UNIVERSITY OF ICELAND

Where do all the happy people live?

Project report for HMS Askur

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Project goals

1. Examining life satisfaction parameters in two data sets at two different time points
2. Mapping life satisfaction indicators to identify “happiness hotspots”
3. Qualitative analysis of “happiness hotspots” and their commonalities

Brief summary

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). 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 want to know where all the happy people of Reykjavik live and what unites their environments.

Are there any “happiness hotspots” in Reykjavik and if so, where are they? We will be identifying areas or neighbourhoods where life satisfaction is higher. This will be done using GIS mapping tools and will be presented in the form of a heatmap. We will utilise two sets of survey data for this: one from 2017 and one from 2021, which will enable fuller coverage of Reykjavik, and to spot any notable changes in life satisfaction and where these changes have taken place. We also want to know what is similar in the “happiness hotspots”. For that, we can look at a variety of characteristics of neighbourhoods, such as greenery or services available in the area. We will also investigate the types of housing typical to the identified areas.

The project benefits urban planners designing neighbourhoods and housing in Reykjavik. Our results will show what areas might need improvements and what kind of housing and in what kinds of contexts is connected to high life satisfaction. This can contribute to the quality of both newly built and current neighbourhoods and housing.

1 Background

A common strategy to reduce the climate impact of urban areas has been densification, with the aim of reducing car use and daily travel distances, as well as living space and infrastructure per capita (Ewing & Cervero, 2010; Glaeser & Kahn, 2010; Hall, 2014). Smaller living spaces in dense areas drive people to expand their living space with shared public spaces, leading to higher consumption-related footprints (Heinonen et al., 2013). Furthermore, higher emissions from long-distance travel have been noted as an unintended side effect of densification (Holden & Linnerud, 2011; Holden & Norland, 2005; Árnadóttir et al., 2019; Czepkiewicz et al., 2018b), which may counteract emissions reduced from daily travel (Czepkiewicz et al., 2018a; Ottelin et al., 2014, 2017; Reichert et al., 2016).

Urban form and land use can impact wellbeing (Olsen et al., 2019; Badland et al., 2017), but is dependent on context (Kyttä et al., 2015; Mouratidis, 2019). Conversely, compact cities can increase wellbeing if people's needs are understood and met (Kyttä et al., 2016; Mouratidis, 2019). Ongoing discussions in Reykjavik point to dissatisfaction with densification and fear of the quality of homes decreasing, i.e. less light in the home (Kristinsdóttir, 2023). Green and open spaces have been positively linked to greater satisfaction with one's local environment (Douglas et al., 2018; Çelik & Jaiyeoba, 2023) and generally higher quality of life and wellbeing (Zhang et al., 2017; Bakolis et al., 2018; Bonaiuto & Chiozza, 2024; White et al., 2013). Loss of these spaces or greater fragmentation of land use during urban planning processes could have a negative relationship with one's wellbeing (Hrehorowicz-Gaber, 2013; Brown et al., 2016).

What is more, lower levels of wellbeing have been linked to higher carbon footprints (Ambrey & Daniels, 2017). Or conversely, people who actively engage in sustainable behaviours to reduce their carbon footprints are reported to have higher satisfaction with life than people not actively engaging in these behaviours (Vita et al., 2020). In study in Finland, reduced use of cars has been linked to increased life satisfaction, although motivation for it stemmed from hedonistic benefits, rather than altruistic. For example, for saving money and improving health rather than reducing carbon emissions for the planet. (Höysniemi & Salonen, 2019). It has been suggested that high income countries should be more ambitious in their GHG emissions reduction targets, as they would not face a loss in wellbeing in doing so (Sugiawan et al., 2019).

The spatial distribution of life satisfaction has not been studied in the Reykjavík Capital Area in this way before. It would be an insightful way to explore how the city in its current form is impacting its citizens. Planning practices in the city have been criticized in the media in recent years, emphasizing concerns for street safety (Ragnarsson, 2024), lack of light in apartments

(Pálsdóttir, 2022; Reynisson, 2022; Logadóttir et al., 2020), reduction in green spaces (Logadóttir et al, 2020) and impact on the overall quality of life as a result of rapid densification policies (Logadóttir et al., 2020). Thus, the project aims to contribute to a more holistic understanding of the Reykjavik urban environment and how it might be affecting people's wellbeing. In addition, it would help understand critical areas of improvement within the built environment, from housing to neighbourhood design.

There are three main societal benefits to the project. Firstly, urban planners will be able to focus more directly on areas where wellbeing of people is lower and also, when constructing plans for new housing, take into consideration what kind of neighbourhood and housing characteristics seem to make people happier. This will improve the quality of the built environment and the quality of life of people living in it. Secondly, there is potential for reductions in consumption-based GHG emissions. Thirdly, creating a happy urban environment greatly benefits the citizens. Cities are for the citizens, after all. Considering the high rate of depression (incl. seasonal depression) (Sigurðardóttir et al., 2023), and that most of Iceland's population lives in the Reykjavik Capital Area, it is paramount that the city and its planning agencies create a living environment that supports the wellbeing of citizens in as many ways as possible.

SDGs: 11.6, 13.2, 13.3, 17.16, 17.17

2 Data and methods

The following sections cover the data used in the project and the methodology used for analysis.

2.1 Data

2017 survey

Using an online softGIS survey (also known as public participation GIS or PPGIS) in 2017, data was gathered about the residential location, travel habits, attitude, wellbeing, and socio-demographic background of 25-40-year-old residents of the Reykjavik Capital Area. The PPGIS method combines the traditional survey method with questions, where people need to mark locations on a map (Brown & Kyttä, 2014; Czepkiewicz et al., 2018c). PPGIS has been used in urban studies and can provide input for urban planning (Hasanzadeh, 2021). The focus of this project was on studying well-being in the form of life satisfaction. Variables used for this purpose are described in section 2.3. Total number of respondents was 706. The full questionnaire is available at https://app.maptionnaire.com/en/2294/.

2022 survey

In Fall 2021 to Spring 2022, a carbon footprint calculator survey was conducted online, gathering data from the five Nordic countries. The set-up and detailed description of the survey is covered in Heinonen et al (2022). People were asked about their various consumption habits, their background info, as well as being asked to mark their home location on a map. Among other information, the survey gathered data about people's life satisfaction, which is examined in this project (see section 2.3). For this project, we are zooming in on the residents who marked their home in the Reykjavik Capital Area, a total 1051 people. The survey is available at https://carbonfootprint.hi.is/.

2.2 Wellbeing measures

Wellbeing as a term encompasses the quality of one's life and their ability to contribute and participate in the world with a sense of purpose, taking into account social, economic and environmental conditions (WHO, n.d.). Broadly, wellbeing can be divided into objective and subjective. Objective wellbeing, as the name suggests, aims to be without bias, typically covering universal needs and aims to (Voukelatou et al., 2021). In contrast, subjective

wellbeing covers one's perception of their happiness, and is split into hedonic (more based on something measurable, e.g. our financial status) and eudaimonic (based on the value we place on something and our perception, for example social life) (Voukelatou et al., 2021; Veenhoven, 2009; Ryan & Deci, 2001).

In our study, we are focusing on subjective wellbeing as it provides a glimpse into how people living in the Reykjavik Capital Area perceive the urban environment and how it aligns with a person's expectations for it. For this, we utilise a life satisfaction measure, which is a component of subjective wellbeing (Lucas et al., 1996; Veenhoven, 2009; Huta & Waterman, 2014; Ryan & Deci, 2001). Life satisfaction scales have seen wide use (Charlemagne-Badal et al., 2015; Oishi, 2010), particularly as a measure of subjective wellbeing. It also has cross-cultural relevance, as in different cultural contexts the value people place on things might be different (Veenhoven, 2009; Huta & Waterman, 2014; Ryan & Deci, 2001). However, it is important to keep in mind that people answering the survey will be influenced by cultural context, mood, question wording and order, and much more (Diener et al., 2013). Nordic countries have generally reported high life satisfaction in global terms with an average of 7.5 on a 10-point scale (Ziogas & Ballas, 2024). Therefore within this study, we will consider that baseline level during the analysis. What might be considered medium satisfaction levels in other countries, could be considered low in the local Icelandic context.

The surveys covered a range of material and eudaimonic wellbeing questions in the form of life satisfaction questions. The questions differed slightly between the surveys, with the 2022 survey adding in a few additional questions. Table 1 provides an overview of the life satisfaction categories and the related questions for both surveys. In our analysis, we will first provide a simple statistical overview of the life satisfaction categories in both surveys, noting some broader changes between the years for further investigation. Then, we will take a closer look at a few categories in more detail using spatial analysis and qualitative analysis methods.

Table 1. Wellbeing (life satisfaction) questions and typology in both surveys.

