IHS
Making cities work

IHS is the international institute of urban management of Erasmus University Rotterdam

MSc Programme in Urban Management and Development

Rotterdam, The Netherlands

September 2015

Thesis

Title: Absence of Architecture: Visual and Spatial Characteristics of Microrayons and Life Satisfaction in Moscow

Name: Marina Salimgareeva

Supervisor: Ronald Wall

Co-Supervisor: Martijn Burger

Specialization: Urban Competitiveness and Resilience (UCR)

UMD 11

MASTER'S PROGRAMME IN URBAN MANAGEMENT AND DEVELOPMENT

(October 2014 – September 2015)

Absence of Architecture: Visual and Spatial Characteristics of Microrayons and Life Satisfaction in Moscow

Marina Salimgareeva

Russian Federation

Supervisor: Ronald Wall

Co-Supervisor: Martijn Burger

UMD 11 Report number:

Rotterdam, September 2015

Summary

Happiness is a somewhat abstract concept that has long been considered immeasurable. However, in recent decades, the academic community accepted that a self-reported level of happiness is a valid measure of one's well-being. Together with growing criticisms of monetary methods of measuring quality of life, this has resulted in the emergence of a new academic field, the economics of happiness, which is nowadays developing rapidly.

Existing happiness studies agree that the most important factors impacting happiness are related to one's personality and private life, but that there are benefits to be gained in studying the effects of external conditions. One of the most important such conditions is the immediate environment, as represented by housing, associated with a number of basic needs and activities and thus a major consideration for most people.

For the majority of residents of Moscow, their living environment is similar to that of any other post-Soviet city, and is composed of microrayons or microdistricts, the product of an ambitious mass housing program initiated in the 1950s. This program resulted in the provision of new apartments to tens of millions of Soviet families, but its achievements were quickly overshadowed by the low quality of construction and the ubiquity of featureless buildings. Over the course of time, economic, political, and social conditions changed dramatically, raising questions on the current meaning of microrayons. The Moscow authorities have recently initiated a discussion on this matter, with the intention of promoting a different housing typology based on the concept of enclosed mid-rise urban blocks. Appropriate research on this proposal has not yet been made public, however.

This thesis seeks to conduct an interdisciplinary investigation and connect the concept of happiness to the architectural characteristics of the microrayon neighborhood environment, in order to contribute both to the field of happiness research and to the understanding of the current position of microrayons in the life of Muscovites.

The methodology of the study included quantitative analysis applied to the primary data, which was collected by survey. The survey was distributed online, covering predominantly young and well-educated residents, and on the streets, targeting an older population. The results of the survey were used for statistical analysis using an ordinary least squares regression, in order to determine the possible effects of living in a certain housing typology on happiness and such life aspects as health, social relations, and satisfaction with housing.

The analysis revealed a modest but statistically significant negative effect of living in microrayons, compared to living in housing built in the Stalin era. The effect on happiness was partly explained by aspects such as satisfaction with one's apartment and appearance of the building, the number of custom designed buildings in the vicinity and an estimation of their appearance, dimensions, and spatial allocation. The same indicators were found to be applicable in explaining the differences in housing satisfaction between typologies. Moreover, such factors as visual appearance of the district and number of custom designed buildings in the locale accounted in part for the differences in mood, quality of local social relations, and satisfaction with health of the residents living in different typologies.

The research findings indicate that the current policy of Moscow authorities to abolish this type of housing in favor of more diversified, small-scale and enclosed complexes would contribute positively to the quality of the living environment and lives of Muscovites. However, changing the approach to new construction may be considered insufficient, and the Soviet microrayons should be brought to the forefront of public and professional discussions in order to develop solutions for improving the living environment at the neighborhood and apartment level.

Keywords

Happiness, Subjective Well-being, Housing Satisfaction, Soviet Microrayons, Microdistric

Acknowledgements

Firstly, I would like to express my gratitude to my supervisor Dr. Ronald S. Wall for first inspiring me to study the relationship between architecture and happiness and then guiding me through this process.

The idea for this thesis emerged from the study, *"Archaeology of the Periphery"*, commissioned in 2013 by the Moscow Urban Forum from a large group of multidisciplinary specialists under the guidance of Y. Grigoryan. The particular reference by S. Sitar to the ideas of P. Aureli on the differentiation of urban development consistent with the architectural principles of space organization and the opposite process of spontaneous urbanization, provided the idea of examining the microrayon environment as a prominent example of economically-driven design, in the context of happiness.

Further, I would like to thank my co-supervisor, Dr. Martijn J. Burger, for his continuous support and insightful comments, which greatly contributed to my understanding of the concept of happiness.

I am also immensely grateful to Anastassia Smirnova, who inspired me with her work and recommendations in the early stages of the research, and provided perspicacious remarks in the final phase.

My special thanks go to the people who made my research possible in its intended volume and scope by helping to distribute it online, namely Ilya Varlamov and Irina Pravnichenko from "City Projects", and Olga Shamina from "Big City". I am also very grateful to those who volunteered to help me with offline data collection and processing. In particular, I am indebted to Christina Bobrova, Stepan Zakharov, Olga Kiseleva, Liza Corsi, Dmitry Bolshakov, Ilya Zhukov, Olga Karyaeva, and Emilia Arslanova.

Furthermore, I would like to thank the Moscow Department of Information Technology for providing access to the database of all residential buildings in Moscow.

I thank Kuba Snopek for helpful advice and information on microrayons.

Finally, l would like to express my gratitude to all the IHS staff, and particularly Monserrat Budding-Polo Ballinas, Dr Spyridon Stavropoulos, and Kirill Zakharov, who supported me and helped to solve the issues experienced in the process.

Abbreviations

IHS	Institute for Housing and Urban Development Studies
GDP	Gross Domestic Product
USSR	Union of Soviet Socialist Republics
DSK	Domostroitel'nyi Kombinat/ Housing Construction Combine
CIAM	International Congresses of Modern Architecture

Glossary

Discreteness – an allocation of buildings that does not allow for enclosed courtyards, but instead represents open spaces with scattered buildings.

Domain satisfaction – a level of satisfaction with a particular domain of life, such as work, home, or family relationships.

Happiness – mainly represented in this study by its measurable aspect, the concept of subjective well-being and the self-evaluation of how happy a person is.

Housing construction combines – factories established in the late 1950s to produce prefabricated elements for the implementation of a mass construction program.

Human scale – the scale of building dimensions in line with the capacity of human perception.

Individually designed buildings – in the context of this research, in which only multidwelling units were considered, the term refers to multifamily non-standardized housing

Khrushchevki – the first generation of microrayons built between the late 1950s and early 1960s.

Large-scale housing – residential architecture characterized by wide distances between buildings and a large number of floors.

Microrayons – microdistricts, the basic elements of city planning in the Soviet Union after the 1950s, represented by standardized prefabricated buildings.

Monotony – in general use, the term describes a high degree of homogeneity and repetitiveness of buildings. With respect to the empirical data, monotony refers to the proportion of standardized buildings in the local area, due to the process by which it was operationalized.

Stalin residential architecture – residential complexes in the Neoclassic style, built in the 1930s -1950s and characterized by spacious apartments, enclosed courtyards, and decorative facades.

Subjective well-being – a self-reported measure of one's happiness.

Visual pleasantness of the built environment – a measure of the appearance of a location, based on subjective evaluation by its residents.

Urban block – a housing typology mainly found in historical European cities and characterized by enclosed private courtyards, narrow public streets alongside the blocks, and moderate dimensions of buildings and spaces.

Table of Contents

List of Tables

List of Figures

Chapter 1: Introduction

1.1.1 Background

The direct measurement of happiness is a relatively new concept in social science, particularly in the field of urban studies, although the number of publications on this topic has rapidly expanded in the last decade (MacKerron, 2012). The happiness of citizens is increasingly promoted as a more appropriate measure of public policy assessment than indicators of economic performance and wealth. In general, happiness is interpreted as a subjective assessment of the individual's satisfaction with life as a whole (Veenhoven, 2009). A number of scholars propose an additional interpretation of the overall satisfaction with life as a culmination of the satisfaction gained from various domains of life (Van Praag, Frijters, et al., 2003, Van Praag and Ferrer-i-Carbonell, 2007). In this context, domain satisfactions mediate an indirect influence of certain aspects of life on happiness.

Most studies on life satisfaction and happiness typically focused on the function of income, GDP, unemployment, and other economic factors (Florida, Mellander, et al., 2013). In recent years, however, growing research interest in non-economic factors has emerged, with a number of studies citing geographical factors as influencing happiness and determining the characteristics of places that can predict levels of life satisfaction and happiness (Ballas, 2013, Aslam and Corrado, 2011, Brereton, Clinch, et al., 2008). The place of living in particular, in predicting happiness, is generally appraised in respect to housing expenses, social climate, local benefits, natural and cultural amenities, and environmental conditions (Ballas, 2013, Florida, Mellander, et al., 2013). Nevertheless, relatively little attention has been shown to the visual and spatial characteristics of the living environment, particularly the architectural aspects of housing that shape the immediate surroundings and affect human behavior and emotions. A body of influential work by Jacobs (1961), Gehl (1987/2011), De Botton (2008), Montgomery (2013) and others propose strong theoretical grounds for including an architectural dimension in the comprehensive examination of subjective well-being predictors.

In many countries, particularly in Central and Eastern Europe, a description of the most common place of living would include modernist large-scale housing estates. In Russia, for example, 80% of the urban fabric consists of microrayons or microdistricts, primary residential units from the former Soviet Union (Goldhoorn and Sverdlov, 2009). Microrayons appeared as the result of a large-scale program of flow-line housing production which started in 1956 and housed 54 million people in apartments by 1964 (Bronovitskaya, 2009). Nowadays, microrayons from the first construction period, known as Khrushchevki, still constitute half a billion of the 2.8 billion square meters of housing stock in Russia (Urban, 2013).

Given the exuberant pace of the implementation program, Moscow, as the capital and the most populous city in the USSR, hosted housing innovations to the greatest extent and experienced precipitous expansion in the second half of the twentieth century due to relentless construction and incremental growth in the number of stories erected.
Several prominent periods of multi-dwelling construction in Moscow can be distinguished, each driven by a certain ideology and thus resulting in different typologies which reflect the political and economic demands of the time. The first attempts of the Soviet government to introduce an affordable housing program started after the end of the Second World War, but the scale of development in the late 1940s was moderate and the spatial organization of districts was based on the traditional model of urban blocks, a typology characterized by enclosed courtyards with regular plan bounded on every side by streets (Volkov, 1982,

Urban, 2013). Apartments were intended for use either as individual dwellings for the privileged classes, or as shared accommodation for several families of ordinary city-dwellers. The situation became ever more pressing, as the main focus of state policy was on the construction of custom designed and amply decorated buildings adjacent to major highways, while many ordinary people resided in basements and barracks (Josephson, 2014). Following the death of Stalin, a shift in ideology prompted a major reversal of state policy regarding affordable housing. In contrast to the previous agenda, the program introduced in 1956 delivered individual apartments to various levels of society, with Stalin's successor, Khrushchev, favoring simplistic and cost-effective dwellings over architectural icons (Wagenaar and Hofer, 2004). Bogdan Tscherkes noted, "Instead of painting illusory pictures of future happiness, symbolized by sumptuous palaces and luxurious architecture, daily labor is now shown as a source of genuine happiness" (Wagenaar and Hofer, 2004, p. 41).

The concept of microrayons stems from the early Soviet projects of enlarged urban blocks and houses-communes developed in the 1920s; despite the fact that the eventual concept was adopted from the work of the American planner Clarence Arthur Perry, the first microrayon experiments of the middle 1950s which sought the right living space prototype still bear traces of the Soviet Avant-garde ideals (Volkov, 1982). The architects viewed the turn in state policy as an opportunity to revive the search for a new housing type, a hybrid between residential and public building with integrated communal services and leisure facilities (Khazanova, 1980). Many audacious initiatives were proposed or even implemented in the early stages of microrayons development, but later abandoned, such as house kitchens, "good services bureaus", rental centers, portable outer walls, and roof gardens (Reid, 2005, Zamanskii and Kozlovskii, 1962). One of the main principles of microrayon design, blatantly violated in the post-Soviet period, was the separation of pedestrian and transport routes, corresponding with the overall modernist idea of functional segregation (Volkov, 1982).

The first microrayon developed in Moscow, Cheremushki 9C, was designed in experimental mode and included a great variety of apartment layouts, architectural materials, elements, and details; some apartments had singular features such as bathrooms with daylight and openings in the kitchen wall for food distribution (Rubanenko, B., 1959). The experiment was acknowledged as a success and awarded with a USSR state prize, but was not further utilized in all its variety and detailed elaboration (Rubanenko, B., 1959). Shortly afterwards, the role of the architect was diminished significantly and the approved standardized series were propagated across multiple Soviet cities. Driven by increasing housing shortages, magnified by the war, the mass construction of cheap and featureless housing was economically and ideologically attractive to the Socialist state and resulted in the appearance of indistinguishable agglomerations of identical residential buildings in most urban environments. Thus, the duplication of projects, regardless of the context and without any particular authorship, led to the spreading of generic housing schemes all over Moscow and in many other Soviet cities. Many new microrayons were named Cheremushki after the prototype, but were lacking the sophistication of the original design (Rubanenko, B., 1959).

The spatial arrangement of microrayons is typified by large open spaces, separated by highways and local driveways and interspersed by a scattering of mono-functional buildings in different combinations (Volkov, 1982). Another distinctive feature is a three-stage system of social infrastructure objects based on the hierarchy, "city center – district center – microrayon center" (Volkov, 1982). The system was designed based on plans for the autonomous provision of all types of facilities, from heat supply to cultural amenities. Therefore, the size of each housing unit was determined by the allocation of child care facilities and pedestrian accessibility to other amenities (Volkov, 1982).

The microrayons of the first generation were composed of five-story buildings scattered around green open spaces, amassed in groups that encompassed cultural, educational, and recreational facilities (Grigoryan, Y., 2013). Among the most obvious features of the environment were discreteness, monotony, small scale, and alignment mainly in the meridian direction (Grigoryan, Y., 2013).

This typology can be considered as a symbol of happiness of the construction period, as it was the first mass-aligned program allowing millions of households to move from shared apartments and cabins to personal dwelling units (Goldhoorn and Sverdlov, 2009). At that moment, people were expected to respond with happiness to the attainment of a private dwelling; equality of living conditions and visual sameness of buildings were perceived as further contributions to overall happiness. Nonetheless, the excitement was soon overshadowed by the low quality of construction, cramped layouts, and homogeneity of the buildings (Urban, 2013).

The next construction period was accompanied by a change in scale through increased numbers of stories, wider distances between buildings, the introduction of corner panels, and more enclosed courtyard spaces (Grigoryan, Y., 2013).

In the 1970s, when criticism of the monotonous microrayon environment became particularly intense, the spatial organization of microrayons was influenced by attempts to create diverse and unusual spaces (Volkov, 1982). However, the public view of the built environment had not changed despite the differences in scale and buildings allocation, as a common fundamental principle of space organization contributed to a generally accepted perception of different types of microrayons as manifestations of the same design (Snopek, 2013).

