.618	-1.188	1.998
	bluespaces1km	-0.040	0.748	0.003	0.957	-1.507	1.427

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	2635.811			
Final	2583.410	52.401	26	0.002

Link function: Logit.

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	6475.558	6634	0.916
Deviance	2583.410	6634	1.000

Link function: Logit.

Pseudo R-Square

Cox and Snell	0.076
Nagelkerke	0.077
McFadden	0.020

Link function: Logit.

Test of Parallel Lines

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	2583.410			
General	2220.194	363.215	234	0.000