	How satisfied are you with …?		
Satisfaction category	**2017 survey question**	**2022 survey question**	**Wellbeing type**
Total life satisfaction	your life as a whole these days	your life as a whole these days	
Material standard of living	your material standard of living	your standard of living	material
Financial situation	-	your financial situation	material
Health	your current state of health	your health	eudaimonic
Personal relationships	your personal relationships	your personal relationships	eudaimonic
Engaging in community or society	feeling part of your community	how you participate in society	eudaimonic
Local environment	the quality of your local environment	your local area as a place to live	material
Housing	-	your housing conditions	material
Job or studies	your main occupation such as job or studies	your job or studies	eudaimonic
Sense of achievement	things you are achieving in life	things you are achieving in life	eudaimonic
Purpose in life	-	meaning or purpose in life	eudaimonic
Free time	the amount of time you have to do things you like doing	the amount of time you have to do things you like doing	eudaimonic
Engaging in daily activities	-	how engaged and interested you are in your daily activities	eudaimonic
Safety	how safe you feel	-	eudaimonic

2.3 Spatial analysis

All spatial analysis was done using ArcGIS Pro 2.9. Information about life satisfaction was tied to one's home location within both surveys. Life satisfaction indicators mentioned in section 2.3 were then extrapolated to a population grid, based on the average life satisfaction of people within each grid cell or closest to the grid cell. This enabled us to see broader spatial patterns. In the following step, a hotspot analysis was conducted using the Optimized Hot Spot Analysis geoprocessing tool. The results of this analysis are presented as maps, which were analysed visually, also noting any big changes between areas between the years. The maps show red areas, or "happiness hotspots", and blue areas, or "happiness cold spots". The spatial analysis is an estimation made based on a small portion of residents living in the Capital Area. Furthermore, the survey respondents differed from year to year, so the results cannot be compared one-on-one, but are comparable within the spatial estimation. Figures 1 and 2 provide a spatial overview of respondent home locations for both surveys. However, the purpose of the analysis is to provide indications of high and

low satisfaction areas. These areas are then further analysed qualitatively, using online maps and fieldwork (photos of streets) to try to explain what the maps are showing.

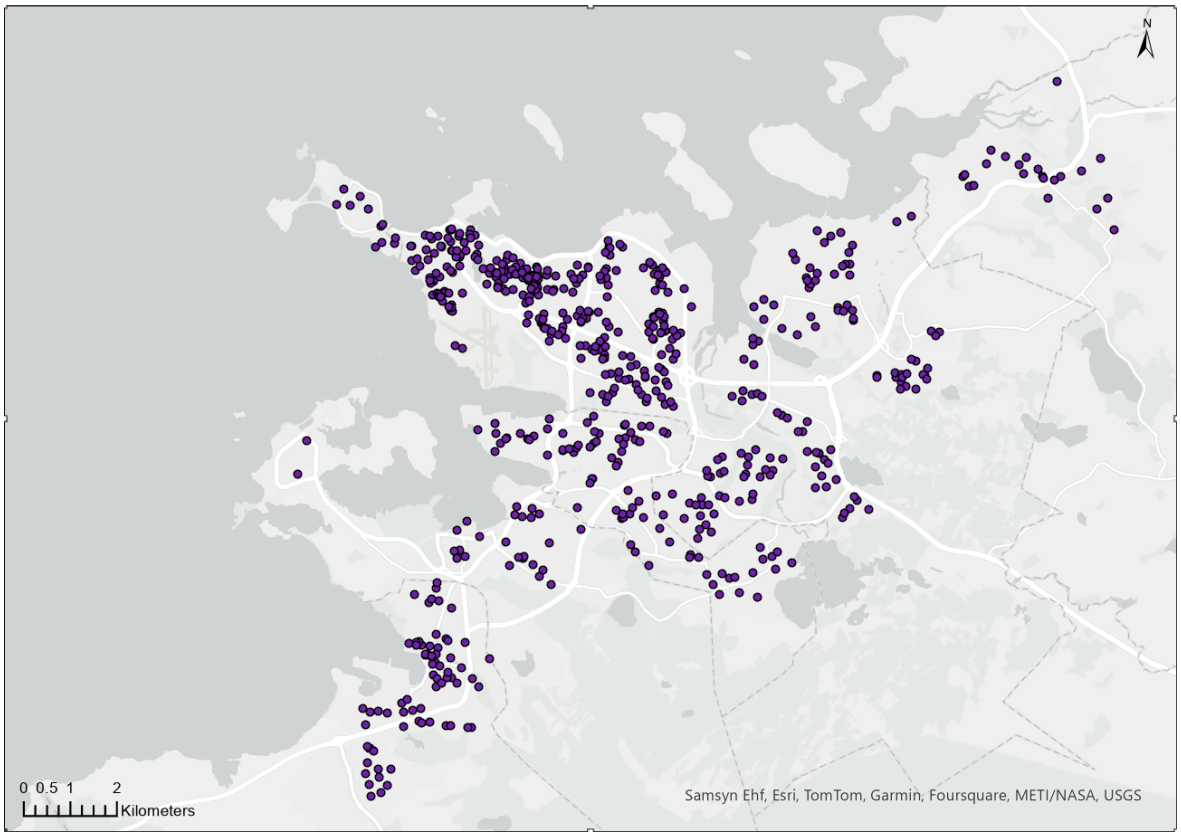

Figure 1. Spatial distribution of respondents in the 2017 survey.

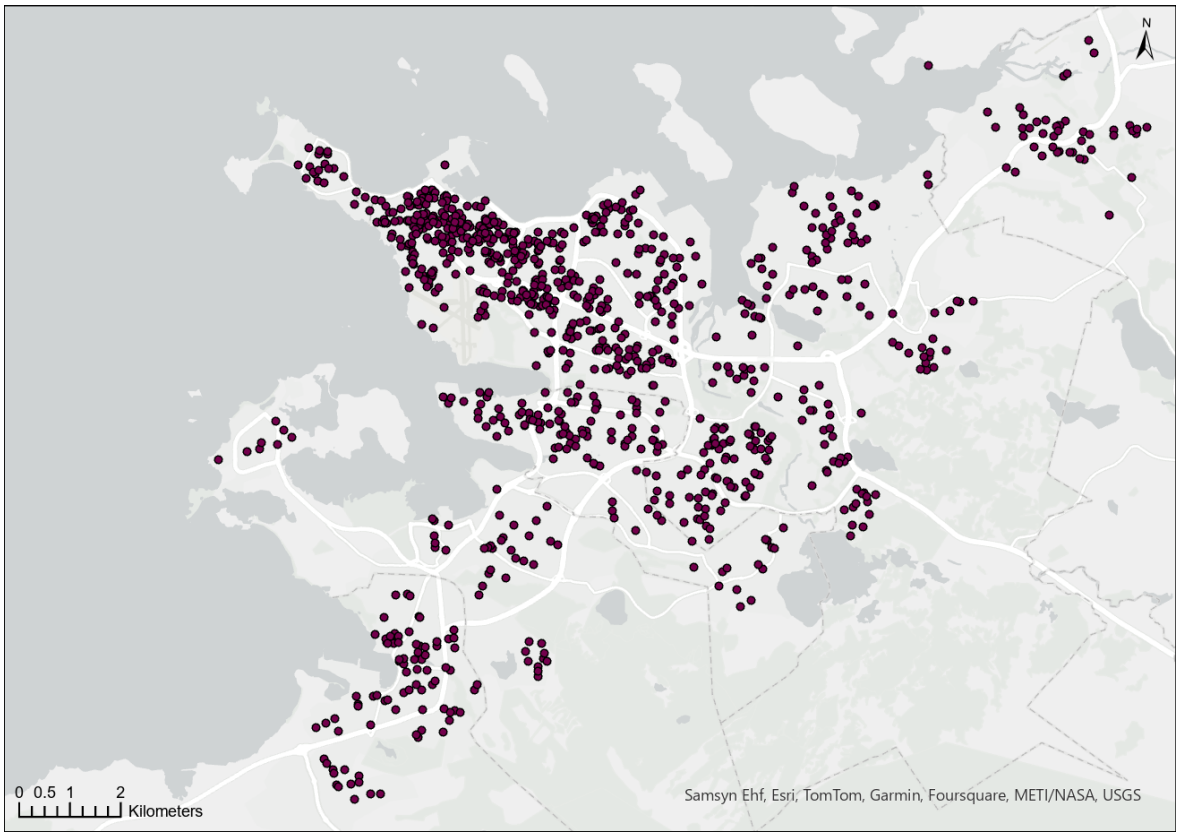

Figure 2. Spatial distribution of respondents in the 2022 survey.

3 Analysis

In the analysis section, we first provide an overview of the wellbeing parameters featured in both surveys. Then, this section covers a spatial overview of hotspots and coldspots for four life satisfaction domains we have chosen to zoom in on. Lastly, a qualitative analysis is conducted on the hotspots and cold spots, with the help of in-field visits to the areas, photos, Google Maps and Já Kort.

Average satisfaction across all categories can be considered relatively high, with median values at 7 or 8 (Table 2, Table 3). This is in line with prior reports of life satisfaction being very high in the Nordics compared to global averages (Ziogas & Ballas, 2024). Full tables can be found in Appendix A.1 (2017 data) and Appendix A.2 (2022 data).

Within our 2017 data set, respondents rated satisfaction with their sense of safety (mean: 7.85), their personal relationships (mean: 7.57) and things they are achieving in their life (mean: 7.29) the highest (Table 2). In 2022, the highest rated satisfaction categories were related to people's local area as a place to live and their housing conditions (mean: 7.95), standard of living (mean: 7.64) and personal relationships (7.63) (Table 3).