Until recently, however, the greater part of new housing development in Moscow still employed the same principle of serial production of prefabricated freestanding high-rises. The situation started to change only in 2013, when the Chief Architect of Moscow, Sergey Kuznetsov, promoted the idea that the new urban policy for Moscow should adopt urban blocks as opposed to microrayons (Shchukin, A., 2014). Such statements initiated a discussion on the advantages and disadvantages of standardized housing in the professional community, and an increasing number of architectural bureaus have now started to apply the principles of urban blocks in their projects. This resulted in somewhat controversial results, as current building regulations in Moscow were inherited from the Soviet period and designed to determine the optimal parameters for building allocation within a microrayon; therefore, it is impossible to design a classic urban block without violating these regulations (Grigoryan, Y., 2013). In this context, the Moscow authorities have taken the first steps towards diversification of the design of newly constructed standardized residential buildings. Starting from 2016, the use of the “old” standardized series will be banned and new economic incentives introduced for companies that accept a prescribed set of measures to enhance the appearance of standardized housing.

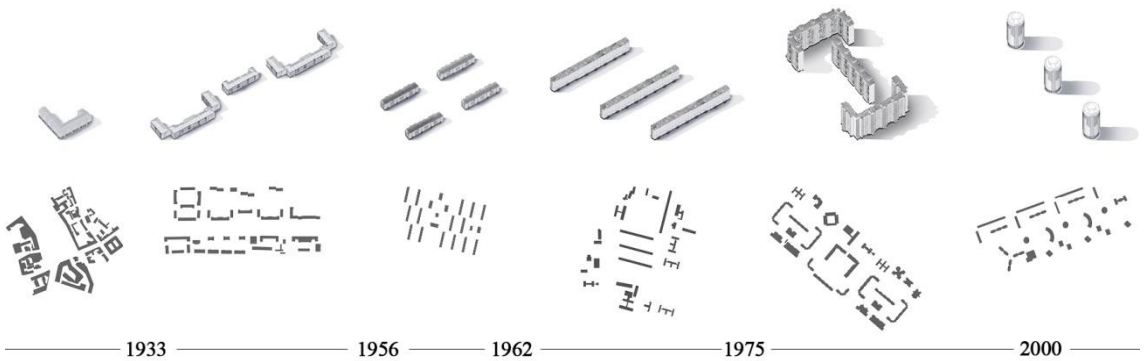


Figure 1. Evolution of housing typologies in Moscow

1.1.2 Problem Statement

According to Aureli (2011), it is necessary to recognize the difference between urban development, consistent with the principles of architecture, and the process of sheer urbanization, lacking architectural value and logic. Since the architectural community was largely excluded from the development of microrayons, the configurations of microrayons were mostly predetermined from an economical perspective in an environment described as an "absence of architecture" (Bronovitskaya, 2009, Lizon, 1996). Ever since the 1960s, microrayons have been widely considered to represent a low-grade living environment, especially in the context of the historical urban fabric of Moscow.

However, it was clear that the economic, social, and political situations changed significantly in the following decades, while notions of the defective nature of microrayons have not been verified. The current campaign against microrayons rests on a long-standing stereotype rather than a thorough analysis.

On one hand, the increasing backwardness of microrayons appears inevitable, as many were built to last for 25 years and have not yet been replaced; a certain number of buildings in disrepair are still inhabited. Additionally, the rising wealth of the population has brought higher expectations of living standards, while the transition to a market economy brought the opportunity to choose a dwelling as opposed to the Soviet system of state allocation. Another major shift in the economic and cultural paradigm influencing Muscovites stems from a transition to a postindustrial and postmodern city, striving for the diversity of urban experiences, scenarios, and functional schemes (Dear, 2001, Grigoryan, Y., 2013). Moreover, it is worth noting the expanding influence of the media, which propagate a negative image of microrayons while promoting illusions of middle-class would-be lifestyles.

On the other hand, the transition to the postindustrial model has led to a general decrease in the significance of physical space in favor of virtual reality. For an increasing number of individuals, a favorable work and living environment is predetermined by access to the Internet, electric power supply, and availability of delivery services, features widely represented in Moscow. Besides, the market liberalization of the 1990s has provided opportunities for residents to finally customize the interiors of their apartments, hence resulting in the inner transformation of microrayons (SVESMI, 2010). Furthermore, the last decades have seen the proliferation of another important component providing escape from the microrayon environment for many Muscovites: dacha, seasonal out-of-town houses. Other considerations of the decreasing role of microrayons include their perception as an authentic habitat by those who grew up within the microrayon environment. At the same time, older generations evaluate their living environment based on childhood memories of the postwar devastation, finding the microrayon environment in this context more than acceptable.

Consequently, the status of microrayons now remains unclear and understudied, though a number of recent projects addressing this topic have emerged, including conceptual projects by bureau SVESMI, research studio, *"Citizens as Customers",* held in 2011-2012 at the Strelka Institute in Moscow, and the report *"The Archaeology of the Periphery"* published by the Moscow Urban Forum in 2013(Grigoryan, Y., 2013, Strelka Specials, 2012, SVESMI, 2009, SVESMI, 2010). These studies illustrate the complexity of the phenomenon and lay the foundation for an inexhaustible field of research. Therefore, the blind acceptance of urban block superiority as a universal theme of city planning, reminiscent of a Soviet way of radical transition from one totalitarian ideology to another, should be called into question (Appenzeller, 2014).

Returning to the role of subjective well-being as a measure of utility, this research proposes a study of current perceptions of microrayons among residents and a bridging of these

perceptions to the concept of happiness. Such an approach would identify the aspects of microrayons habitation that truly matter to its residents and thus require further investigation. Furthermore, this research would add to the methodology of architectural studies, particularly in Russia, by setting a precedent for empirical testing of the impact of architecture on happiness.

1.1.3 Research Objectives

The following research aimed to determine the aspects of living in microrayons which impact the levels of happiness of the residents, and compare these to the effects of living in the closest version of urban blocks found in Moscow, the Stalin housing. Consequently, this study sought to make recommendations for the improvement of existing areas and the refinement of planning tools for future housing developments. Moreover, an evaluation of the utility and validity of the current policy changes in Moscow may be derived from the results.

1.1.4 Provisional Research Questions

Main research question:

- What is the impact of visual and spatial aspects of the built environment on the happiness of microrayon residents in Moscow?

Research sub-questions:

- How are the spatial and visual features of microrayons perceived by their residents?
- Does residence in microrayons have a direct impact on happiness?
- Does residence in microrayons have an indirect impact on happiness through mediating domain satisfactions?
- Do the spatial and visual characteristics of the built environment mediate the expected effects of living in microrayons?

1.1.5 Significance of the Study

The existing literature provides extensive evidence of the influence of contextual factors of the environment on happiness, but rarely considers architecture as an influential factor. In turn, architectural research and design is often based on professional ideals of what benefits people, an observation particularly relevant in Russia. This research aimed to contribute both to the field of happiness studies by providing further evidence of the contribution of the built environment to overall happiness and different domains of life, and to the methodology of architectural research by introducing sociological and econometric perspectives to the study of the built environment.

The significance of visual and spatial characteristics of mass-produced modernist residential areas is revisited, with particular focus on the prevalence of microrayons in many Central and East European countries. The current situation in Moscow provides favorable conditions for such a discussion, as municipal authorities currently promote the antinomy between microrayons and urban blocks. This research therefore assesses the actual perception of microrayons, as opposed to that of the closest interpretation of urban blocks in Moscow, the Stalin residential architecture, and the contribution of both types the lives of Moscow residents. Therefore, the results can potentially facilitate correspondence between professional viewpoints and the actual needs and perceptions of Muscovites, in order to bring greater utility to future housing development and introduce elements of a bottom-up approach

to local urban policies. Finally, the research aimed to identify the most pressing issues of the existing Moscow microrayons that require immediate redress.

1.1.6 Scope and Limitations

The thesis focused primarily on the visual and spatial organization of the microrayon neighborhood environment in Moscow.

The research considered microrayons, built both in the Soviet and post-Soviet periods plus non-microrayon typologies, allowing a comparison between different configurations of the built environment. The principal analytical model encompassed the following groups:

- "Stalin" residential architecture built in the 1930s-1950s,
- the first microrayon typology, the five-floor "Khrushchevki",
- mid-rise microrayons,
- high-rise microrayons, and
- high-rise custom designed housing.

While visual and spatial characteristics of the built environment were the main subject of this research, other sensory stimuli and socio-economic conditions were included as control and mediating variables. The personal characteristics of residents were also considered, although a limited coverage of the control variables was observed. The survey mainly observed the characteristics of households and housing that contributed to subjective well-being in general cases, but for a deeper understanding of life in microrayons, issues pertaining to the history of the relationship between a person and their place of living should be addressed.

The scale of the study suggested an examination of effects at the level of the courtyard and neighborhood, with minor exceptions. A smaller scale was not addressed in the analysis due to time limitations and sample size. It was advised to address the characteristics of microrayons at the level of the building and apartment during the further qualitative stages of the research.

The limited timeframe and resources available determined that the research targeted the most accessible social groups, hence a major limitation in the representativeness of the results. Moreover, due to the unique position of Moscow as the wealthiest and the most populous city in Russia, the results are not representative of the entire Russian population. Besides, the specifics of microrayons prevent the findings from being attributed to the modernist estates of the West, but instead provide a starting point for similar research to be undertaken.

Chapter 2: Literature review

This chapter reviews the existing literature related to happiness, and attempts to place it in the context of the microrayon environment. Firstly, a general conceptualization of happiness is provided, describing the main predictors of happiness, followed by a discussion of the concept of domain satisfaction. The national and metropolitan specifics of the happiness evaluation in Moscow are considered, before shifting focus to the role of regional and environmental factors in predicting happiness, highlighting the importance of geographic dimension in happiness studies and the role of the neighborhood scale. The section concludes with a conceptual framework summarizing the mechanisms by which the built environment affects happiness. In the following section, the impact of the built environment on life domains is explained in more detail, with respect to the spatial and visual characteristics of the environment. The next section provides an overview of the concept of microrayons in the context of public housing in Western countries, and the concluding section includes a hypothesis describing the relationship between happiness and the built microrayon environment.

2.1 Understanding Happiness

2.1.1 The Concept of Subjective Well-being

The concept of subjective well-being, as an equivalent to happiness, has gained increased attention in recent decades in the fields of sociology, psychology, and economics, due to the obsolescence of the utilitarian concept of holding consumer behavior as a predictor of happiness levels. Previously, the conventional method of measuring happiness was based on the assumption that people generally are incapable of measuring the level of attained happiness; therefore, the most accurate approach is to observe a person's life situation, market behavior, and preferences (Van Praag and Ferrer-i-Carbonell, 2011, Veenhoven, 2010). However, emerged that the imperfections of information and complexity of life scenarios prevent people from making decisions that increase happiness, while direct questioning on the assessment of one's life is nowadays accepted to be a reliable source for evaluating happiness levels (Van Praag and Ferrer-i-Carbonell, 2011). Thus, happiness can be equated to the outcome of a personal evaluation of one's life; hence it is common to use the terms "subjective well-being", "life satisfaction", and "happiness" interchangeably in contemporary literature. In this work, the same principle was employed.

Several views exist on how the mechanisms of subjective evaluation of life operate from a psychological point of view. The most notable are Set-point theory, suggesting that happiness levels are predetermined by personality traits, Comparison theory, assuming that subjective well-being is purely the result of a cognitive comparison between one's life situation and external standards or expectations, and Affect theory, which interprets happiness as an expression of affective experience dependent on the gratification of innate needs (Veenhoven, 2009).

The first model, Set-point theory, implies that happiness is an internal quality of every individual and therefore not subject to the influence of external factors. Since every approach is backed by consistent reasoning, and that it is difficult to imagine that such a complex matter as happiness can be explained by one mechanism only, an assumption can be made that all scenarios are involved in the process of life evaluation to a certain extent. However, Veenhoven (2009) disputes the theory that happiness can be explained exclusively by personality and proposes that it can be influenced by public policy.

2.1.2 The Main Predictors of Subjective Well-being

A considerable body of work has been conducted to try and identify the most significant factors influencing happiness. Despite certain variances, this research provides an overview of the main principles behind subjective well-being composition.

One of the most widely recognized classifications of the factors affecting happiness was formulated by Layard (2005), and is known as the "Big Seven". The author claims that seven particularly important aspects of life exist, in the following order of "importance":

- family relationships,
- financial situation,
- work,
- community and friends,
- health,
- personal freedom, and
- personal values.

Moreover, Dolan, Peasgood, et al. (2008) provided an extended literature review on the most probable determinants of subjective well-being. The results concur with those of the previous author and are represented by the following groups (Dolan, Peasgood, et al., 2008):

- income (nominal and relative income, and aspirations),
- personal characteristics (age, gender, ethnicity, and personality traits),
- socially developed characteristics (education, health, occupation, and employment status),
- how people spend time (hours worked, commuting, caring for others, community involvement and volunteering, exercising, and religious activities),
- attitudes and beliefs (towards circumstances, trust, political persuasion, and religion),
- relationships (marriage and intimate relationships, having children, and contact with family and friends), and
- wider economic, social, and political context (income inequality, unemployment rates, inflation, welfare system and public insurance, degree of democracy, climate and the natural environment, safety and deprivation of the area, and urbanization).

The most important conclusions were that income has a positive but diminishing effect on happiness, while health problems, unemployment, lack of social contact, and separation have a strong negative impact on subjective well-being (Dolan, Peasgood, et al., 2008).

Further work by Van Praag and Ferrer-i-Carbonell (2011) showed similar conclusions, indicating age, gender, income, health, and unemployment as the most influential factors in predicting happiness among different countries; however, valuable statements were made on the dependence of effects of the social structure in different countries and the limitations in establishing a causal relationship between these indicators and happiness.

2.1.3 Overall Satisfaction and Domain Satisfactions

The cognitive component of subjective well-being explains an individual’s satisfaction with life as a whole, while some scholars go further to quantify a person’s satisfaction with specific domains of life, such as work, health, relationships, housing, etc. Several studies represent overall satisfaction with life as an aggregate of perceived satisfaction levels in

separate realms (Andrew and Withey, 1976, Van Praag and Ferrer-i-Carbonell, 2007, Van Praag and Ferrer-i-Carbonell, 2011, Van Praag, Frijters, et al., 2003). As illustrated in Figure 2, this research showed that overall satisfaction can be influenced by certain indicators, not only directly, but also through changing the balance of domain satisfaction (Van Praag and Ferrer-i-Carbonell, 2011).

Figure 2. Impact of independent variable X on satisfaction with life in general (Van Praag and Ferrer-i-Carbonell, 2011).

An alternative perspective, however, suggests the opposite causal relationship; Heady et al. (1991) showed that one's level of happiness was more likely to predetermine domain satisfaction than to experience its impact. This view is referred to as a top-down approach, while the previously discussed contrasting opinion is termed a bottom-up model (Diener, 1984).