Table 2. Overview of wellbeing parameters in the 2017 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

The lowest rated satisfaction categories in 2017 were related to quality of one's local environment (mean: 6.03), their material standard of living (mean: 6.67) and feeling part of

one's community (mean: 6.84) (Table 2). In 2022, the lowest categories were related to being engaged in daily activities (mean: 6.63), the amount of time people had to do things they like (mean: 6.75), and participating in society (mean: 6.8) (Table 3).

Table 3. Overview of wellbeing parameters in the 2022 carbon footprint calculator survey.

How satisfied are you with...?	N	Mean	Median	SD	25th	50th	75th
your life as a whole these days	1534	7.36	8	1.9	7	8	9
your standard of living	1531	7.64	8	2.2	7	8	9
your financial situation	1529	6.91	8	2.4	5	8	9
your health	1524	6.91	7	2.2	6	7	8
your personal relationships	1517	7.63	8	2.2	7	8	9
how you participate in society	1513	6.8	7	2.3	5	7	8
your local area as a place to live	1517	7.95	8	1.9	7	8	9
your housing conditions	1520	7.95	8	1.8	7	8	9
your job or studies	1440	7.4	8	2.3	7	8	9
things you are achieving in life	1487	7.35	8	2.2	6	8	9
meaning or purpose in life	1492	7.54	8	2.3	7	8	9
the amount of time you have to do things you like doing	1506	6.75	7	2.3	5	7	8
how engaged and interested you are in your daily activities	1500	6.63	7	2.3	5	7	8

Overall, both eudaimonic and hedonic wellbeing are relatively high on average. Although the samples involve different respondents, there seems to be a broader positive change in satisfaction with one's local living environment and material standard of living (+1-2 points). At the same time, some other aspects remain virtually unchanged between the years, like satisfaction with personal relationships, feeling part of the community or society, time one has to do things they like, or health.

Based on literature and the abovementioned changes in satisfaction, it was decided to focus more closely on material standard of living and local environment. In addition, we looked at satisfaction with health as it has been associated in literature with local environments and particularly in relation to mobility. Lastly, we added total life satisfaction as it did not change between the samples and it would provide a background of the spatial distribution of life satisfaction overall.

Total life satisfaction

Total life satisfaction in 2017 was on average 7.35 (median: 8, stdv: 2.205) (Table 2).

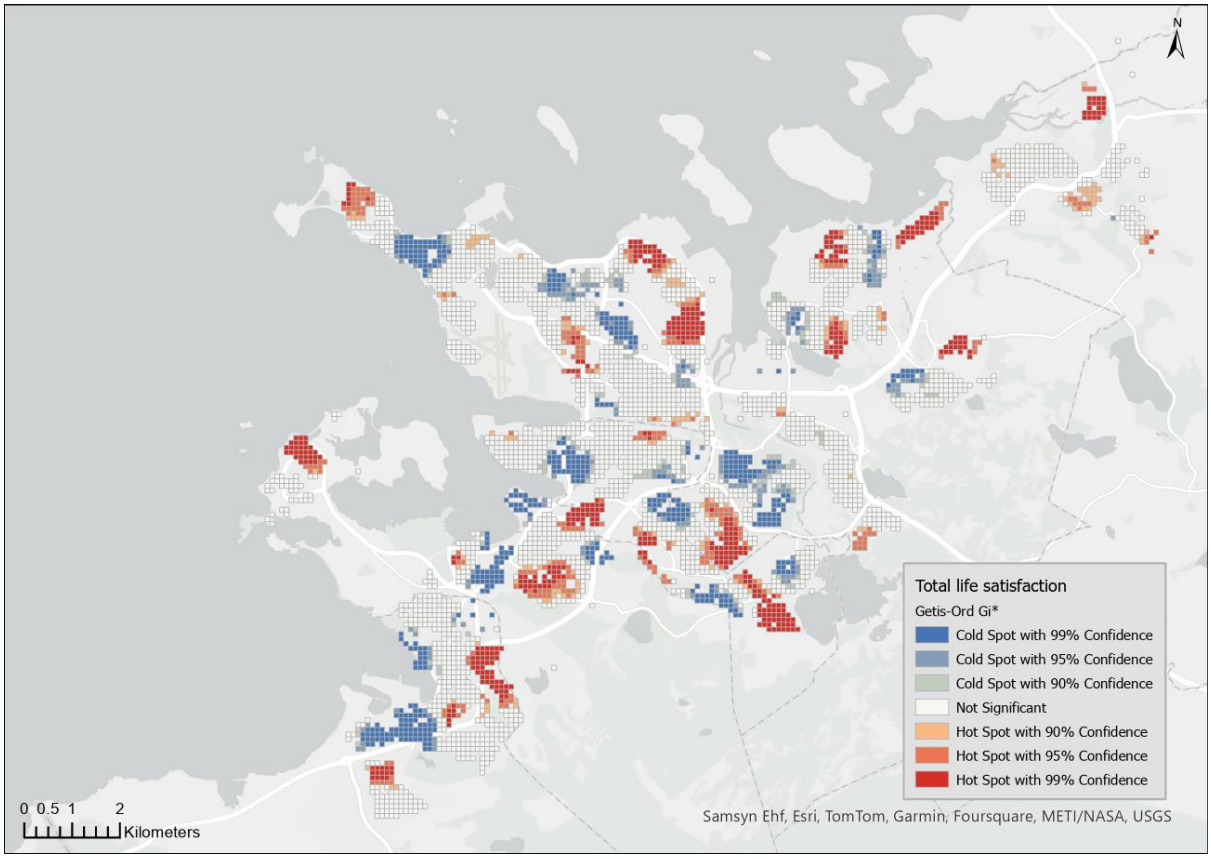

Figure 3. Total life satisfaction (2017 data)

When looking at the hotspots in this category, there is a clear concentration of high life satisfaction 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).

There were also noticeable bigger cold spots around the city center 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).

Total life satisfaction in 2022 was on average 7.3 (median: 8, stdv: 1.908) (Table 3).

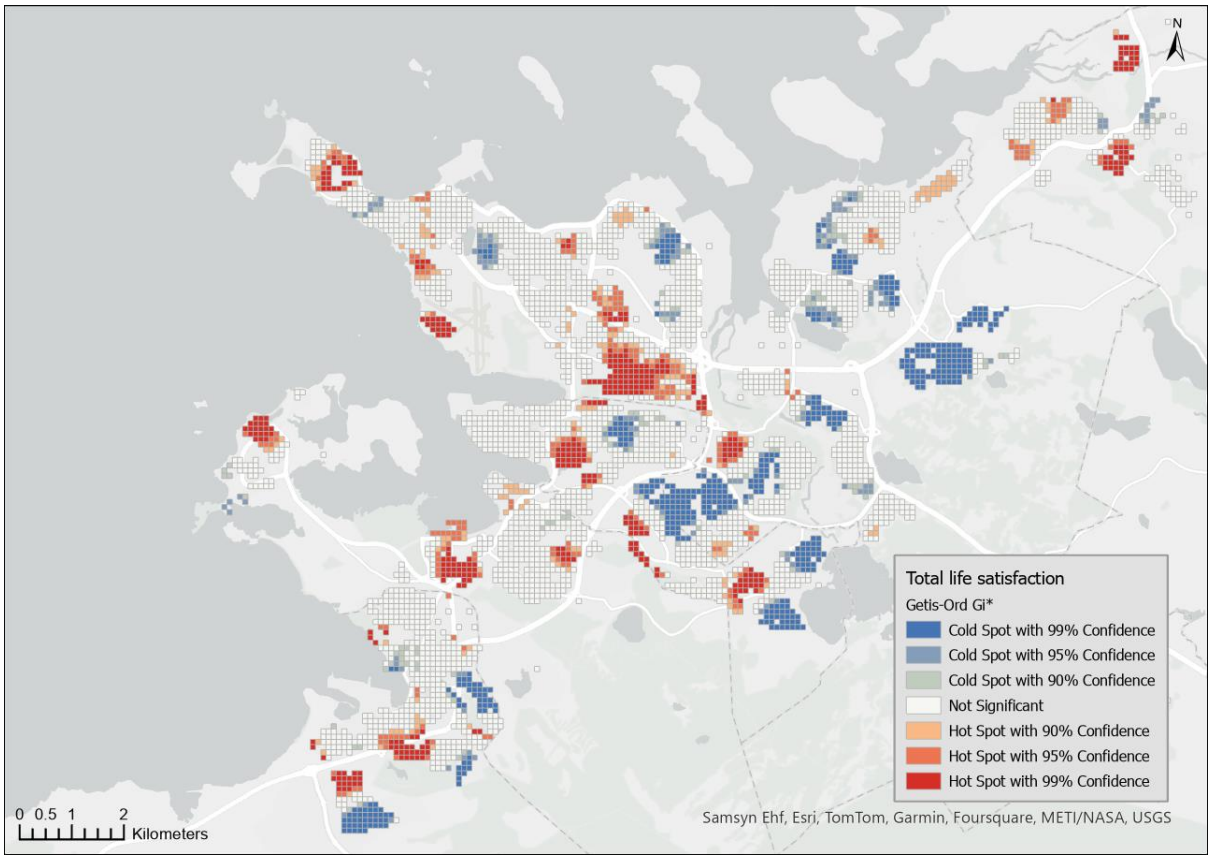

Figure 4. Total life satisfaction hotspots and cold spots (2022 data).

When looking at the hotspots in this category, there is a clear concentration of high life satisfaction in Seltjarnarnes, Álftanes, Háaleiti Norður (108), Fossvogur and the area north and south of Bústaðavegur (108), central Kópavogur (200), Hvammar (200), Lindir (201), Kórar (203), Hraunsholt in Garðabær (210), Ásland and northern part of Vellir (221) in Hafnarfjörður, and in parts of Mosfellsbær (270).

There were also noticeable bigger cold spots around the city center in the area between Vatnsmýri and Hallgrimskirkja on the east side of Tjörnin (101), Lækir (105), various parts of Grafarvogur (112), Digranes (200), Lindir (201), Sel (109), Efra-Breiðholt (109), Árbær (110), Þing (203), Hvörf (203), Grafarholt and Úlfarsárdalur (113).

It is important to note that a complete one-on-one comparison cannot be made as the data sets involve different respondents. However, spatially some shifts can be observed and considered. Therefore, the comparisons made here should not be taken as hard facts, but rather indications which can aid in the planning processes.

Total life satisfaction remained the same between the years (-0.05). Spatiallly, in the 2017 data we can see that the hotspots and coldspots are more distributed around the capital area, often with low satisfaction areas being located right next to high satisfaction areas. In 2022, larger clusters of hotspots and coldspots emerged in some areas. For example, total life satisfaction hotspots appear in Fossvogur, Stakkar, Háaleiti Norður and around the university and in Vesturbær. However, in other areas, cold spots replaced hotspots, such as in Þing (Vatnsendi), Sel (Breiðholt), Laugarás, and parts of Grafarvogur.

Total life satisfaction considers all aspects of one's life. Therefore, in terms of planning, it can be difficult to discuss why changes occurred in some of the abovementioned areas. For that purpose, we looked more closely at three sub-categories of life satisfaction - material standard of living, health, and local environment.

Satisfaction with material standard of living

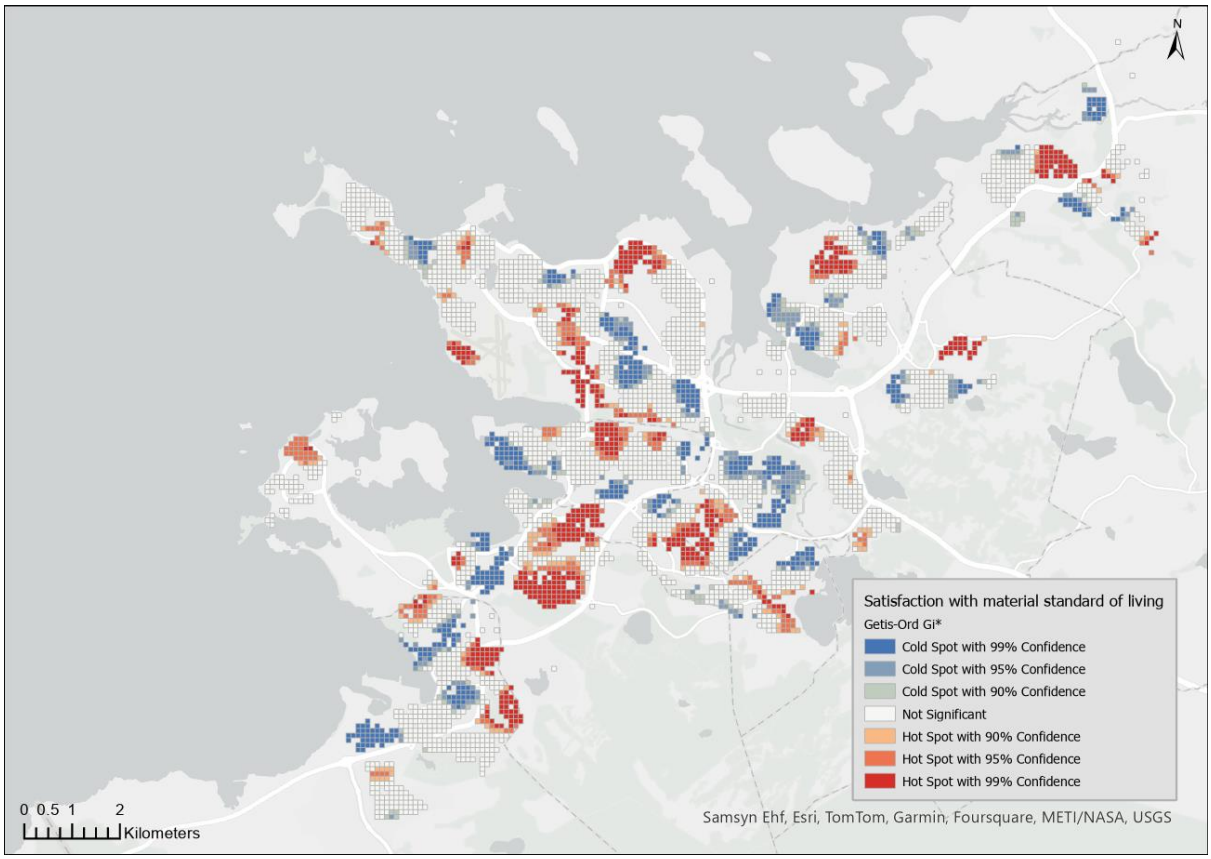

Figure 5. Satisfaction with material standard of living (2017 data)

On average, within our 2017 data set, the satisfaction with material standard of living was 6.67 (median: 7; stdv: 2.525) (Table 2).

Satisfaction with one's material standard of living was high 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.

On the other hand, cold spots appeared 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.

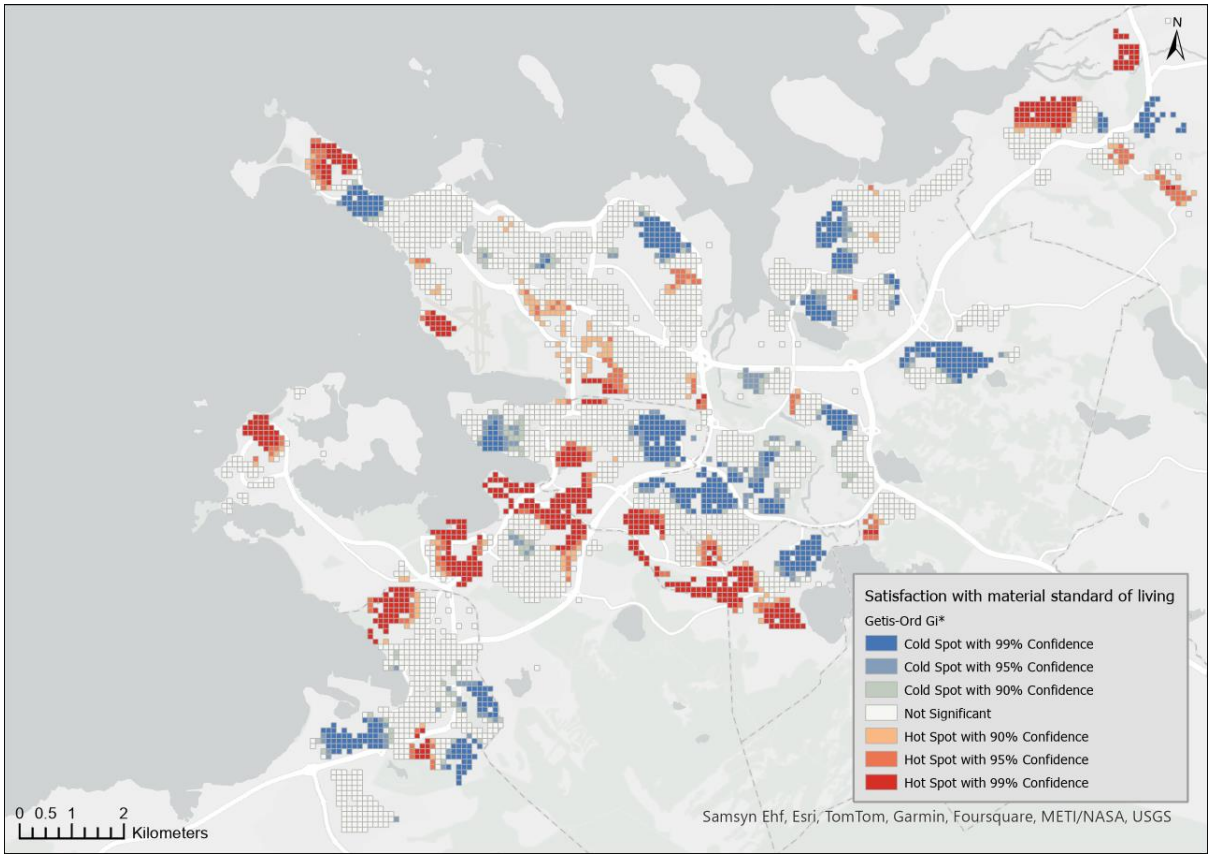

Figure 6. Satisfaction with material standard of living (2022 data)

On average, satisfaction with the material standard of living was quite high among our 2022 sample – 7.72 (median: 8, stdv: 2.142). It was also higher than in our 2017 sample (6.67) (Table 3).