In this thesis, a bottom-up relationship is assumed; therefore domain satisfactions are considered mediators of the indirect effects of the built environment on happiness. Thus, the literature review focuses on the domains most closely associated with the built environment, such as housing, community, and health.

2.1.4 National and Metropolitan Effects on Happiness in Moscow

Most global research into happiness shows that people in Russia and other post-Soviet countries have considerably lower levels of life satisfaction for their income group than average (Abbott and Sapsford, 2006, Guriev and Zhuravskaya, 2009, Veenhoven, 2001). Traditionally, this gap is explained by the negative manifestations of the transition process from the administrative-command system, low social trust, economic instability, and an undeveloped institutional environment (Abbott and Sapsford, 2006, Guriev and Zhuravskaya, 2009). While most research on happiness in Russia cites studies conducted in the 1990s, Guriev and Zhuravskaya (2009, p. 167) propose that "In more recent data such as the Life in Transition Survey or the Russian Longitudinal Monitoring Survey levels of happiness are rising, following the growth in per capita GDP". Therefore, the diminishing effects of this transition can be considered in conjunction with increasing financial well-being.

Glebova and Khabibrahmanova (2014) examined a number of indicators of life quality in million-plus population cities in Russia, and identified three main groups of factors:

- social welfare (health, family institution, social life, education, and culture),
- economic well-being (income and employment), and
- living conditions (safety of life, ecology, and living conditions).

2.2 Happiness and Environment

2.2.1 Geographical Focus: Happiness from a Regional and Urban Perspective

The role of the living environment as a determinant of happiness has been examined in multiple studies. Veenhoven (2013) proposes classifying all aspects of life into two groups, chances and outcomes, and inner and outer qualities. This process results in a fourfold matrix of the quality of life, where the first group is presented vertically and the second horizontally, and the livability of the environment is classified as an external factor describing the life chances of an individual (see Figure 3). However, the author indicates that the concept of livability is extremely complex, virtually immeasurable, and multidimensional, being employed by various disciplines in different meanings.

Figure 3. Four qualities of life (Veenhoven, 2013).

In sociology, the most important features of the environment are attributable to the quality (i.e., material welfare and equality) of society as a whole, and to the particular position of an individual in society; in the field of urban planning, the terms livability and habitability are used to describe the quality of the physical setting, infrastructure, and other manmade entities (Veenhoven, 2013).

Apart from interdisciplinary variations in the interpretation of the living environment, its characteristics can be measured on different scales. An increasing number of authors refer to the importance of the application of regional, metropolitan, and neighborhood scales to happiness studies, as most earlier work considered happiness determinants only on a national or personal level (Lawless and Lucas, 2011, Rentfrow, Mellander, et al., 2009). The importance of including a geographical perspective in happiness studies has since been demonstrated in multiple studies (Ballas and Tranmer, 2011, Ballas, 2013, Brereton, Clinch, et al., 2008, Pacione, 2003).

Moreover, predictors of happiness can function differently at state, regional and individual levels (Aslam and Corrado, 2011, Florida, Mellander, et al., 2013, Rentfrow, Mellander, et al., 2009). Pierewan and Tampubolon (2014) examined happiness across Europe and identified clusters of similar levels of well-being due to unobserved regional factors, concluding that regional well-being was subject to local contextual conditions.

Among the most important characteristics of "place and space", relevant on a regional level, are regional GDP growth, regional unemployment rate, income inequality, traditional values, amenities, and climate (Ballas, 2013, Pierewan and Tampubolon, 2014). Florida, Mellander, et al. (2013) identified human capital, housing values, and unemployment as significant factors for happiness on a metropolitan level. Brereton et al. (2008) examined the effects of location-specific factors on happiness at the individual and local level, and showed that climate, transport accessibility, and proximity to cost and waste facilities had an impact on well-being; moreover, the inclusion of spatial variables in the model considerably increased the explanatory power of the happiness function (Brereton, Clinch, et al., 2008).

Leyden et al. (2011) analyzed how the design and living conditions of 10 cities across the globe were related to happiness. It was found that the subjective well-being of residents was

higher in cities with accessible public transportation, cultural and leisure amenities, and favorable conditions for raising children. Furthermore, people were more likely to be happy when they felt connected to places and other residents of their cities, believed that their city was beautiful, and trusted those living around them (Leyden, Goldberg, et al., 2011). The authors also concluded that further research on the relationship between happiness and spatial characteristics within urban areas was required.

Cloutier, et al. (2014) investigated a possible relationship between sustainable urban development and the self-reported happiness of residents using several environmental indices. The study revealed that all four considered indices were positively associated with happiness, two of which were statistically significant. The authors concluded that cities promoting sustainable urban development and a healthy environment provided more favorable opportunities for happiness, but cautioned that the causality of the relationship was not explicitly determined.

However, while acknowledging the importance of local conditions and urban scale, it is necessary to mention that their role is secondary to personal life circumstances. Therefore, the effect of these contextual factors should be analyzed in combination with individual characteristics.

2.2.2 Happiness and the Neighborhood Environment

According to Power et al, (1999), "environmental domain is at least as important as the other basic domains in predicting overall quality of life" (Bonaiuto, Fornara, et al., 2006, p. 24). An examination of the contextual factors contributing to life satisfaction at the neighborhood level is a valuable tool for assessing the outcomes of policy intervention (Pacione, 2003).
In understanding the contribution of these factors, it is necessary to determine the interplay between the neighborhood environment and life satisfaction. Sirgy and Cornwell (2002) tested three models, based on theoretical findings in the literature, to examine the relationship between satisfaction with physical, economic, and social features of the area and overall life satisfaction through mediating domain satisfactions (neighborhood, community, housing, and home satisfaction).

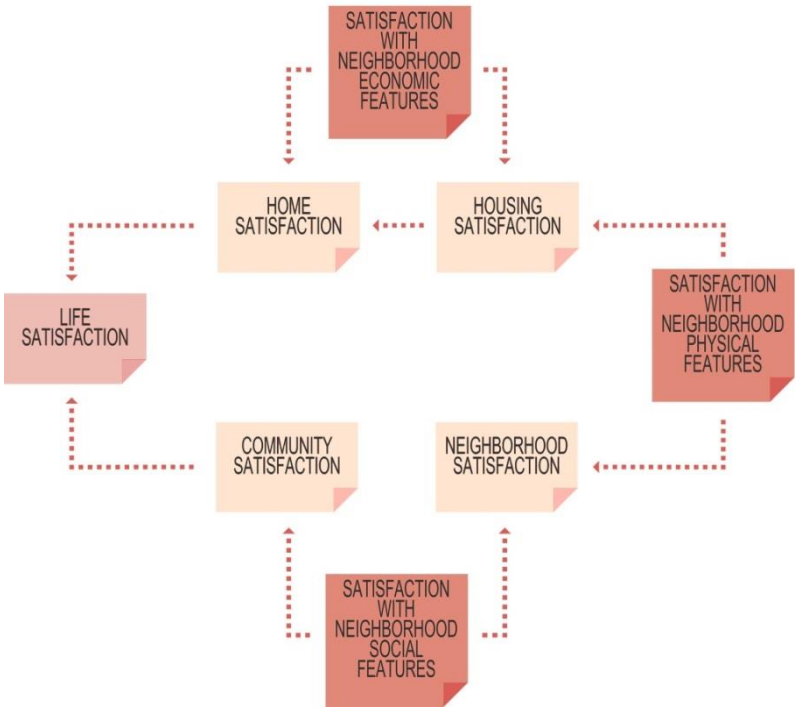


Figure 4. Model of the impact of neighborhood characteristics (Sirgy and Cornwell, 2002).

The results revealed the strongest support for the model proposing that satisfaction with the physical characteristics of the neighborhood contributes to housing and neighborhood satisfaction, the social characteristics of the area influence satisfaction with community and neighborhood, the economic factors have an impact on housing and home satisfaction, feelings about housing affect home satisfaction, while home and community satisfaction directly contribute to overall satisfaction (Sirgy and Cornwell, 2002). Contrary to expectations, the hypothesized impact of neighborhood satisfaction on housing and community satisfaction was not supported by the data. The resulting hypothesis is presented in Figure 4.

Pacione (2003, p. 24) presents an alternative overview of environmental effects by listing a number of theoretical perspectives, summarized in a model based on the role of stress in urban impact. Depending on the coping mechanisms that an individual is capable of implementing, such stress may result in either successful adaptation or cumulative effects, such as mental disorder. The author identified four major groups of environmental stressors (Pacione, 2003, p. 25):

- cataclysmic events—for example, geophysical hazards,
- ambient stressors—for example, air and water pollution,
- stressful life events—for example, a death in the family, and
- daily annoyances—for example, noisy neighbors.

Analysis of the environmental effects on happiness requires distinguishing between objective characteristics and subjective evaluations of the environment and applying both of these domains to the analysis (Pacione, 2003, Van Kamp, Leidelmeijer, et al., 2003). However, Okulicz-Kazaryn (2013a) argues that objective measurements of quality of life are of limited significance, especially in the developed world. On the contrary, subjective characteristics are key to understanding that, "what matters is what we perceive, not what is out there" (Okulicz-Kozaryn, 2013a, p. 15). Figure 5 represents the contributions of objective and subjective variables to the overall perception of the environment, based on the stress model of urban impact by Pacione (2003).

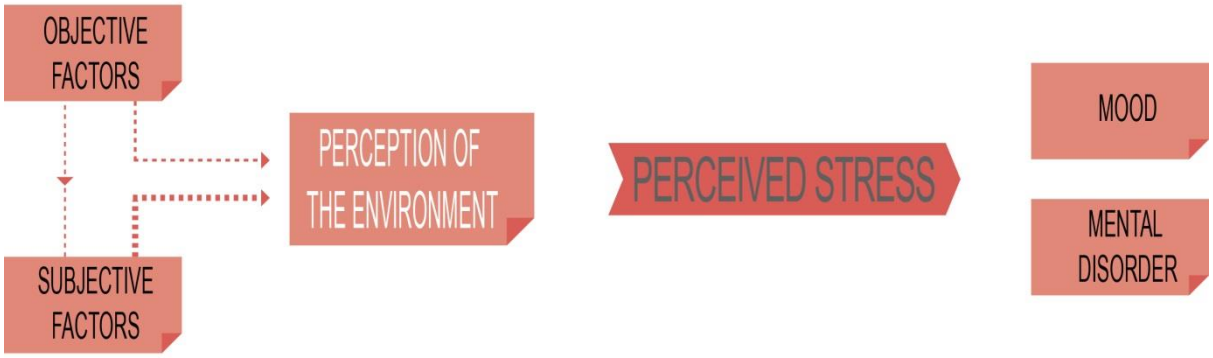


Figure 5. A stress model of urban impact (Pacione, 2003).

An additional insight into the influence of the environment on quality of life is proposed by Matsuoka and Kaplan (2008) in an extensive review of the literature on human needs in the urban landscape. The authors identify two main groups of needs impacted by the urban environment: natural needs, related to the contact with nature, aesthetic preference,

recreation, and play, and human-interaction needs, such as social interaction and privacy, citizen participation in the design process, and a sense of community identity.

To summarize, the the first two sections of this chapter, an overview of the concept of subjective well-being, its main predictors, and the role of contextual urban and neighborhood scales were provided. The findings of these sections outlined a framework for establishing the potential effects of the built environment in microrayons on happiness, and highlighted the supposed mechanisms underlying this relationship.

Notwithstanding the limited impact of contextual factors on happiness, compared to aspects of one's personal life, it is clear that the neighborhood environment influences people's lives in a number of ways which can be represented in a stress model of urban impact (Pacione, 2003). The stressors are recognized as objective characteristics of the environment, or the subjective evaluation of residents, the latter having a greater influence on the quality of life (Okulicz-Kozaryn, 2013b). Objective stress affects one's mood and feelings, while the cumulative effects of perceived stress may result in mental disorders or performance deficits (Pacione, 2003). Apart from the impact of stress, environmental features influence the perception of such life domains as neighborhood, local community, housing, and home (Sirgy and Cornwell, 2002). Besides, the characteristics of the urban environment satisfy a number of human needs, represented by groups of natural and human interactional needs (Matsuoka and Kaplan, 2008). The following section graphically represents, and briefly discusses, how the built environment affects happiness.

2.2.3 Conceptual Framework

The relationship between the built environment and the two main channels for the evaluation of life, cognitive and affective, are reflected in the conceptual framework. It is assumed that the built environment mainly influences how people feel about life through the gratification of certain needs; at the same time, the impact of perceived environmental stress on mood and

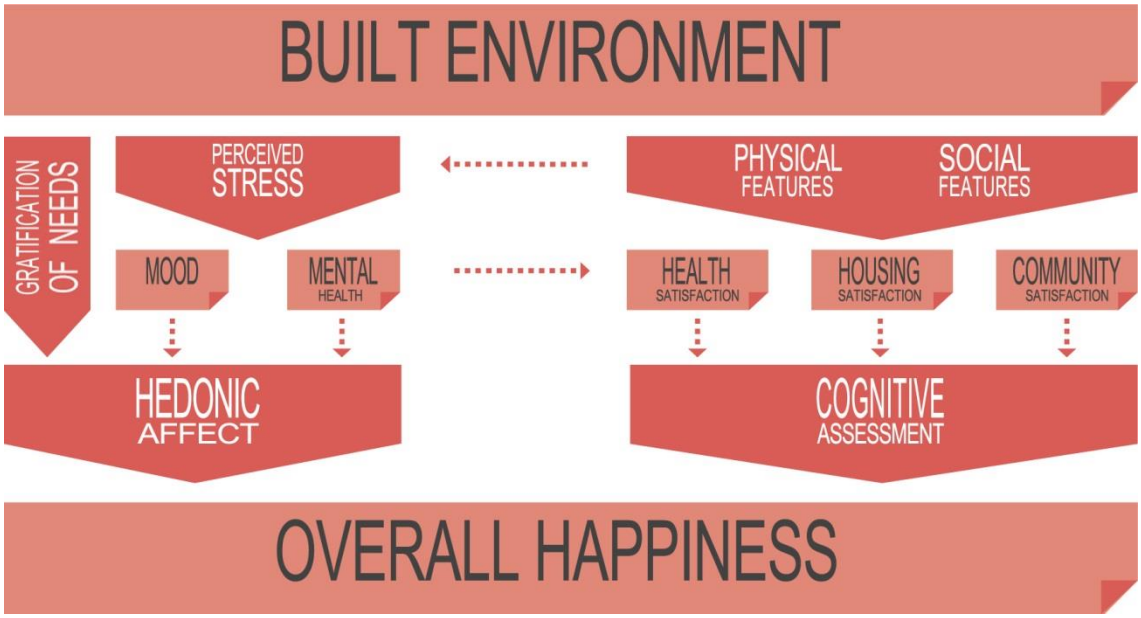


Figure 6. Conceptual framework. Happiness and the built environment

mental health, leading to changes in affective evaluation, can be observed.