In the 2022 data, satisfaction with one's material standard of living was high in Álftanes, Seltjarnarnes, Skerjafjördur, Garðabær (Hraunsholt), Kópavogur (Hvammar, and then from

Árnarneshæð all the way down to Elliðavatn), Hafjarfjördur (Norðurbær) some areas around Kringlan (Hlíðar, Fossvogur), Sund in Laugardalur and in Mosfellsbær.

Whereas satisfaction with material standard of living was low in parts of Hafnarfjörður (Hvaleyerarholt, Asland, Setberg), Kársnes and Hjallar in Kópavogur, many parts of Breiðholt, Laugarás, around Eiðistorg in Seltjarnarnes, Árbær, Foldir and Rimar in Grafarvogur, Grafarholt, and eastern parts of Mosfellsbær.

Between the years, satisfaction with material state or standard of living has increased by about one point (+1.05; median +1 point). Satisfaction with material standard of living broadly remained similar spatially between 2017 and 2022. However, some positive shifts were noticed in Seltjarnarnes, Hlíðar, Fossvogur, Hraunholt in Garðabær, Stakkar in Breiðholt, Rimar in Grafarvogur, and parts of eastern Hafnarfjörður. Conversely, negative shifts were noted in the Laugardalur area, Hjallar and Lindir in Kópavogur, Norðurbær in Hafnarfjörður and Árbær.

It is also important to note areas where the coldspots have remained the same within both survey data. These areas were in the Grandar/Eiðistorg area, Kársnes, Foldir in Grafarvogur, Efra-Breiðholt, Hvörf, and Hvaleyrarholt in Hafnarfjörður.

Satisfaction with health

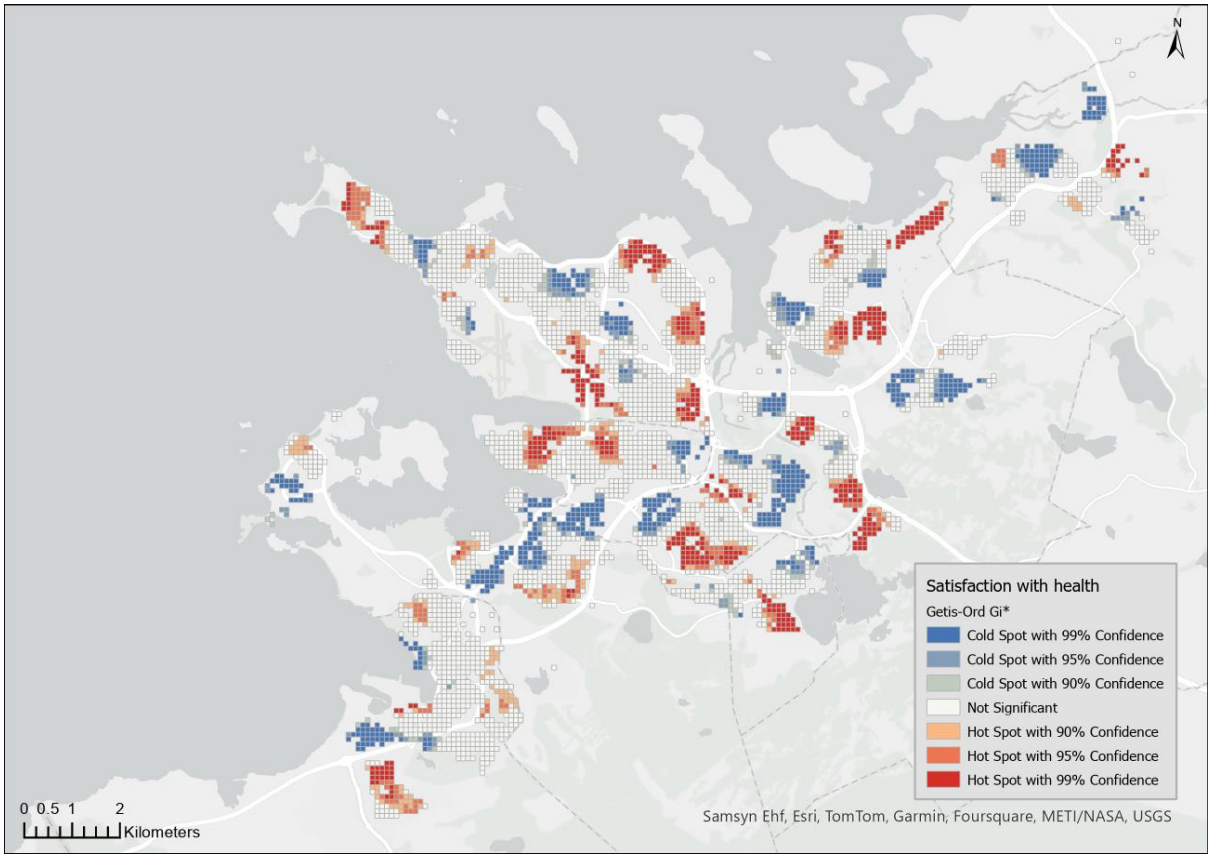

Figure 7. Satisfaction with health (2017)

Average satisfaction with health in our 2017 sample was 6.99 (median: 8; stdv: 2.468) (Table 2).

Spatially, areas with higher satisfaction with one's state of health are located in Seltjarnarnes, parts of Vesturbær, Lækir and Sund in Laugardalur, Hlíðar, Gerdi, central Kópavogur (Kársnes, Hamraborg), also in Lindir, Kórar and Vatnsendi, parts of Árbær, Vellir in Hafnarfjörður, Foldir, Borgir and Stadir Grafarvogur, and Flatir and Búðir in Garðabær.

Areas of low satisfaction with health were concentrated more notably in Grandar, Tun, Háaleiti Norður, Hamrar (Grafarvogur), Grafarholt, Mosfellsbær, Efra-Breiðholt, parts of Árbær, Hvammar, Árnarneshæð, Smárinn, Central Garðabær and Hraunsholt, Hvaleyrarholt in Hafnarfjörður.

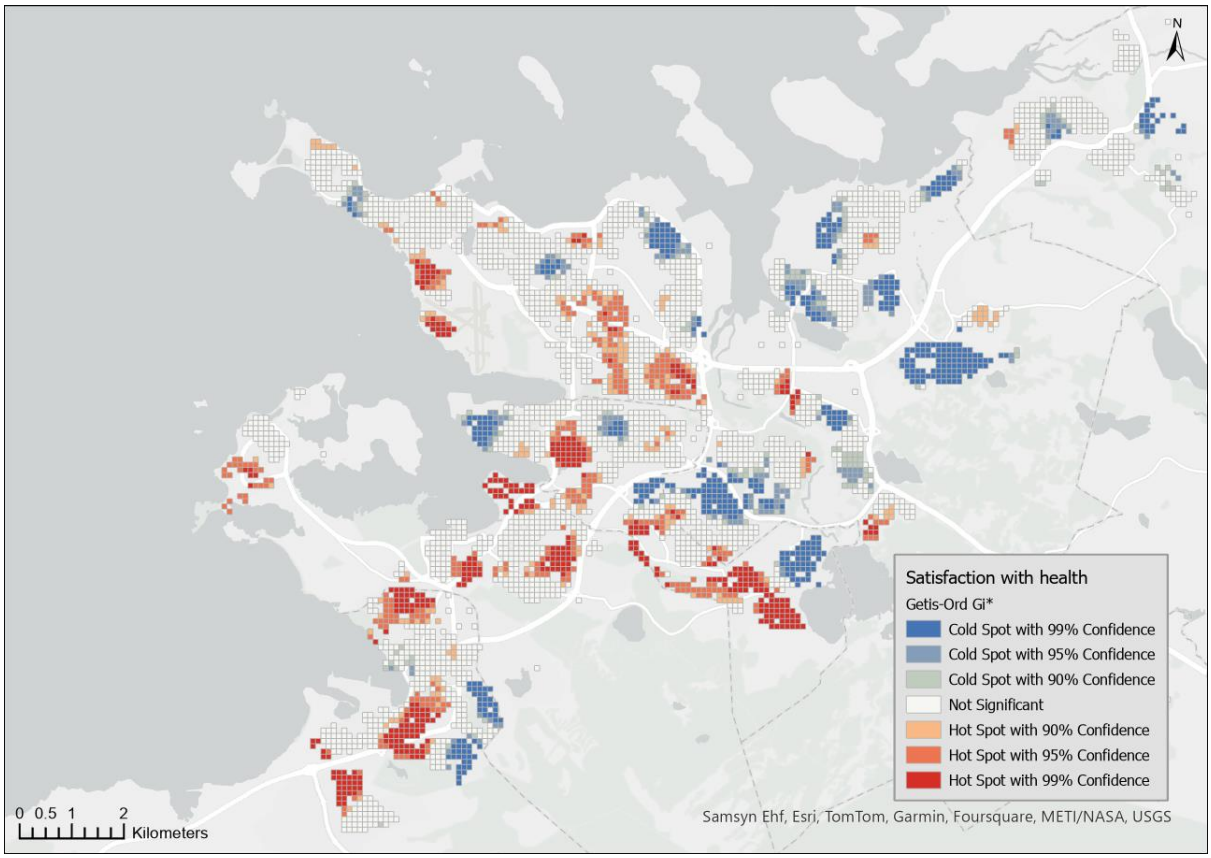

Figure 8. Satisfaction with health (2022 data)

Average satisfaction with health in our 2022 sample was 6.96 (median: 7; stdv: 2.19). Although the mean has not changed much between the years, the median has dropped by a point between the two samples (Table 3).