Aspects of cognitive evaluation include several domains that experience considerable influence from characteristics of the built environment: community satisfaction is primarily

affected by social relations predetermined by the built environment, health satisfaction is influenced by physical features, and housing satisfaction is subject to both social and physical effects triggered by the built environment.

2.3 Impact of the Built Environment on Life Domains

The role of the neighborhood environment is most frequently discussed in the literature in relation to its effects on health, safety, social capital and housing satisfaction, or gratification of housing-related needs (Bonaiuto, Fornara, et al., 2006, Jacobs, 1961, Pacione, 2003, Sirgy and Cornwell, 2002, Van Kamp, Leidelmeijer, et al., 2003). An overview of the most prominent effects of the built environment on the aforementioned variables is presented in this chapter in order to facilitate an understanding of possible indirect effects of the built environment on happiness.

2.3.1 Built Environment and Health Effects

Health is widely accepted to be one of the most powerful and significant predictors of subjective well-being (Dolan, Peasgood, et al., 2008, Van Praag and Ferrer-i-Carbonell, 2011, Van Praag, Frijters, et al., 2003). However, this aspect of human life is largely exposed to external conditions, as stated by many policies seeking to minimize the detrimental effects of industrialization and urbanization since the mid-nineteenth century (Lindheim and Syme, 1983). Studies on the impact of the built environment on health can be represented by two groups, observing its effects on mental well-being, and considering its influence on the physical condition. Coates, et al. (2013) argue that the built environment can negatively influence health in both ways, for example, by discouraging physical activity and recreation.

The effects of the living environment on physical health are mostly related to the levels of air and noise pollution; besides, the layout of buildings, amenities, and infrastructure strongly affects whether they enable active involvement in walking and outdoor physical activities, thus directly contributing to physical condition (Evans, 2003, Jandy, Boarnet, et al., 2002). Jackson (2003) examined the literature on effects of urban design on health at three levels: buildings, neighborhood, and town/region. She concluded that, at the level of buildings "the most healthful architecture exposes inhabitants to natural light and ventilation, views of greenery, and close proximity to outdoor green space" (Jackson, 2003, p. 192). Conversely, the adverse effects of living on the upper floors of high-rise buildings were cited in relation to low physical activity and respiratory illnesses among children due to the phenomenon of 'indoor pollution' (Jackson, 2003, Lindheim and Syme, 1983). In relation to the stimulation of physical activity, Fan and Khattak (2009) provided empirical evidence on the correlation between the proximity of parks to the living space and the frequency of engagement in outdoor recreational activities, considering green zones as major contributors to community well-being.

Mental well-being is subject to the effects of the built environment in a number of ways. Evans (1998) describes five aspects of buildings, related to psychological stress:

- stimulation, characterized by intensity, variety, complexity, mystery, and novelty in the design,
- coherence, meaning clarity in perception and comprehensibility of the space,
- affordances, or transparency in the ways to utilize the building or its elements,
- control, the ability to modify the environment or master the level of exposure and interaction with the surroundings, and
- restorative, the qualities encouraging recovery from stress and cognitive fatigue.

To illustrate the restorative power of the environment, Ulrich (1979) assessed the ability to recover from stress with exposure to natural and American urban scenes. The outcomes of the experiment revealed that exposure to natural landscapes increased positive affect and encouraged recovery from stress, while American urban views reduced the emotional well-being of participants and exacerbated feelings of sadness and anger (Ulrich, 1979).
Cooper, Goswami, et al. (2009, p. 988) reviewed extensive literature on mental well-being and identified three main groups of relevant built environment features:

- quality of the fabric of the physical environment, such as design, construction, and maintenance of buildings and infrastructure,
- quality of the ambient environment, including lighting, noise/acoustics, thermal quality, and access to nature, and
- psychological impacts of the physical and ambient environment, such as density, accessibility, safety and fear, route finding.

Empirical studies by Guite, et al. (2006) on the effects of the built environment on mental well-being also refer to noise, over-crowding in the home, the presence of valued escape facilities, such as green and public spaces, and fear of crime as significant factors influencing mental well-being.

2.3.2 Built Environment and Social Effects

Throughout the twentieth century, urban planning has been increasingly used as an instrument for providing certain social conditions, especially in modernist plans, but these attempts often relied solely on idealistic visions rather than solid observations (Urban, 2013). One of the first and most powerful insights into the outcomes of urban design on issues of social capital and safety was presented by Jacobs (1961) in *The death and life of great American cities*. She discussed the crucial role of streets and pavements in the city as its most important components, serving as public spaces and ensuring three primary goals: safety, social contact, and assimilation of children. Thus, the keystone of safe urban environment is not the police, but rather an invisible network of mutual surveillance among residents, “eyes upon the street”, which can be supported by providing a diverse, actively exploited, environment with human scale (Jacobs, 1961). The same conditions foster social interaction in the neighborhood – diversity of local activities brings people together and creates social networks based on trust and commitment (Jacobs, 1961). The main factors in planning a diverse, livable environment, according to Jacobs (1961), are mixed use, small blocks, buildings of mixed ages, and concentration of people, which together generate the vitality required for a safe and happy urban mix.
In his influential book *Life between buildings: using public space*, Jan Gehl (1987/2011) builds on the principles identified by Jacobs and explores how different characteristics of the built environment can influence social interaction. He classifies all outdoor activities as necessary, optional, or social; the first group includes purposeful activities such as commuting, using amenities or transport modes; the second describes spontaneous and pleasurable activities, like walking or contemplation; finally, social activities happen when people interact with each other (Gehl, 1987/2011). The significant feature of the first group is that necessary activities rely little on the physical environment, while optional activities almost entirely depend on the attractiveness of physical surroundings and social activities also respond significantly to ambient characteristics (Gehl, 1987/2011). The most obvious example of social interaction deterrents is a set of barriers preventing people from communicating, i.e., physical barriers, large distances, high speeds, multilevel structures, or orientation (for example, when installing seating furniture) (Gehl, 1987/2011).

Several levels of social interaction can be identified, from communicating with close friends and acquaintances to accidental or passive (contemplation and listening to others) contact, the latter being the most readily encouraged by the built environment (Gehl, 1987/2011). Another crucial point made by Gehl (1987/2011) is the necessity to provide a hierarchy of spaces, from private to public, including different scales and levels of privacy and applying traditional elements such as the street and square in order to create favorable conditions for social interaction in the urban environment.

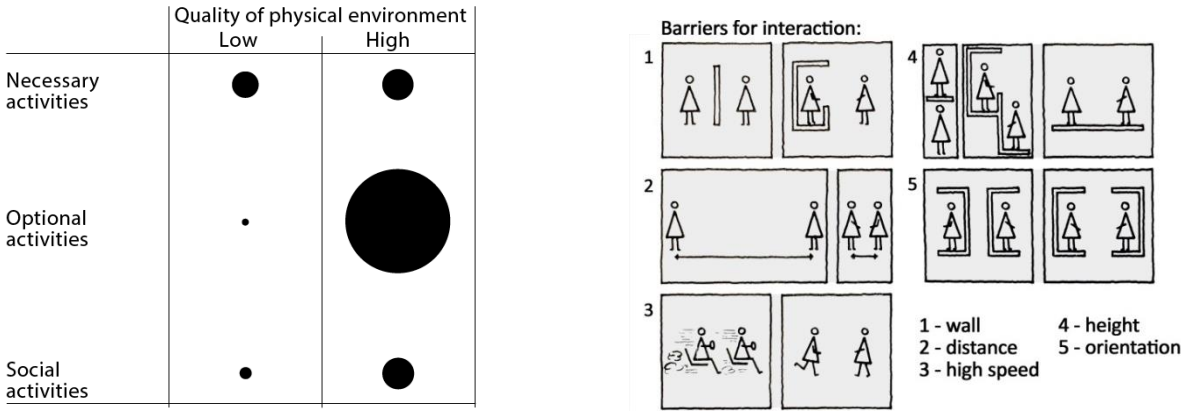


Figure 7. Physical environment and activities (Gehl, 1987/2011)

Huang (2006) used an empirical approach to examine the relationship between groups of activities and a high-rise housing environment as described by Gehl (1987/2011). Prior to the study, theoretical support showed that provision of seating furniture, open public spaces, play areas, green areas, and event areas in the residential environment increased social interaction and bonding (Huang, 2006, Jackson, 2003, Campbell and Campbell, 1988, Coley, Sullivan, et al., 1997, Kuo, Sullivan, et al., 1998, Marcus, 1988). These findings suggest that scenic and activity spaces containing aspects such as visual focus, plants, playing areas, and open areas promote more social interaction than other types of spaces (Huang, 2006).

Similarly, Leyden, et al. (Leyden, Goldberg, et al., 2011) summarized from a number of studies that "some neighborhood designs appear better suited for social connectedness than others" (Freeman, 2001, Leyden, 2003, Frumkin, 2002, Wood, Shannon, et al., 2008, Richard, Gauvin, et al., 2009). The authors advocated mixed-use, public spaces and walkable neighborhoods as opposed to car-dependent areas to facilitate increased social connectivity and safety.

Montgomery (2013) refers to similar problems of estrangement, related to long distances and high speeds in modern cities, as detrimental factors and urged a restoration of the balance, based on trust and cooperation.

2.3.3 Housing Satisfaction

Housing is a fundamental human need and one of the important determinants of life satisfaction, representing the major consumption domain for many people (Adams, 1984, Lu, 1999, Sirgy and Cornwell, 2002, Coates, Anand, et al., 2013). Findings by Galster (1987), Park (2006), and Lee and Park (2010) confirmed that housing satisfaction influences quality of life (Ibem and Amole, 2014). Van Praag, Frijters, et al. (2003) studied satisfaction with life as a whole and with various domains among residents of East and West Germany from 1992 to 1997 and claimed that overall satisfaction was influenced by a number of domains, one of which was housing.

Coates, et al. (2013) assumed that, apart from the primary function of the shelter, good quality housing provides recreation and a place for communication with family, friends and neighbors; it is also associated with a healthy and dignified lifestyle, feelings of self-respect, identity and security.

The concept of residential satisfaction is represented by three main aspects: behavioral, cognitive, and affective (Amérigo and Aragones, 1997, Bonaiuto, Fornara, et al., 2006). The behavioral component relates to residential mobility, moving patterns, and preferences, while the cognitive addresses the perceived residential environment quality; the affective component involves place attachment (Bonaiuto, Fornara, et al., 2006). The characteristics influencing perceived residential environment quality can be presented in four groups (Bonaiuto, Fornara, et al., 2006, p. 26):

- architectural/town-planning features, such as space, organization of accessibility and roads, and green areas,
- socio-relational features, for example, people and social relations,
- functional features, such as welfare services, recreational services, commercial services, and transport services, and
- context features, including pace of life, environmental health, upkeep and care.

Factors that impact housing satisfaction can be further classified by differentiating between compositional (attributable to the household) and contextual (determined by the environment) features (Galster and Hesser, 1981).

This thesis predominantly focuses the role of exterior characteristics of housing, but it is necessary to mention the paramount importance of certain aspects of an individual's life, as well as the interior features of housing, when discussing the factors contributing to residential satisfaction. In general, empirical studies revealed such indicators as income, tenure, life cycle stage, house size, and housing quality as the most powerful predictors of residential satisfaction (Lu, 1999). However, it is important to account for the perceptions represented by subjective data rather than objective indicators (Herfert, Neugebauer, et al., 2013, Lu, 1999). Empirical findings by Lu (1999), in contrast to the previously described results by Sirgy and Cornwell (2002), suggest that neighborhood satisfaction contributes significantly to housing satisfaction; home ownership, housing costs and adequacy of housing space positively correlate with residential satisfaction (Lu, 1999). With respect to the interior space, Ibem and Amole (2014, p. 495) provided empirical evidence that, "satisfaction with the sizes of living/dining space, bedrooms, toilets, and bathrooms is critical in enhancing residents' subjective well-being in public housing."

Scenic and aesthetic qualities are components of living environment and housing satisfaction (Brereton, Clinch, et al., 2008, Van Kamp, Leidelmeijer, et al., 2003). Florida, Mellander et al. (2011) explored the role of beauty and aesthetical characteristics on community satisfaction and found that these variables featured among other important indicators. De Botton (2008) suggested that people need to see surrounding architecture and interior items as an embodiment and reminder of shared ideals, as the home serves not only as a physical shelter, but rather as a psychologically supportive environment.

In addition, a number of external conditions influence housing satisfaction such as cultural norms and context, personal expectations, preferences, and past experiences (Coates, Anand, et al., 2013).

In summary, several characteristics of the built environment impact health, social relations, and housing satisfaction. The most relevant, for the purposes of this study, are the qualities related to aesthetical value and spatial arrangement of buildings within residential urban cells. The impact on mental health of such factors as visual variety and complexity of environment,

which should not interfere with comprehensibility of space, is of particular interest. Moreover, the ability to control spatial scenarios and retreat when necessary is an important condition for an optimal psychological state.
The most relevant architectural aspects, in terms of facilitating local social interaction, are the presence of mixed-used public places and streets with a hierarchy of spaces, walkability of space, and absence of barriers to interaction, human scale, diversity in building age, and overall subjective attractiveness of buildings.
Residential satisfaction is subject mainly to interior characteristics such as size and rooms, but other valid indicators include a subjective evaluation of the overall quality of housing, scenic, and aesthetic appearance of the building.
Figure 8 illustrates the conceptual framework for understanding the aggregate effects of the visual and spatial features of the built environment. Both groups contribute to the level of perceived stress, while visual characteristics are additionally responsible for the feelings and cognitive considerations related to aesthetics and spatial organization of urban areas affects the probability and quality of social contacts.

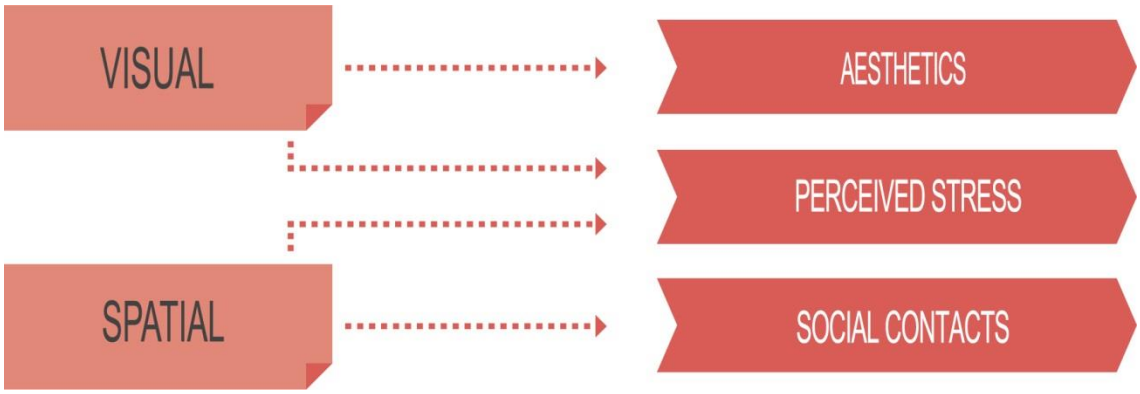


Figure 8. Conceptual framework; effects of visual and spatial characteristics.

2.4 Mass Housing as a Living Environment

In this section, a historical overview of the development of modernist housing in Western and Socialist countries is provided, in order to facilitate an understanding of the living environment in microrayons, as a phenomenon derived from international practice and adapted to the economic and social conditions under communist rule. The role of microrayons during the Soviet period and in modern life is discussed, along with their potential relationship with the concept of happiness.

2.4.1 The Rise and Fall of Modernist Public Housing

The concept of mass public housing emerged due to extreme technological and societal changes at the end of the nineteenth century, and from the onset was strongly related to the concept of happiness by promoting the image of an egalitarian and progressive society (Urban, 2013). Further advancements in technology at the beginning of the twentieth century permitted the introduction of a prefabricated method of construction and its application for the first time in Germany after the First World War (Urban, 2013). The desire to construct a better society through the provision of improved housing and environmental conditions for the working classes, together with a fascination with the aesthetics of machine-produced architecture, took a strong hold on the minds of leading architects from Germany, the USSR,

and France (Turkington, Van Kempen, et al., 2004, Urban, 2013). The modernist movement, led by Le Corbusier, established the International Congresses of Modern Architecture (CIAM) in 1928, an organization with a mission to develop and promote new solutions for the urban problems inherited from the nineteenth century (Turkington, Van Kempen, et al., 2004, Mumford, 1992). The modernist image of a new city was characterized by a strict segregation of functions and modes of transportation, multi-level structures for traffic, and the elimination of traditional urban components such as streets, blocks and squares, and their replacement by vast green spaces and freestanding high-rise buildings (Mumford, 1992).
However, these ideas were realized in full only after the Second World War, owing to a huge demand for rebuilding both destroyed cities and devastated societies (Wagenaar and Hofer, 2004). In Western countries, social welfare systems were emerging, and with housing considered one of the most important aspects of the welfare state, standardized urban blocks were erected globally following endorsement by various authorities (Urban, 2013). Despite extensive theoretical assurances, modernist large-scale estates became a synonym of architectural failure in just several decades, as these typologies were accused of exacerbating social inequality, providing the perfect environment for criminal activity, and embodying the image of urban dystopia in every aspect (Urban, 2013). The Ronan Point gas explosion in London in 1967, the Pruitt-Igoe residential complex demolition in St. Louis in 1972, the urban riots of Broadwater Farm in 1985, and the misfortunes of the Bijlmermeer residential complex in Amsterdam were among the strongest examples of public disappointment with high-rise social housing (Urban, 2013, Turkington, Van Kempen, et al., 2004, Wagenaar and Hofer, 2004). During public discourses of the 1970s, CIAM Urbanism was perceived as "technocratic architectural idiocy, insensitive to climate, local culture or human scale" (Mumford, 1992). Nevertheless, most researchers nowadays agree that these architectural features mediated and channeled pre-existing problems rather than generated them (Urban, 2013).
Regardless of the modernist preferences for high-rise buildings, not all public housing projects applied this principle (Urban, 2013). Still, one of the most commonly encountered complaints against standardized public housing is its large scale, which is assumed to evoke fear, dissatisfaction, stress, behavioral problems, suicide, poor social relations, reduced helpfulness, and hindered child development (Gifford, 2007). However, a review of empirical studies indicates that no definite relationship can be established between the purely architectural qualities of a living environment and such serious issues, but instead suggests that the majority of people tend to be somewhat optimistic about low-rise housing (Gifford, 2007).

2.4.2 Soviet Legacy: Public Housing in Central and Eastern Europe

The introduction of new technologies together with communist expansion in Central and Eastern Europe provided a spacious polygon for the construction of thousands of prefabricated microrayons across the socialist camp countries in the 1960s-80s. After Nikita Khrushchev gave his epoch-making speech, "On the extensive introduction of industrial methods, improving the quality and reducing the cost of construction" in 1954, integrated housing construction combines, or Domostroitel'nye Kombinaty (DSK), were built all over the Soviet Union (Khrushchev, 1954). While Western society was on the verge of admitting the failure of large-scale prefabricated public housing, the Communist states employed this principle on an unprecedented scale, exacerbating the negative repercussions of the phenomenon by reducing the role of an architect to a minimum and implementing the use of cost-effective building materials (Lizon, 1996). These limited resources widened the gap further between utopian theory and sober reality than was apparent in Western countries (Urban, 2013). However, the large volume of construction output and a mostly equal distribution led to different social conditions in microrayons; some studies concluded that the

panel housing districts of the former communist countries represented a higher homogeneity of the urban environment and contained a more diversified demographic, including a larger proportion of highly-educated residents and a smaller share of immigrants than in Western Europe (Kährik and Tammaru, 2010). Moreover, the massive construction program provided fifty million households with the opportunity to vacate their communal apartments, cabins, and basements, and move into their own homes (Goldhoorn and Sverdlov, 2009).

Figure 9. Consruction of microrayon (*Source: https://mgsupgs.dreamwidth.org*)

Another noticeable difference was that in Western Europe, even standardized dwellings were designed by Le Corbusier exponents, with regards to specific architectural principles, while in Soviet microrayons, economic strategies eventually adopted a dominating role in the planning process (Pallot and Shaw, 1981, Grigoryan, Y., 2013). During the early stages of microrayon development, architects were heavily involved in a search for the optimal solution to provide decent housing for the masses at a minimal cost to the state (Rubanenko, B., 1959). However, during the later stages, architects were constrained both in the visual and spatial aspects of design, as the primary goal of Soviet urban planning was proclaimed to be the optimization of the construction process and access to the objects of social infrastructure by residents (Grigoryan, Y., 2013, Meuser and Zadorin, 2015). Only isolated republics, such as Uzbek SSR, experienced a relatively creative freedom which resulted in the installation of unique mosaics, balconies, and even stairwell cores, contributing greatly to the artistic value of the design and acting as a form of creative rebellion against severe regulations from the state (Meuser and Zadorin, 2015). The majority of planning bodies, however, were required to conform to the strict regulations governing almost every aspect of design, from the number of floors to the organization of access to the apartments. For example, the positioning of buildings in microrayons, apart from the landscape, was influenced by the trajectory of the lifting crane and the proximity to social services, while the optimal orientation was south and north, as this permitted the design of small apartments receiving sufficient amounts of daylight, even with windows facing only one side (east or west) (Grigoryan, Y., 2013, Snopek, 2013). Such conditions eliminated the contributions of architects to the design process, eventually resulting in the emergence of an unprecedented self-replicating urban landscape, predefined by a set of calculations.

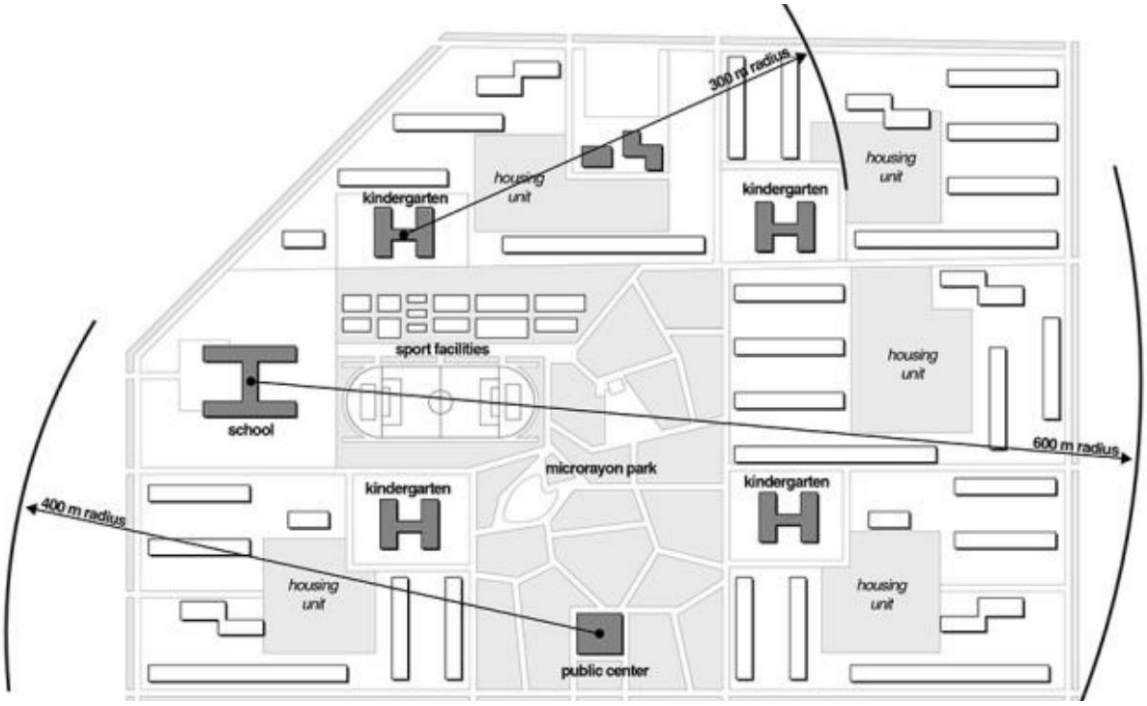


Figure 10. Plan of an ideal microrayon from an architectural manual. Layout of residential buildings is predetermined by the optimal distances to social infrastructure objects (Snopek, 2013)

In general, due to a higher social homogeneity and the benefits of providing individual apartments to millions of people, microrayons in Central and Eastern Europe retain a more positive image than modernist housing in Western countries, but are still associated in certain regions with Socialist oppression and interference (Kährik and Tammaru, 2010, Urban, 2013). Figure 11 summarizes the similarities between microrayons and Western modernist estates, namely, large scale, free layout, monotony, and mass construction type. The differences, also presented, were mainly attributable to the restricted role of architects, the all-union scale of construction, and the social mix among microrayon tenants.

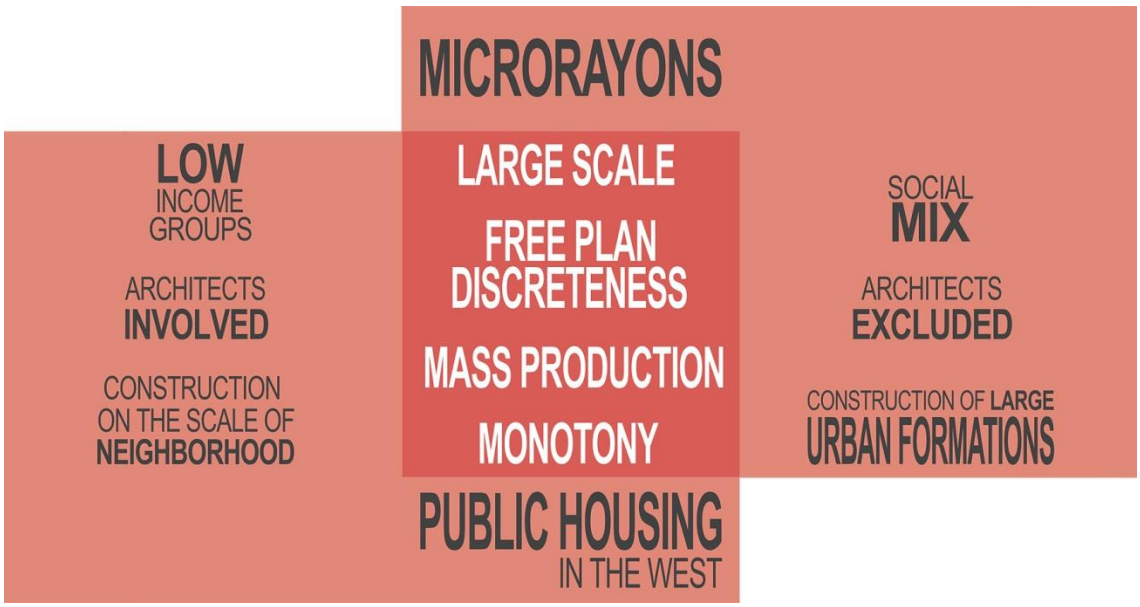


Figure 11. Similarities and differences between microrayons and Western public housing.

2.4.3. Public Housing in Moscow

After Moscow regained its capital status in 1918, the most prominent ideas of the Soviet architectural school were discussed and implemented there. Moisei Ginsburg, Andrei Burov, Boris Blokhin, and Nikolai Ladovski experimented with industrial and prefabricated structures inspired by ideas of transforming society by means of a new mode of architecture (Urban, 2013). However, the political agenda changed in the 1930s, with the suppression of the avant-garde and its replacement by the concept of socialist realism, promoting the glorified image of a communist regime in Neoclassic forms and proliferating across Socialist territories for several decades to come (Wagenaar and Hofer, 2004). The housing typologies of the 1930s-50s were characterized by spacious apartments, ample decoration, and enclosed courtyards, widely used for neighborhood meetings due to their semi-public character and abundance of greenery (Bronovitskaya, 2009). However, these typologies made only a small contribution to the overall housing shortage. The first attempts to develop new a mass-housing program were made shortly after the Second World War, but were considered contrary to "the notion of architecture as high art" (Bronovitskaya, 2009, p. 24). Only after the death of Stalin, a paradigm shift and subsequent realization of a massive construction program became possible, and the prototype and testing ground for further developments in this experiment was the district Cheremushki 9C in Moscow, completed in 1958 (Snopek, 2013). A group of architects, under the guidance of Natan Osterman, worked on various modifications of compact and rapidly constructed buildings for this territory in order to identify the optimal combination of cost-effective techniques and a comfortable living space (Rubanenko, B., 1959). The microrayon included a complex of social facilities and fourteen types of residential buildings made of brick, slag-concrete or brick blocks, and panels (Rogachev, 1999). The outdoor spaces and green zones were designed with particular attention, as were the architectural elements of the exterior and interior of the buildings. The apartments were somewhat compact, but included such unique features as bathrooms with daylight access through the kitchen, and openings in the kitchen walls for food distribution (Rubanenko, B., 1959). Following a successful endorsement of the experiment, several typologies were proposed as prototypes for further construction, but the approach to the design process had meanwhile changed drastically. Following the expansion of Moscow's administrative boundaries in 1960, many hectares of vacant land were built up with five-story buildings, but the resulting microrayons were far less advanced compared to the project in Cheremushki in terms of the design elaboration, attention to details and quality of construction (Snopek, 2013).

The symbol of this time is the K7 series, an adaptation of an experimental type from Cheremushki, a widely known typology, due to the praise of Khrushchev to the innovative technological solution represented by a frame with unusually thin panels, which nevertheless proved to be a source of multiple structural problems thereafter (Meuser and Zadorin, 2015). Specifically, the panels required additional reinforcement, thus increasing construction costs, but did not contribute to an improvement in the extremely poor sound insulation, leading to a growing displeasure among the residents (Meuser and Zadorin, 2015).