Areas of high satisfaction with health were located around the University of Iceland, in Skerjafjördur, in Fossvogur and Gerdi, Hamraborg, Árnarneshæð, Hvammar, Lindir, Smárinn, Kórar, Þing, Garðabær, Hafnarfjörður (north, center, Vellir).

Cold spots for health were around Eiðistorg, Holt (104), Laugarás, Grafarvogur and Grafarholt, Efra-Breiðholt, Sel and Hvörf, Kársnes and Brekkur in Kópavogur, and Asland and Setberg in Hafnarfjörður.

Satisfaction with health did not change (-0.03) between the samples, although the median dropped from by one point. Spatially, more shifts were noted than for the previous two life satisfaction maps. Namely, positive shifts occurred in Garðabær and most of Kópavogur and Hafnarfjörður, also in Fossvogur around Bustadavegur, and in Álftanes, Seltjarnarnes and the University of Iceland area. In contrast, negative shifts occurred in the Laugardalur area, Kársnes, Árbær, Grafarvogur, and Setberg in Hafnarfjörður.

Areas of cold spots that remained the same are similar to that of material satisfaction. Namely, Grandar and Tun (104) areas, Efra-Breiðholt, Vatnsendi(Hvörf), Grafarholt and Mosfellsbær.

Satisfaction with local environment

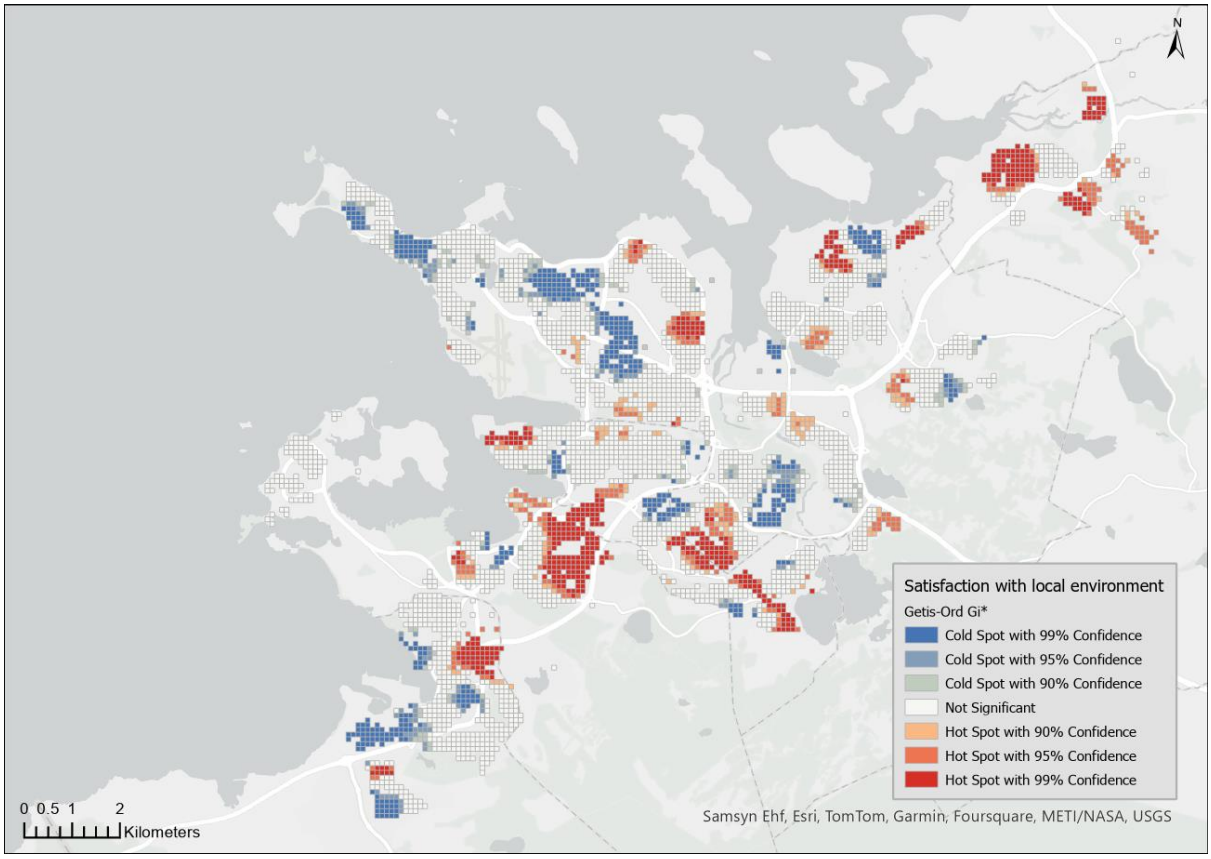

Figure 9. Satisfaction with local environment (2017)

Satisfaction with local environment among our 2017 sample was 7.29 on average (median: 8; stdv: 2.107) (Table 2).

Hotspots of local environment satisfaction were located 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.

Satisfaction with the local environment was low 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.

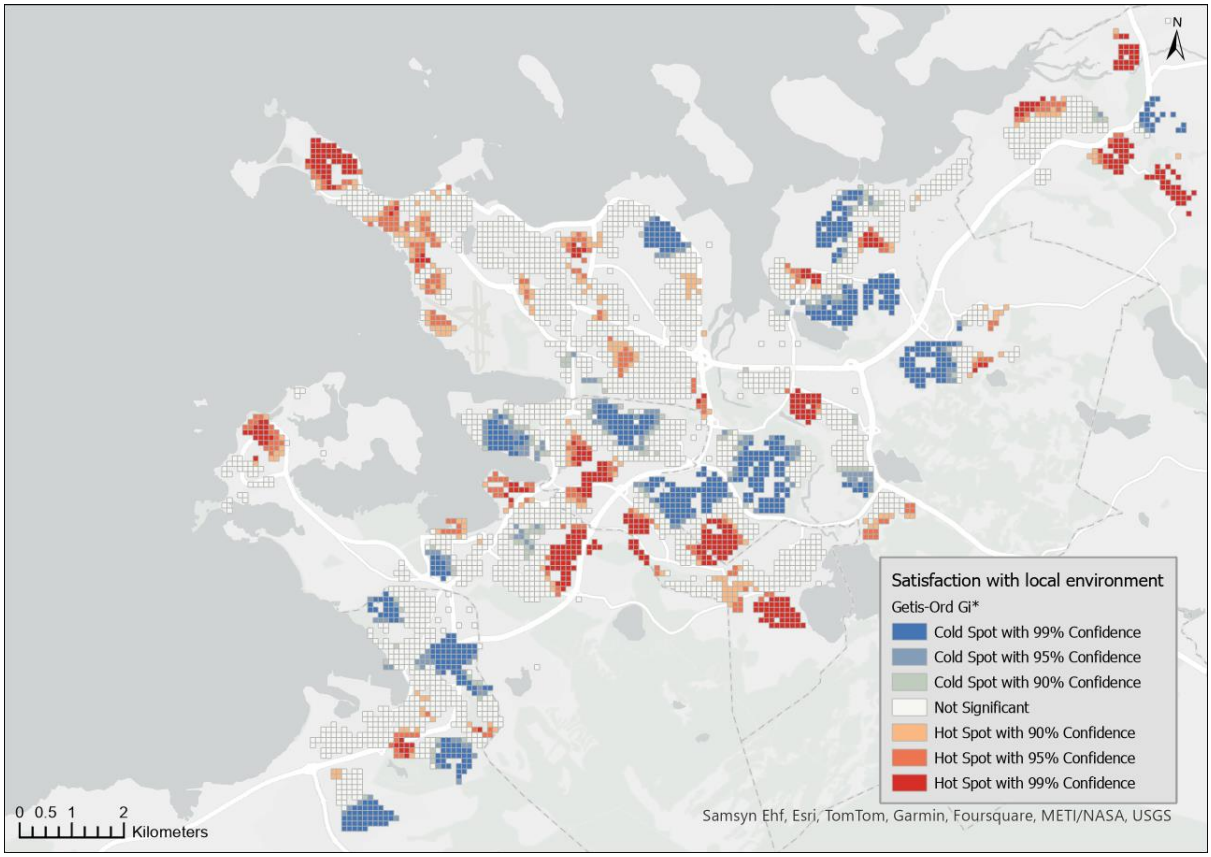

Figure 10. Satisfaction with local environment (2022 data)

Satisfaction with local environment among our 2022 sample was 7.97 on average (median: 8; stdv:1.842) (Table 3).

Local environment satisfaction hotspots were in Seltjarnarnes and Vesturbær (107), Kringla, Tun (104), Hamraborg, Hvammar, Kórar, Salir, Vatnsendi in Kópavogur, Búðir in Garðabær, Álftanes, central Hafnarfjörður, Árbær, Mosfellsbær, and Hamrar and Engi in Grafarvogur.