Figure 12. On the left – prototype of K7, on the right – final modification (Meuser and Zadorin, 2015)

By 1962, approximately 98% of new Moscow developments were of the Khrushchevki type, but by then had been acknowledged to be economically inefficient (Urban, 2013, Yankova and Rodzinskaya, 1982). The number of floors in serial projects increased, and by 1975, five-story buildings were almost completely withdrawn from production, giving way to nine- and twelve-story housing in various combinations (Volkov, 1982, Urban, 2013). The quality of building materials and the size of the apartments built in the 1970s and 1980s increased significantly and the spatial compositions of buildings became more diverse, but the main principles behind planning and housing production remained unchanged (Kährik and Tammaru, 2010). Despite these improvements, the shortcomings of previously constructed microrayons had tarnished the achievements of living space provision by the 1970s, while a third of Muscovites interviewed in 1974 reported the "addresslessness" of their home, and the word "khrushcheba", standing for the hybrid of "Khrushchev" and "slum", was widely used to describe tiny apartments with low ceilings (Urban, 2013, Ruzhzhe, 1974).

The visual unattractiveness of neighborhoods and insufficient size of the apartments were exacerbated by the fact that due, to severe economic conditions, many critical objects of social infrastructure experienced significant construction delays, as well as the landscaping and equipment in the courtyards (Bronovitskaya, 2009). The ambition of the Soviet state to build a new communist society by means of improving living conditions has failed, people were eager to optimize the long-awaited opportunity for a private life in a separate apartment, and by 1982, approximately 60% of microrayon residents experienced no social contact with their neighbors (Urban, 2013, Yankova and Rodzinskaya, 1982). On one hand, Khrushchevki were perceived as a new symbol of personal freedom, but on the other, this type of housing was deemed merely acceptable rather than desirable (Urban, 2013).

The dream home of an average Soviet family in the 1970s was a spacious apartment in a brick building with high ceilings and a balcony, and the most desirable areas to live in were located in the center or Western part of the city (Morton, 1980). Such a description more closely matches Stalinist architecture rather than microrayons, but, as Urban (2013) suggests, these typological preferences had limited validity, as separate residence, a central neighborhood location, and proximity to social infrastructure were considered more important. Besides, the fact that East Moscow was traditionally occupied by the working classes, while scientists, prominent cultural figures, and foreign employees were located in the center and West of the city, contributed to public opinion (Urban, 2013).

The later Soviet microrayons were erected primarily on the outskirts of Moscow and composed of fourteen- to seventeen floor buildings, with further improvements in the amount of living space available (Grigoryan, Y., 2013). The composition of neighborhoods became less discrete, but the increase in the number of floors caused a further extension of the distances between buildings. The use of typology experienced little change with the fall of the Soviet Union, and following economic stabilization, the universal construction of the Soviet series continued right up to the beginning of the 21st century. Gradually, the upgraded versions of the Soviet series became more common, but the use of the old series is not expected to be banned by the Moscow authorities until 2016 (Moskomarhitektura, 2015a).

Originally, microrayons featured a number of initiatives, representing a faint reflection of the ideas of the Soviet avant-garde movement regarding the inclusion of social services in the private life of every family. For example, many microrayons had house kitchens where food was served and "bureaus for good services", but in many cases even basic social infrastructure, such as schools and community centers, experienced considerable delays in construction, and soon the initial concepts had been abolished (Reid, 2005, Zamanskii and Kozlovskii, 1962, Bronovitskaya, 2009). Moreover, microrayons were composed of blocks

designed to withstand only pedestrian traffic, with the driveways located on the boundaries of the blocks, but the post-socialist reality changed this condition among many others (Goldhoorn and Sverdlov, 2009). In a capitalist society, once crucial social services have lost or modified their initial purpose under the pressure of public demand, schools are no longer chosen based on pedestrian accessibility, ground floor apartments are reorganized for retail purposes, collective space in the courtyards is occupied by multitudes of vehicles or dismountable private garages; these changes all contributed to inconsistencies in the use of the residential environment (Goldhoorn and Sverdlov, 2009). However, a point of view exists that a microrayon environment with many unorganized empty plots is somewhat flexible in terms of adaption to new functions; therefore in recent years, it has become more diversified and habitable, particularly where renovation has taken place (Bronovitskaya, 2009).

During the post-Soviet period, the majority of new housing construction still relied on the principles of microrayon spatial organization and construction process. The Soviet standardized series remained in use for almost a decade after the fall of the Soviet Union, and were gradually replaced by upgraded modifications, but the housing construction combines are still major providers of affordable housing in Moscow.
However, a new market in luxurious custom designed housing emerged, still employing the modernist typology of the "tower in the park", and somewhat comparable to mass housing in terms of aesthetic quality (Urban, 2013). This controversy is apparent from an incident whereby a German newspaper mistook one of the most prestigious estates in Moscow with Plattenbau, the German equivalent of a microrayon (Urban, 2013, Zekri, 2007).
Nevertheless, a gradual increase in the wealth of Muscovites and access to the free market creates enabled some people, unable to relocate from the microrayon environment (which, due to the general high costs of property in Moscow, is an option only available to a select few), to at least personalize the interior of their apartment with more expensive furniture and appliances, an action considered by many as a compensation for the unattractive exterior of the building (Goldhoorn and Sverdlov, 2009).

2.4.4 Microrayons and Happiness

With respect to the connection between microrayons and happiness, according to Zavisca (2012), living conditions have a unique position in the hierarchy of needs of the average Russian, as in the Soviet period, "housing was a right for citizens and a reward for socialist labor" and many Russians longed for this particular promise of communist society. Increased material stability and income were still unable to compensate for the housing shortages experienced by the majority of Russian citizens living with extended families or occupying deteriorated dwelling units (Zavisca, 2012). In such a situation, the inadequacy of the communist housing stock was expected to become even more pronounced over time.
In addition, attitudes towards microrayons are strongly influenced by the role of the media, which have remained skeptical on this topic since the mid-1970s when the microrayons were called "featureless" for the first time in the cult film *The Irony of Fate* (Yerofeev, 2015). The movie openly ridiculed the homogeneity of Soviet residential districts, featuring a story about a man who does not realize that he is in a strange city, thus confusing a standard house and street with his own and entering an identical apartment with his key. Such a standpoint was in line with the general criticisms leveled at modernist architecture, leading to a deep discrepancy between the well-meaning attempts of the state and architects to create egalitarian living conditions and the actual perceptions of the public. An optional application of these attempts, reflected by the fact that the privileged classes still received special treatment, only exaggerated the negative connotation (Urban, 2013). In this view, residents of a large city such as Moscow can expect exposure to the influence of the media to a great extent, thus amplifying the negative perception of microrayons.

That being said, it is necessary to cite the unique position of Moscow as the wealthiest, most populated, and therefore most unequal city in Russia. Moreover, Moscow and Saint-Petersburg have a considerably higher amount of well-preserved historical residential architecture than other cities in Russia, a potential additional stimulus for social comparison and exacerbation of the sense of inequality in housing distribution (Urban, 2013).
In such circumstances, a consensus of opinion among all residents appears highly improbable, but conditions exist to presume the vital importance of microrayons for the majority of residents.

2.5 Summary

Overall, this chapter reviewed the concept of subjective well-being and the ways in which it can be influenced by the contextual factors of the living environment, the main focus being on visual and spatial aspects of the neighborhood environment. Further, the historical context of the phenomenon of microrayons was considered, along with the perception of microrayons in modern life and their potential to influence the happiness of residents.

The concept of happiness, or subjective well-being, has been recognized as a measure of the utility of one's life and a tool to evaluate the performance of state policies aimed at increasing the quality of life. A model, based on the possibility of measuring the impact on happiness in terms of direct effects and mediation of domains, was employed in this study. Such an assumption permitted a discussion of the influence of the built environment on mental and physical health, quality of social relations in the neighborhood, and housing satisfaction. The most relevant findings, with respect to the visual and spatial characteristics of the neighborhood environment, promoted organization of space facilitating physical activity along with social communication, choice of behavioristic scenarios, exposure to natural and aesthetically pleasant scenery, and a hierarchy of private, semi-public and public spaces. Other crucial factors included low levels of air and noise pollution, the presence of a variety of functions and services, interior characteristics, and the size of dwellings.

The living environment of microrayons represents a paradox of polar connotations, as on one hand it is associated with stability, the distribution of social goods among the population, and the provision of individual space, but on the other hand, with poorly constructed and maintained, cramped and monotonous housing built under the rule of the authoritarian state. The interior living conditions of microrayons gradually improved with each generation of new series, but the neighborhood environment became ever more large-scale and alienating. With the fall of the USSR, a new market emerged, but the standardized buildings continued to feature heavily in the provision of affordable housing. The market economy brought new focus to microrayons and transformed the meaning of pre-existent social services, while the apartments became highly customized in order to compensate for the lack of exterior uniqueness. In general, microrayons can be considered as among the most influential aspects of the Soviet legacy that continue to shape everyday life in Russia.

2.6 Hypothesis

In order to determine the impact of microrayons on happiness, they are contrasted to the living environment in residential areas constructed during the Stalin era. The latter are widely known to be prestigious and desirable residences among Muscovites.
The dominant components contributing to the differences in happiness observed between typologies are expected to relate to the interior attributes of the housing, such as the size of the apartment, the number of rooms, and the ceiling height. The role of external architectural qualities is expected to be moderate but statistically significant.

It is assumed that the visual and spatial features of microrayons are perceived negatively among its residents and have a negative effect on overall happiness, compared to the neighborhood environment of the Stalin housing. Among these features are poor aesthetic quality, monotony and excessive repetition of scenery, low quality materials and construction, an abundance of undeveloped open spaces, and the overwhelming scale of the buildings and courtyards of the high-rise typologies.

The non-microrayon environment is expected to be perceived more positively in terms of the evaluation of the visual and spatial characteristics of the neighborhood, due to such factors as the non-standardized character of buildings and subsequent greater aesthetical quality, enclosed courtyards, a moderate scale (compared to the high-rise microrayon typologies), and the use of brickwork and decorations in construction as opposed to mass produced plain concrete panels. Despite the positive image of the Stalin residential architecture, however, it should not be perceived as the embodiment of all favorable conditions described in the literature as the basis of a prosperous neighborhood. These areas often lack diversity in the ages of buildings, and the enclosed character of the courtyards does not always indicate that the streets and squares outside of the blocks are suitable for extensive multifunctional use.

Apart from the direct link between the features of microrayons and happiness, indirect effects mediated by such aspects of life as housing satisfaction, local social relations, and health are considered. Housing satisfaction is expected to be the main mediating dependent variable, correlating with less pronounced effects of the characteristics of the built environment on health and community satisfaction.

In terms of the applicability of the hypothesis to different segments of the population, the patterns observed are expected to be more pronounced among younger Muscovites, who are more exposed to the influence of media and typically have higher expectations of the standards of life than the generations which have grown up in the Soviet period.

Chapter 3: Research Design and Methods

3.1 Revised Research Questions

Main research question:

- What is the impact of visual and spatial aspects of the built environment on the happiness of microrayon residents in Moscow?

Research sub-questions:

- How are the spatial and visual features of microrayons perceived by their residents?
- Does residence in microrayons have a direct impact on happiness?
- Does residence in microrayons have an indirect impact on happiness through mediating domain satisfactions?
- Do the spatial and visual characteristics of the built environment mediate the expected effects of living in microrayons?

3.2 Conceptualization

During the literature review, three crucial concepts for further research were identified:

- happiness, measured as subjective well-being - a dependent variable,
- domain satisfactions of the residents, such as housing satisfaction, community satisfaction and health satisfaction, considered to be the mediating dependent variables,
- built environment in microrayons - an independent variable.

The term ***happiness*** is used in various ways to describe positive life experiences, but most frequently, academic literature defines it as the concept of subjective well-being. Subjective well-being can be measured by asking subjective and open-ended questions, such as "Taken all together, how would you say things are these days—would you say that you are very happy, pretty happy, or not too happy?" (Easterlin, 2003, p. 1). Some other definitions presume that:

Subjective well-being refers to people's evaluations of their lives—evaluations that are both affective and cognitive (Diener, 2000, p. 34)

Subjective well-being is a broad concept that includes experiencing pleasant emotions, low levels of negative moods, and high life satisfaction (Diener, Lucas, et al., 2002, p. 63)

Subjective well-being is often used by psychologists as an umbrella term for how we think and feel about our lives (Dolan, Peasgood, et al., 2008, p. 95)

Subjective well-being—defined as people's subjective cognitive and affective evaluations of their quality of life (Florida, Mellander, et al., 2013, p. 614)

Domain satisfactions relate to the satisfaction derived by an individual within a particular domain of life and can be operationalized in a similar way to ***happiness.***

Satisfaction with ***housing in general*** can be measured by asking questions such as "How satisfied would you say you are on a scale from 0 to 10, where 0 is extremely dissatisfied and 10 is extremely satisfied, with your current place of living in general?" In a similar fashion,

other questions can be formulated to gather information on the specific aspects of housing, such as ***building appearance, courtyard, hall and apartment***.

Likewise, there are several ways to measure ***community satisfaction***. Some of these methods include direct questioning or indirect evaluation of related aspects and components—the related concepts being 'opportunities to meet new people', 'whether people living in the area trust and help each other'.

Health satisfaction can be measured by asking the respondents to rate their satisfaction, regarding health, on a scale of 1 to 5, where 1 is "very bad" and 5 is "very good".

In order to operationalize the spatial characteristics of the ***built environment***, certain objective and subjective indicators should be measured. Arakelyan (2011) suggested a number of objective indicators, including the following:

- the area of the planning unit,
- the character and planning structure of the built environment,
- the density (ratio cumulative area/empty area),
- the ratio built up area/empty area, and,
- the number of floors in the area.

Further, the following subjective architectural and town-planning indicators of perceived residential quality were identified by Bonaiuto, et al. (2006, p. 26):

- There's enough space between buildings in this neighborhood
- Buildings are too close together in this neighborhood
- Open spaces and built-up areas are well-balanced in this neighborhood
- Buildings are beautiful in this neighborhood
- Buildings are too tall in this neighborhood
- The dimension of buildings is oppressive in this neighborhood

The concept of ***microrayons*** refers to the housing typologies that were widely employed in Socialist countries in the 1960s – 90s.

… The microrayon (microdistrict) is a free-pattern, planned residential area with a school at its center (Bronovitskaya, 2009).

It is a residential complex—a primary structural element of the residential area construction in the Soviet Union and in some post-Soviet and former Communist states (Strelka Specials, 2012).

Having compared the microrayons to traditional forms of urban fabric, Shchukin (2014) determined the following five distinctive characteristics of microrayons: larger size of a planning unit (1000 m against 100-200 m), a larger number of floors (specifically, in the buildings constructed after 1975), free layout inside the planning unit, absence of a hierarchy of private, semi-private and public space, absence of the streets as elements of multifunctional public space.

In order to examine the differences between a microrayon and a non-microrayon environment, the main independent variable of the analysis was chosen the dwelling of a particular housing typology. For explanaition on which features of the built environment in ***microrayons*** are responsible for the differences, subjective and objective characteristics are introduced.

Most of the data was obtained using questionnaires, but a number of characteristics of the built environment have been defined based on the indicated address using a spatial analysis software and online based services. Certain objective characteristics such as monotony, average number of floors and built up area in the vicinity were determined by calculation of mean for all buildings within the radius of 1000 meters. In order to measure monotony, every custom designed building was assigned with a value of 0, every standardized one with 10 and a non-recognized design building with 5. The average distance between buildings was represented by the mean of the distances from the place of residence to the four closest buildings in the radius of 200 meters. The discreteness of the environment was manually defined by verifying if the courtyard was enclosed on one, two, three, or four sides, and consequently recoding this figure on the reverse scale. The characteristics of separate buildings such as architect's involvement and the number of floors were derived directly from the database of the residential buildings in Moscow, which was provided by the Department of Information Technology of Moscow (more details see Annex 2).

The control variables identified through the application of spatial analysis software included transport accessibility (derived from dummy variables indicating the presence of a metro station within 1 km, and of another public transport stop within 200 meters), noise pollution (represented by a dummy variable showing whether the building was facing a highway or railway), density of amenities in the vicinity (the number of services within a 1 km radius), and distance from the city center (as measured from the Kremlin).

3.3 Operationalization

The following table summarizes the most relevant of the research concepts, variables and indicators related to the aforementioned terms.

The first part of the table describes indicators used to measure the dependent variable—subjective well-being. The second part includes the domain satisfactions that can be substantially affected by the built environment and were assumed to mediate between the characteristics of the built environment and overall life evaluation. The next section is dedicated to independent variables—the subjective evaluations of the microrayon environment by residents that are expected to have an impact on the dependent variables, and the objective characteristics underlying such perceptions. The list of control variables includes two groups of indicators, the first one relating to the environment related variables, and the second one relating to the variables influencing happiness in general (see Annex 1).

Table 1. Dependent variables

Concept/ variable		Indicators	Scale	Source	Question example
Happiness	Subjective well-being	Overall happiness	interval	questionnaire	Taking all things together, how happy would you say you are? 0-10 scale, (ESS, 2012)
		Positive Affect	interval	questionnaire	How much of the time during the past week you felt depressed/happy/sad/enjoyed life? 1-4 scale (ESS, 2012)

Table 2. Mediating dependent variables/ Housing satisfaction

Concept/ variable		Indicators	Scale	Source	Question example
Domain satisfactions	Housing satisfaction	Overall satisfaction with place of living	interval	questionnaire	Would you say you are very satisfied, somewhat satisfied, neither satisfied nor dissatisfied, somewhat dissatisfied, or very dissatisfied with: -current housing, dwelling, or place you live? (World Poll, 2008) -court yard environment in the place you live? -indoor environment of your housing? -appearance of your house? -the apartment that you live in?
		Satisfaction with outdoor environment	interval	questionnaire	
		Satisfaction with indoor environment	interval	questionnaire	
		Satisfaction with appearance	interval	questionnaire	
		Satisfaction with apartment	interval	questionnaire	
Concept/ variable		**Indicators**	**Scale**	**Source**	**Question example**
Domain satisfactions	Community satisfaction	Overall satisfaction with community	interval	questionnaire	Thinking of the community where you live, are you satisfied or dissatisfied with your community as a place to live? (World Poll, 2008)
		Area attachment	interval	questionnaire	This area is part of me (Bonaiuto, 2006)
		Wilingness to migrate	interval	questionnaire	In the next 12 months, are you likely or unlikely to move away from the city area where you live? (World Poll, 2008)
		Social relations in the area	interval	questionnaire	I feel close to the people in my local area (ESS, 2012) People in my local area help one another (ESS, 2012)
Domain satisfactions	Health satisfaction	Overall satisfaction with personal health	interval	questionnaire	How is your health in general? Would you say it is very good/ good/ fair/ bad/ very bad (European Social Survey, 2012)

Table 3. Independent variables

Concept/ variable		Indicators	Scale	Source	Question example
Place of residence	Typology	Typology 1	nominal	questionnaire	Historical buildings
		Typology 2	nominal	questionnaire	Stalin architecture
		Typology 3	nominal	questionnaire	First microrayons, 5 floors
		Typology 4	nominal	questionnaire	Microrayons, 9-12 floors
		Typology 5	nominal	questionnaire	Microrayons, 14-25 floors
		Typology 6	nominal	questionnaire	Custom designed mid- and high-rise housing
		Typology 7	nominal	questionnaire	Other
Explaining independent variables/ subjective					
Concept/ variable		**Indicators**	**Scale**	**Source**	**Question example**
	Aesthetics	Aesthetical pleasantness	ordinal	questionnaire	This area is aesthetically pleasant (Bonaiuto, 2006)
		Monotony	ordinal	questionnaire	Buildings are too monotonous in this area
		Beauty	ordinal	questionnaire	Buildings are beautiful in this area (Bonaiuto, 2006)
	Scale of environment	Excessive height of the buildings	ordinal	questionnaire	Buildings are too tall in this area (Bonaiuto, 2006)
		Excessive space between buildings	ordinal	questionnaire	There's (too) large space between buildings in this area (Bonaiuto, 2006)
	Scale of environment	Deficient space between buildings	ordinal	questionnaire	There's (too) little space between buildings in this area (Bonaiuto, 2006)
	Discreteness	Allocation of buildings	ordinal	questionnaire	Open spaces and built-up areas are well-balanced in this area (Bonaiuto, 2006)
		Organization of space	ordinal	questionnaire	The organization of space in this neighborhood is comfortable

Explainng independent variables/ objective					
Concept/ variable		**Indicators**	**Scale**	**Source**	**Explanation**
	Aesthetics	Monotony index	ratio	database/ ArcMap	Share of standardized buildings in 1000 meters
		Architect involvement	nominal	database	standardized/ custom designed
	Scale of environment	Number of floors in the building	ratio	database	-
		Average number of floors in the area	ratio	database/ ArcMap	Average number of floors in the radius of 1000 meters (Arakelyan, 2011)
		Distance between buildings	ratio	ArcMap	Natural logarithm of the mean of the distance to four closest buildings
	Discreteness	Built up area	ratio	database/ ArcMap	Cumulative area of all built up plots in the radius of 1000 meters (Arakelyan, 2011)
		Discreteness index	ratio	maps.google.com	Reverse scale of whether the courtyard is enclosed from 1, 2, 3 or 4 sides

3.4 Research Strategy

In order to examine the variables, the research employs quantitative and spatial analysis. Since the concept of happiness is associated with subjective evaluations of people interpreting their perceptions, attitudes and feelings, the most appropriate and widely used strategy to study subjective well-being is the survey method, which allows addressing numerous units of study with a fair degree of generalization (Van Thiel, 2007).

At the same time, the research also has to focus on the spatial and visual characteristics of the built environment; therefore objective data on various aspects of the living environment should be identified. In order to do so, secondary data were obtained from the following sources:

- database of multifamily housing in Moscow, provided by the Department of Information Technology of Moscow,
- online mapping services.

The secondary data were used to associate the collected primary subjective data with the objective characteristics of the same locations. After the collection of primary and secondary data, statistical methods of analysis are applied to answer the research questions.

3.5 Research Methods

Due to the constraints on time and resources, a cross-section survey was employed, meaning that the results were collected only once, and moreover, in a restrained period of time (four

weeks). The primary instrument of data collection during the survey was the questionnaire. The questionnaire was used to collect both quantitative (age, income, rent) and qualitative (opinions, perceptions) data, further transforming qualitative data into quantitative by means of coding the answers into numerical values.

The current research applied such methods of conducting a survey, as combining self-administered online questionnaires with face-to-face interviews. The questionnaire was distributed in a form of an online-based set of questions, printed and communicated verbally to the respondents. Methods such as distribution of questionnaires by post and telephone were not used due to high costs and low response rate, given the size of the questionnaire.

Spatial analysis included the search in a database to assign every respondent with a building typology and its characteristics, and the calculation of missing parameters of the built environment, such as the average height of buildings, the space between buildings, ratio of built up and empty areas in the spatial analysis software.

3.6 Sampling Procedure

Five housing typologies have been identified for the study, including three types of microrayons and two groups of custom designed housing projects. The units of the study were all residents of the defined typologies in Moscow. The precise size of the population were unknown, because the the database contained information about buildings, but not the residents. A crude approximation suggested this number as 8 million people.

In order to make a comparison between housing typologies, a sample representing each typology was considered. Since there was no possibility to ensure the inclusion of the entire population in the survey, quota sampling was used. After collecting the first wave of responses online, the range of demographic characteristics of the audience have been identified. Further, the missing groups of every housing typology were identified and targeted for interviews.

The way to randomize the selection of respondents for interviews was as follows: the map of the examined areas was divided in sectors, each sector was assigned a number, and the generator of random numbers determined which sectors were to be selected for conducting the interviews. However, not all selected sectors have been covered due to time limitations.

The survey was supported by the non-profit organization, “City Projects”, and the online-magazine “Big City”. The primary channels for online distribution of the survey were the websites www.bg.ru and www.varlamov.ru, and the local community blogs on the social network www.vk.com.

3.7 Validity and Reliability

Among the main limitations of the survey as a research instrument were the superficiality of the received information and the lack of control over the answering process. For example, it is highly problematic to guarantee a high response rate, ensure a common interpretation of the questions by different respondents and discover the motivation behind their answers. Moreover, there were certain threats in terms of validity and reliability, the most significant ones relating to operationalization, non-response and respondents’ answering tendencies (Van Thiel, 2007).

Operationalization was a particularly important step in a survey preparation, because the improper selection of indicators would have resulted in a poor questionnaire design, compromising the results in terms of internal validity, which could have been be overcome

solely by redoing the entire survey, unlike in other more flexible research strategies, such as the case study or the experiment.

The problems caused by insufficient response rate can undermine the research in two different ways: first of all, insufficient number of responses would interfere with intentions to apply statistical analysis; secondly, high non-response rate would lead to a decrease in the representativeness of the sample, in the process impairing external validity of the survey (Van Thiel, 2007).

The answering tendencies can be described as a phenomenon of adaptation of respondents' behavior to a position of being in a survey by giving socially desirable answers (presumed to be politically correct or expected by a researcher) or employing certain responding patterns, such as always choosing to agree, or always disagree; picking only the extreme or merely non extreme categories; using previous answers as a model for further replies (Van Thiel, 2007).

Two ways of distributing questionnaires were employed in the research to compensate for the drawbacks of every method, namely, low response rate and risk of influencing the respondents' opinion during face-to-face interviews, and exclusion of social groups without access to the means of communication during online surveys (Babbie, 2010).

With respect to the specifics of conducting a survey in Moscow, the major revealed obstacle was an unwillingness to be involved in the survey due to general lack of social trust in post-socialist countries and Russia in particular (Bahry, Kosolapov, et al., 2005, Kornai, Rothstein, et al., 2004); this is coupled with the obstacle faced from increasing use of surveys in various fields that people are asked to participate in too often (Van Thiel, 2007). The way to overcome this difficulty was by taking the help of existing local communities and self-government institutions, which already have an established level of trust and connections with residents. Moreover, the aim of online distribution of the questionnaire was to increase the number of respondents, as anonymity permits more freedom to provide personal details of life. Another necessary precaution was to construct the questionnaire in the clearest and the shortest possible way, while including ample explanation of the importance and relevance of the study in the improvement of the living environment quality in Moscow.

An association with well-known organizations increases the probability of achieving higher response rates, but at the same time can result in a bias, as the sample is somewhat representative of the target audience than of the general population. The online-magazine "Big City", is mostly targeted at a young and well-educated population, while the website of Ilya Varlamov has a broader readership but still includes a significant proportion of readers interested in city and urban development. In order to compensate in part for this bias, the neighborhood blogs on social network Vkontakte (www.vk.com), representing a more general audience, were included.

The challenges associated with secondary data were many, but due to a very limited and targeted use of the secondary indicators, they mostly do not apply in this research. The single major drawback of the employed database was a considerable amount of missing data on the standard housing series, which was partly covered by using open resources about housing in Moscow. The survey template and the description of the database are presented in Annex 2.

Chapter 4: Research Findings

4.1 Data

4.1.1 Data collection

The majority of data was obtained from an online survey of Moscow citizens. 414 respondents completed the survey on the website of the magazine *Big City* (http://bg.ru/city/opros-22856/), and 1437 respondents participated through social media (vk.com, facebook.com) and on the website of the blogger Ilya Varlamov (http://varlamov.ru/1394000.html). Based on the demographic characteristics of the responses received, the data for deficient age groups were collected from residential districts of Moscow by a team of seven interviewers, including volunteers provided by "City Projects", resulting in a further 132 completed questionnaires. Particular attention was given to areas containing housing typologies that were underrepresented in the online survey.

Considerable differences in average reported happiness between online and face to face interviews suggested a tendency for interviewees to provide socially desirable answers, or dishonesty of interviewers. The analysis considered all responses, but a robustness check was conducted on various subsets of the data in order to control for possible bias.

Table 4. Happiness

	N	Mean	SD	Min	Max
Online survey	1836	6.619826	1.813759	0	10
Interviews	132	7.166667	2.093854	0	10

The spatial distribution of addresses of respondents by collection method is illustrated in Figure 13. Empty plots on the map represent non-residential areas such as parks and

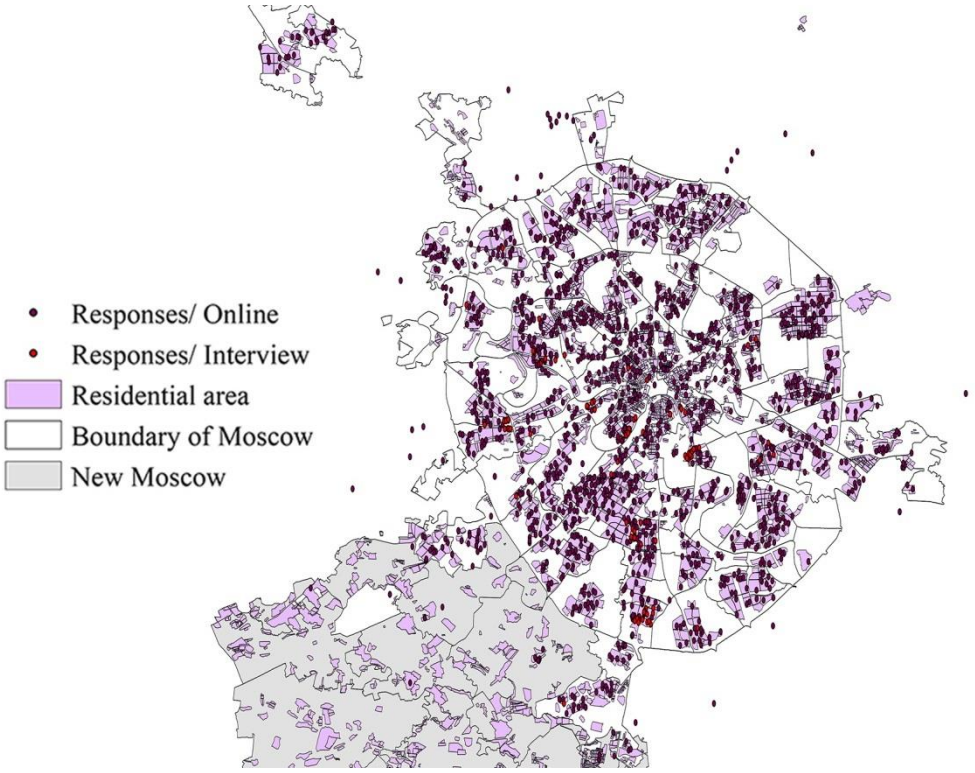


Figure 13. Spatial distribution of responses.

industrial zones, while light-purple areas indicate residential districts. Based on a visual

inspection, it was concluded that the responses showed an even distribution among the residential areas. Red dots indicated the results of interviews conducted in the street, the allocations being predetermined by the largest areas of concentration of the typologies of interest and by volunteer availability. The area marked as "New Moscow" was officially designated part of the city in 2011 and is therefore only partly and unevenly urbanized. Therefore, the area was not included for interviews, but responses received online were retained in the principal model and later removed for the robustness check. Data from respondents living in urbanized areas adjacent to Moscow were retained in the sample.