Cold spots were located in Laugarás, Kársnes, Grundir and Lindir in Kópavogur, Sel, Bakkar, Efra-Breiðholt, Holar in Breiðholt, Hraunsholt in Garðabær, Foldir, Rimar, Hus, Borgir in Grafarvogur, and Norðurbær, Vesturbær, Vellir, Asland in Hafnarfjörður.

Overall, it can be said that people in the capital area are quite satisfied with their local environment. Between the years, average satisfaction with one's local environment increased (+0.68). Spatially, some bigger shifts could be seen. Firstly, the area from Seltjarnarnes up to Háaleiti/Kringla shifted from coldspots to hotspots. On the other hand, negative shifts occurred in Kársnes and central Kópavogur, central Gardaber, Hraunsholt,

Hraun in Hafnarfjörður, Grafarvogur and Grafarholt. Also, cold spot areas emerged or intensified in Laugarás and Breiðholt.

Examples of „happiness hotspots“

One example of consistently high satisfaction across the examined categories is in the Búðir and Flatir area in Garðabær (Figures 11-13). The area is characterised by single-family housing, and lots of greenery. Streets are lined with both high- and low-level plants (Figures 11-12). The area also sits on higher ground, with views into the distance, which adds to the pleasantness of the environment (Figure 12). The streets are relatively quiet, with lower speed limits than the main road (Vifilstaðavegur) that runs between the area (Figure 13). The sidewalks are well-kept and separated from the road.

Figure 11. Búðir area in Garðabær in October 2023

Figure 12. Flatir in Garðabær in October 2023

Figure 13. Flatir in Garðabær in October 2023

There are playgrounds scattered around the neighbourhoods, with schools nearby. Essential services (grocery store, health care center, etc) are located in the downtown area of Garðabær, which are a 15–20-minute walk away from most of the area. Bus connections are limited to two lines – 22 and 24 – of which only nr 24 goes through the neighbourhood. Both lines are scheduled every half hour (within a few minutes of each other). During the observation period, we could not see people waiting for the bus, nor people walking. Mainly people seemed to be moving around by private car. Despite that, streets were quiet and seemed safe, likely due to low speed limits (Figure 14).

Figure 14. End of low-speed area; Búðir area in Garðabær in October 2023

In front of the houses and on the road, you could see mainly newer cars, which could be an indication of the general wealth of the area. Owning or renting private houses is another indicator of that. Indeed, if we look at the maps for satisfaction with one's material standard of living, people living in this area are quite satisfied within this category.

Similar areas with high local environment satisfaction were in Seltjarnarnes and 107 Vesturbær, which have shifted from cold spots to hot spots between the years. The areas have proximity to essential services, schools, public transport. Many people walk or cycle in the area, which is supported by the seaside recreational paths and areas. However, there is also a lot of car traffic in the 107 area and streets are often parked full of cars. Similarly to Garðabær, people living in these areas are generally satisfied with their health and material standard of living. There are many playgrounds and proximity to blue and green spaces is higher (i.e. seaside walkways, bird conservation area in Grotta, playgrounds).

Seltjarnarnes in particular is characterised mainly by single family homes or low-rise apartment blocks (Figures 15-19). Many of these homes also have access to a garden space and are in proximity to the oceanside. The low-rise development of the area allows more light to enter the homes. Bus connections to the area are limited, but since essential services are within this locality, people could easily cycle or walk places.

Figure 15. Residential area in Seltjarnarnes with ocean view in the distance. Photo taken March 2024.

Figure 16. Residential area in Seltjarnarnes. Photo taken March 2024.

Figure 17. Residential area in Seltjarnarnes, low speed limits. Photo taken March 2024.

Figure 18. Green area, parking lot and residential area in Seltjarnarnes. Photo taken March 2024.

Figure 19. Residential area in Seltjarnarnes. Photo taken March 2024.

However, it should be noted that although there are corner shops, there is currently not any well-priced grocery store (Bónus, Krónan) in the area around the university, although it does not seem to significantly affect people's satisfaction with the area. For Seltjarnarnes residents, the closest store is Hagkaup, which is known as a higher priced supermarket. The stores in Grandi, however, service a lot of people both from these areas and from 101. This is evidenced by busyness of the Grandi area during typical after-work hours and weekends.

Examples of low satisfaction areas

An area where people rated their satisfaction with life, health, material status, and local environment quite low throughout was Efra-Breiðholt. Although this area has access to essential services locally, decent bus connections (3 different lines in the area, with a nearby central station in Mjódd), nature surrounding the area, the satisfaction is still continuously low for people living in this area. Efra-Breiðholt is known as the most populous area in Iceland, with the most people living per square kilometre. Indeed, when driving around there, a big part of Efra-Breiðholt can be characterized by apartment blocks, ranging from 3-7 stories (Figures 20-23). Between the houses, a lot of paved road and parking lots can be seen (Figure 20, Figure 23), to accommodate for the cars of all the people living in this densest area of Reykjavik. There are some gardens of row houses that have trees and bushes (i.e. Vesturberg), but there are fewer green spaces around apartment blocks (Figures 20-21). In many places, views and light are blocked by higher apartment complexes.

Figure 20. Neighbourhood in Efra-Breiðholt. Photo taken March 2024.

Figure 21. Pedestrian street/walkway in Efra-Breiðholt. Photo taken March 2024.

Figure 22. Central area in Efra-Breiðholt, characterized by parking lots and empty fields. Photo taken March 2024.

Figure 23. High rise block in Efra-Breiðholt with parking lot. Also known as the most populous area in Iceland. Photo taken March 2024.

Between the two data sets, Laugarás emerged as a newer area, where satisfaction was low in all categories, despite being surrounded by two high satisfaction areas (Sund and Lækir). The area can be characterised by high-rise buildings and bounded by Sæbraut, which is a very busy and noisy road (Figures 24-28). Many buildings in this area also have a view of the industrial area just across the way from Sæbraut (Figures 25-26). It is likely that, due to the nature of high-rise buildings, there is not much light in the apartments, especially during winter (Figure 24, 27, 28). The area is in close to Laugardalur with its recreational spaces. However, many essential services and locations are just out of reach of the 15-minute walking distance. Furthermore, the neighbourhood bus line (14) runs 3-4 times an hour and goes by some centers like Glæsibær and Skeifan. Those centers provide quite a few essential services, although still dominated by parking lots that make moving around there difficult as a pedestrian. There could therefore be a lack of places for social gathering and essential services like healthcare.

Figure 24. Apartment blocks in Laugarás by Sæbraut. Photo taken March 2024.

Figure 25. View across Sæbraut from Laugarás area. Photo taken March 2024.

Figure 26. View across Sæbraut from Laugarás area, with Esjan and Eimskip. Photo taken March 2024.

Figure 27. High rise apartment blocks in Laugarás. Photo taken March 2024.

Figure 28. Apartment blocks by Sæbraut. Sæbraut at this point is 6 to 8 lanes wide. Photo taken March 2024.

In many areas, particularly that have turned cold between the years, one underlying reason could be increased development and construction, which tends to be a slow process that affects the life of local residents for a while. One example is Kársnes, which on paper is like Laugarás, with good access to essential services, schools, recreational areas and nature, and people living in private houses, but where satisfaction with the local environment is low. We suspect that the construction of the Kársnes peninsula has a lot to do with this dissatisfaction. On top of that, with the development of the Blue Lagoon, the area receives increased traffic, including heavier vehicles like trucks and buses.

Similarly, in Foldir in Grafarvogur, where there is a lot of greenery, private houses, basic services, satisfaction is low, although not much construction is happening in the area. On the other hand, the nearest grocery stores there are quite far (minimum 30min walking) and bus connection is more scarce. This could be affecting satisfaction with the local area.

Conclusion

The project “Where do all the happy people live?” focused on identifying areas in the Reykjavik Capital Area with high life satisfaction, the so-called “happiness hotspots” with the aim of spotting areas in the urban fabric which might require more attention to improve the local environment there.

The project set out three main goals:

1. Examining life satisfaction parameters in two data sets at two different time points
2. Mapping life satisfaction indicators to identify “happiness hotspots”
3. Qualitative analysis of “happiness hotspots” and their commonalities

Life satisfaction changes over time and is influenced by various factors. In addition, high satisfaction with different aspects of one’s life does not necessarily equate with happiness, or vice versa (Ruggeri et al., 2020). On average, life satisfaction in the Capital Area is relatively high (median 7-8), which is also corroborated by prior studies (Ziogas & Ballas, 2024). Because our data was gathered from different people at two time points, direct conclusions should not be drawn from this analysis. Rather, the analysis should serve as an indication of possible changes happening in various areas across the Capital Area.

Some key common elements emerged for “happiness hotspots”. Namely, green spaces and proximity to nature was associated with higher satisfaction. Furthermore, “happiness hotspots” were more likely to have private houses or low-rise multi-family homes, which have garden spaces (private or shared). Also, access to essential services, especially within a 15-minute walking distance, seemed important. Particularly important could be the proximity of more affordable supermarkets like Krónan or Bónus (compared to typical corner stores like Krambúðin).

We also looked for any commonalities between areas of low satisfaction, or “happiness coldspots”. Many of these common aspects are the opposite of those found in “happiness hotspots”. One aspect that we noticed was lack of greenery within the neighbourhoods, and the excess of built-up environment and infrastructure (including proximity to big roads). Also, many of these cold spots had high-rise buildings, blocking out the already scarce daylight, which could affect people’s mood and wellbeing, especially in the winter months (Kristinsdóttir, 2023; Reynisson, 2022). Another similar aspect was the lack of essential services available on a neighbourhood level. If grocery stores were more than a 20-minute

walk away, that would encourage people to take a car instead of walking. But taking a car adds to the overall commuting stress, driving up people's dissatisfaction. The importance of public transport connectivity in people's assessment of satisfaction was unclear. This could be in part due to the low popularity of the bus system already, or conversely, the popularity of car ownership.

Due to the overall wealth of the Icelandic society, it can be difficult to spot areas that might be affected by income disparities. However, satisfaction with one's local environment seems to go hand in hand with satisfaction with one's material standard of living. As the 2022 respondents were likely influenced by the COVID-19 pandemic, where the financial situation of many suffered, it is important to consider the shift in the cost of living as part of satisfaction with the local environment. Part of the lower satisfaction with the local environment could therefore be due to people lacking the ability to choose where they live due to financial constraints. Therefore, people might end up living in a place that is less connected and further from their day-to-day destinations.

Lastly, to answer the question posed in the title of the project, "where do all the happy people live?", it seems that people in general tend to be more satisfied when their material standard of living is higher or satisfactory to them. Having a better material standard of living (including financial status) can support having more options for choosing where one wants to live. Therefore, we can see high satisfaction in wealthy areas like Garðabær, and low satisfaction in lower wealth areas like Breiðholt. We should turn our attention to improving areas which have lower satisfaction with material standard of living combined with lower satisfaction with the local environment. Even though financially some people might not be able to choose living in a greener area or an area with better infrastructure, does not mean their living environment should be neglected. Indeed it should be in those areas where focus is on improving transport, access to services, and de-concreting the local area (or conversely greening the area).

In summary, high satisfaction seems to be linked to satisfaction with wealth, but also proximity to greenery and services. Vast concrete areas and parking lots are not conducive to improved wellbeing. Although it is difficult to improve already built areas, like in Breiðholt, areas could shift their built environment to have more usable outdoor spaces with both high- and low-level foliage, and to bring in more color into neighborhood design. A stronger emphasis on service accessibility within a 15-20-minute walking radius seems important for satisfaction with the local environment. This ties in to transport planning, which should be pushing a faster shift to public transport and active transport modes, thus reducing the need

for paved infrastructure. Furthermore, paved infrastructure (i.e. parking lots) should be made permeable. Permeable concrete and pavement used on roads has many environmental benefits, including stormwater catchment, urban heat island effect mitigation, and noise reduction from traffic (i.e. Kayhanian et al., 2015; Xie et al., 2019). Lastly regarding transport, pedestrian safety within the transport network needs stronger consideration (Ragnarsson, 2024).

Strengths and limitations

The project investigates “happiness hotspots” spatially and qualitatively across two data sets at two time points. Although the surveys have different sample sizes and participants, spatially they still give some general indications of satisfaction in regions around the Reykjavik Capital Area and help observe some bigger changes. The project identified some areas for improvement and consideration in future planning processes.

The surveys reached a limited number of people, and thus the spatial coverage is not complete for the capital area. Therefore, estimations had to be made to see broader patterns. When considering the results, planners should also take into consideration the concentration of respondents in those areas. The authors tried to consider this in the analysis and to focus more on areas with better respondent coverage or with notable changes.

Also, seasonality might have affected how respondents feel during the survey. Particularly, the 2022 survey which was sent out in the Autumn-Winter period could have seen effects of low moods associated with wintertime in the North. Personality and mood have also been noted as potential influencing factors in prior literature on wellbeing surveys (Pavot & Diener, 2008).

Also, as indicated by prior studies, the wording and distinction between questions could influence how people respond (Pavot & Diener, 2008; Diener et al., 2013). For example, 2022 had some more detailed questions like asking about material standard of living and financial situation separately, or like asking about living environment and housing separately (although they had the same mean value in our sample). It might not be so clear to respondents what the difference is between these two options. Furthermore, we might see more accurate results when combining life satisfaction questions using factor analysis, distinguishing more broadly between eudaimonic and material wellbeing. For the purpose of this analysis they were left separate to study the satisfaction with the local environment in more detail.

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Appendix A.1

Table 4. Statistical overview of life satisfaction categories/items in the 2017 PPGIS survey.

									Skewness		Kurtosis		Shapiro-Wilk		Percentiles		
How satisfied are you with...?	**Variable name**	**N**	**Missing**	**Mean**	**Median**	**SD**	**Minimum**	**Maximum**	**Skewness**	**SE**	**Kurtosis**	**SE**	**W**	**p**	**25th**	**50th**	**75th**
your life as a whole these days	satisfactionLife	667	0	7.35	8	2.2	0	10	-1.307	0.095	1.503	0.19	0.87	< .001	7	8	9
your material standard of living	satisfactionMaterial	667	0	6.67	7	2.5	0	10	-0.947	0.095	0.322	0.19	0.91	< .001	5	7	8
your current state of health	satisfactionHealth	667	0	6.99	8	2.5	0	10	-1.023	0.095	0.42	0.19	0.89	< .001	6	8	9
your personal relationships	satisfactionPersonal	667	0	7.57	8	2.3	0	10	-1.319	0.095	1.306	0.19	0.85	< .001	7	8	9
feeling part of your community	satisfactionCommunity	667	0	6.84	8	2.6	0	10	-1.038	0.095	0.409	0.19	0.89	< .001	6	8	9
the quality of your local environment	satisfactionLeisureTime	667	0	6.03	6	2.6	0	10	-0.49	0.095	-0.581	0.19	0.95	< .001	4	6	8
your main occupation such as job or studies	satisfactionJobStudies	667	0	7.09	8	2.4	0	10	-1.231	0.095	1.109	0.19	0.87	< .001	6	8	9
things you are achieving in life	satisfactionLocalEnvironment	667	0	7.29	8	2.1	0	10	-1.311	0.095	1.779	0.19	0.87	< .001	7	8	9
the amount of time you have to do things you like doing	satisfactionAchieving	667	0	6.92	7	2.4	0	10	-1.15	0.095	0.956	0.19	0.88	< .001	6	7	8
how safe you feel	satisfactionSafety	667	0	7.85	8	2.2	0	10	-1.588	0.095	2.339	0.19	0.81	< .001	7	8	9

Appendix A.2

Table 5. Statistical overview of life satisfaction categories/items in the 2022 carbon footprint survey.

									Skewness		Kurtosis		Shapiro-Wilk		Percentiles		
How satisfied are you with...?	**Variable name**	**N**	**Missing**	**Mean**	**Median**	**SD**	**Minimum**	**Maximum**	**Skewness**	**SE**	**Kurtosis**	**SE**	**W**	**p**	**25th**	**50th**	**75th**
your life as a whole these days	lsat_all	1534	19	7.36	8	1.9	0	10	-1.177	0.063	1.63505	0.13	0.89	< .001	7	8	9
your standard of living	ds_living	1531	22	7.64	8	2.2	0	10	-1.15	0.063	1.03768	0.13	0.88	< .001	7	8	9
your financial situation	ds_finance	1529	24	6.91	8	2.4	0	10	-0.837	0.063	0.0575	0.13	0.92	< .001	5	8	9
your health	ds_health	1524	29	6.91	7	2.2	0	10	-0.844	0.063	0.36083	0.13	0.93	< .001	6	7	8
your personal relationships	ds_personl	1517	36	7.63	8	2.2	0	10	-1.27	0.063	1.45905	0.13	0.87	< .001	7	8	9
how you participate in society	ds_society	1513	40	6.8	7	2.3	0	10	-0.829	0.063	0.38197	0.13	0.93	< .001	5	7	8
your local area as a place to live	ds_local	1517	36	7.95	8	1.9	0	10	-1.343	0.063	2.08715	0.13	0.86	< .001	7	8	9
your housing conditions	ds_house	1520	33	7.95	8	1.8	0	10	-1.263	0.063	1.99882	0.13	0.88	< .001	7	8	9
your job or studies	ds_job	1440	113	7.4	8	2.3	0	10	-1.371	0.065	1.79612	0.13	0.86	< .001	7	8	9
things you are achieving in life	ds_achieve	1487	66	7.35	8	2.2	0	10	-1.174	0.064	1.32507	0.13	0.89	< .001	6	8	9
meaning or purpose in life	ds_purpose	1492	61	7.54	8	2.3	0	10	-1.267	0.063	1.34788	0.13	0.86	< .001	7	8	9
the amount of time you have to do things you like doing	ds_time	1506	47	6.75	7	2.3	0	10	-0.7	0.063	-0.001	0.13	0.94	< .001	5	7	8
how engaged and interested you are in your daily activities	ds_engage	1500	53	6.63	7	2.3	0	10	-0.808	0.063	0.19646	0.13	0.93	< .001	5	7	8