4.1.2 Sample description

Sample characteristics were defined based on the information provided by respondents and contained a negligible number of missing values for questions about age, gender, education, income, and health difficulties, due to the refusal of certain respondents to share private information. The total sample consisted of 1968 respondents after disqualification of 15 datasets based on location (areas not adjacent to Moscow, or other cities in Russia) or meaningfulness of answers. A response was considered meaningless when a clear pattern of selecting only one option to answer a considerable number (more than ten) of successive but inverted questions was observed.

The sample mostly represented young people (M=32.18, SD=11), with 54% of male and 46% of female respondents (SD=0.499). Most respondents were married (M=0.388, SD=0.487) or in a relationship (M=0.276, SD=0.447), while 28% were single (SD=0.437) and 8% were divorced, widowed, or in an alternative situation (SD=0.269). The majority, namely 88%, of individuals were of Russian ethnical background (SD=0.319) and 98% were Russian citizens (SD=0.121). Employment scenarios were represented by five groups: paid workers, including self-employed and freelance workers (M=0.721, SD=0.449); students, including those working part-time (M=0.110, SD=0.313); the unemployed and not job seeking (volunteers, homemakers, carers, unemployed for to health reasons, or other, M=0.094, SD=0.291); retired (M=0.034, SD=0.181); unemployed and actively looking for a job (M=0.042, SD=0.2). The education level in the sample included completion of high school (M=0.080, SD=0.272), vocational or unfinished higher education (M=0.137, SD=0.344), degree obtained in higher education establishments (bachelor, master or specialist, M=0.731, SD=0.444), or PhD (M=0.052, SD=0.222). Monthly income level per household was represented by nine groups with an interval of €350, starting from group 1 "less than €350" and ending with group 9 "more than €2800" per month (M=5.549, SD=2.46). Lastly, around 13% of respondents reported experiencing difficulties in everyday life due to health problems (SD=0.337).

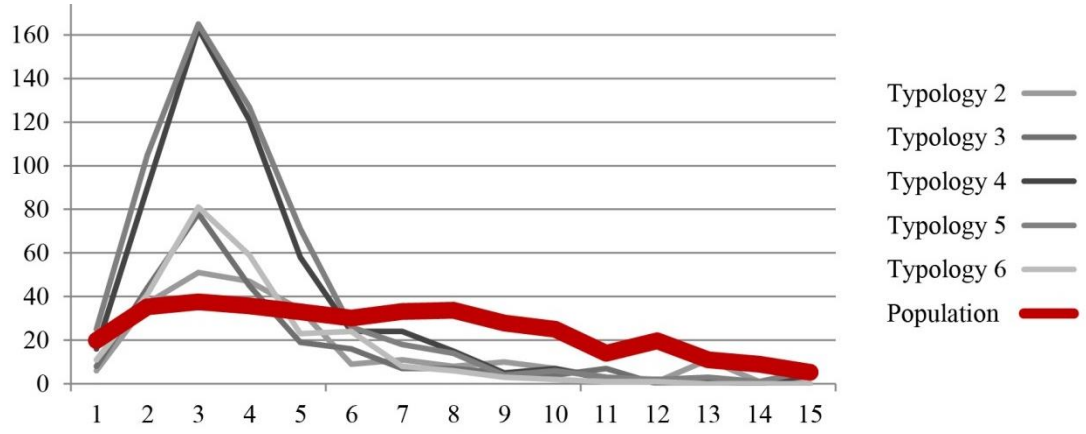


Figure 14. The distribution of respondents by age group, where 1 is 15-19 years and 15 is above 85 years.

The sample was not considered representative in terms of the age distribution of respondents due to the large number of responses collected online (see Figure 14).

In order to control for possible bias, a robustness check with weighted age grouping was applied. A further non-representative aspect of the sample was the educational level of respondents, with 78% of people having obtained higher education or PhD degree (among the general population of Moscow, this figure is around 42%).

The general proportions of distribution of other characteristics of the sample, such as gender, ethnicity, income, employment, and relationship status, were closer to the average.

Table 5. Sample characteristics

		N	Mean	SD	Min	Max
Age		1 956	32.180	11	14	93
Gender	*(1 -male 2 - female)*	1 963	1.462	0.499	1	2
Marital Status		1 968	2.045	0.989	1	4
	Married	1 968	0.388	0.487	0	1
	Single	1 968	0.257	0.437	0	1
	Have a partner	1 968	0.276	0.447	0	1
	Other	1 968	0.079	0.269	0	1
Ethnicity	*(1 - Russian 2 - other)*	1 968	1.115	0.319	1	2
Citizenship	*(1 - Russia 2 - other)*	1 968	1.015	0.121	1	2
Occupation		1 968	1.566	1.067	1	5
	Paid work	1 968	0.721	0.449	0	1
	Student	1 968	0.110	0.313	0	1
	Not working not looking for a job	1 968	0.094	0.291	0	1
	Retired	1 968	0.034	0.181	0	1
	Not working looking for a job	1 968	0.042	0.2	0	1
Education		1 965	2.754	0.671	1	4
	Secondary (school)	1 965	0.080	0.272	0	1
	Vocational/unfinished higher	1 965	0.137	0.344	0	1
	Higher	1 965	0.731	0.444	0	1
	PhD	1 965	0.052	0.222	0	1
Income Group	*(< €350 - > €2800)*	1 812	5.549	2.46	1	9
Health Difficulties	*(1 - no 2 - yes)*	1 959	1.131	0.337	1	2

4.1.3 Dependent variables

All dependent variables were obtained from the results of the survey. The main dependent variable was happiness and it was assessed by the answer to the question “Taking all things together, how happy would you say you are?” on a scale from 0 to 10, where 0 means “extremely dissatisfied” and 10 means “extremely satisfied” (M=6.657, SD=1.838).

The following variables were supplementary and served to explain the indirect effects of the built environment on happiness through its impact on domain satisfactions. Housing satisfaction was measured with the question "How satisfied would you say you are with your current place of living in general?" on a scale from 0 to 10, where 0 means "extremely dissatisfied" and 10 means "extremely satisfied" (M=6.266, SD=2.448).

Health satisfaction was evaluated by self-reported responses to the question "How is your health in general?" on a scale from 1 to 5, where 1 means "Very bad", 2 means "Bad", 3 means "Fair", 4 means "Good", and 5 means "Very good" (M=3.569, SD=0.703).

Mood index is a mean of the frequency of feeling depressed, happy, sad and enjoying life during the previous week, as reported by respondents. The answers were measured on a scale from 1 to 5, where 1 corresponds to "none or almost none of the time" and 5 means "all or almost all of the time", and the results for negative statements (feeling depressed and sad) were reversed in the index, which showed a mean of 3.554 and standard deviation of 0.837.

Social index represents local social relations and is a mean of satisfaction with the local community and opportunities to meet new people and make friends, measured on a scale from 0 to 10, and helpfulness of neighbors ("People in my local area help one another") and feeling connected ("I feel close to the people in my local area"), measured on a scale from 1 to 5. Therefore, the overall index has a scale from 0 to 7.5 (M=3.482, SD=1.592).

Table 6. Dependent Variables

	N	Mean	SD	Min	Max
Happiness	1 968	6.657	1.838	0	10
Housing Satisfaction	1 968	6.266	2.448	0	10
Health Satisfaction	1 968	3.569	0.703	1	5
Mood Index	1 967	3.554	0.837	1	5
Social Index	1 968	3.482	1.592	0.5	7.5

(0 - extremely dissatisfied, 10 - extremely satisfied)

4.1.4 Independent variables

The main independent variable was habitation in a particular housing typology and was originally provided by respondents during completion of the survey and subsequently verified based on the address provided. Processing of the survey results revealed nine housing typologies that were merged into seven groups for the analysis, including five main and two supplementary typologies.

Table 7. Independent Variables

	N	Mean	SD	Min	Max
Typologies	1 968	4.144	1.377	1	7
Typology 1 (supplementary)	1 968	0.037	0.188	0	1
Typology 2 (non-microrayon)	1 968	0.12	0.325	0	1
Typology 3 (microrayon)	1 968	0.127	0.333	0	1
Typology 4 (microrayon)	1 968	0.261	0.439	0	1
Typology 5 (microrayon)	1 968	0.304	0.46	0	1
Typology 6 (non-microrayon)	1 968	0.137	0.344	0	1

Typology 7 (supplementary)	1 968	0.014	0.118	0	1

The main criteria used to distinguish between the typologies were period of construction, number of floors, and whether the building was of standard or custom design. The numbers were assigned to typologies in chronological order. Standardized buildings constituted three microrayon typologies (types 3, 4, 5), while individually designed buildings were assigned to the groups "Historical", "Stalin" and "Contemporary" housing (types 1, 2, 6). The last group contained all cases that did not match any of the previous criteria (Typology 7).

Typology 1. "Historical"

Individually designed before 1960; low- and mid-rise housing excluding "Stalin" type

Figure 15. Typology 1

According to the "Set of Rules in the Field of Urban Planning", the term "historical buildings" is applicable to all houses built before the start of the mass large-panel construction program that commenced around 1960 (Ministry of Regional Development, 1989).

However, in the context of this study it was appropriate to not consider all historical buildings as one group, but rather to isolate the so-called Stalin architecture from the rest of the historical buildings due to its higher occurrence, number of residents, and homogeneity in terms of architectural aspects. Consequently, Typology 1 was purposely underrepresented in the survey and serves purely as a supplementary type, without the perspective of being interpreted as a predictor of happiness.

This typology contained 72 respondents with 60 identifiable addresses. All identified buildings were constructed between 1876 and 1957, were custom designed, and varied in height from two to twelve floors.

Table 8. Typology 1

		N	Mean	SD	Min	Max
Happiness	*0-10 scale*	72	6.681	2.155	0	10
Housing Satisfaction	*0-10 scale*	72	6.875	2.611	0	10
Construction year		60	1 923	18.01	1 876	1 957
Number of floors		60	5.35	1.645	2	12
Design	*0 - standard, 1 - custom*	60	1	0	1	1

Typology 2. "Stalin"

Individually designed in the 1930s-50s; mid-rise housing

Typology 2 included housing built primarily in the 1930s-50s Stalinist Empire style for the accommodation of privileged classes or joint residence of multiple working class households. Prior to the mid-1950s, all buildings were of unique architectural design and appearance, but after the shift in the ideological paradigm the construction of this typology ceased almost completely and thereafter occurred only sporadically with prominent modifications; original decor was abolished, while standardized design and elements were introduced.

Figure 16. Typology 2

The majority of Stalinist architecture exemplars are distinguishable by the feature of courtyard spaces, designed as a form of enclosed private area in contrast to the spatial character of the mostly discrete microrayon environment. Among other distinctive features are the use of brick as a basic building material, a considerable number of rooms (typically 3 or 4), and ceiling height of over 3 meters.

The typology was represented by 236 observations, with the highest mean of happiness (M=7.123) and housing satisfaction (M=7.669) of all observed typologies. The sample included late exemplars, built until 1964; therefore 97% of buildings were custom designed with a small portion of standardized housing that preserved the main features of Stalinist architecture.

Table 9. Typology 2

		N	Mean	SD	Min	Max
Happiness	*0-10 scale*	236	7.123	1.708	0	10
Housing Satisfaction	*0-10 scale*	236	7.669	1.729	2	10
Construction year		226	1 954	7.329	1 931	1 964
Number of floors		226	8.23	2.409	3	17
Design	*0 - standard, 1 - custom*	226	0.973	0.161	0	1

Typology 3. "Khrushchevki"

Standardized 5-floor housing built in the 1950s-70s

Initial attempts to introduce mass housing programs in the USSR began with the development of five-floor brick buildings that retained some features of Stalinist architecture (building material, high ceilings, modest decoration). However, cheaper and more compact panel

versions were later accepted as the principal design model and became prevalent in many cities. This type is known as “Khrushchevki” and is typically characterized by very compact apartments with a small number of rooms (usually one or two) and low ceilings, but green and spacious courtyards which are not separated from each other and often form one open public space.

Figure 17. Typology 3

The sample consisted mainly of residents of panel five-floor buildings, with a minor group of brick housing of similar visual and spatial characteristics included, some of which were individually designed. This sub-group was subsequently excluded from the robustness check. The typology further incorporated several four- and six-floor buildings with similar characteristics. In total, 250 respondents were included, displaying the lowest mean of happiness (M=6.544) and housing satisfaction (M=5.636) compared to other typologies.

Table 10. Typology 3

		N	Mean	SD	Min	Max
Happiness	*0-10 scale*	250	6.544	1.984	0	10
Housing Satisfaction	*0-10 scale*	250	5.636	2.506	0	10
Construction year		229	1 962	2.958	1 954	1 977
Number of floors		229	5.004	0.175	4	6
Design	*0 - standard, 1 - custom*	216	0.134	0.342	0	1

Typology 4. Mid-rise microrayons

Standardized 9-12-floor housing built since the 1950s

Nine-floor standardized buildings can be attributed both to the first stage of the mass housing program, when they served as an addition to the five-floor Khrushchevki, or to the next period when they replaced Khrushchevki as the primary element of new construction. Later series included more variation in the spatial allocation of buildings and improved layout of apartments. Most series were built of panels, but a considerable share of brick models exist.

Figure 18. Typology 4

The group contained 514 responses with 465 identifiable addresses. In addition to the main volume of buildings built in the Soviet period, the sample included more recent housing, constructed from older standardized designs or their derivatives. The number of floors generally numbered between nine and twelve, but a small number of lower buildings with similar characteristics were included in the group.

Table 11. Typology 4

		N	Mean	SD	Min	Max
Happiness	*0-10 scale*	514	6.58	1.874	0	10
Housing Satisfaction	*0-10 scale*	514	5.586	2.51	0	10
Construction year		465	1 973	8.526	1 958	2 007
Number of floors		465	10.2	1.488	7	12
Design	*0 - standard, 1 - custom*	460	0	0	0	0

Typology 5. High-rise microrayons

Standardized 14-25-floor housing, built since the 1960s

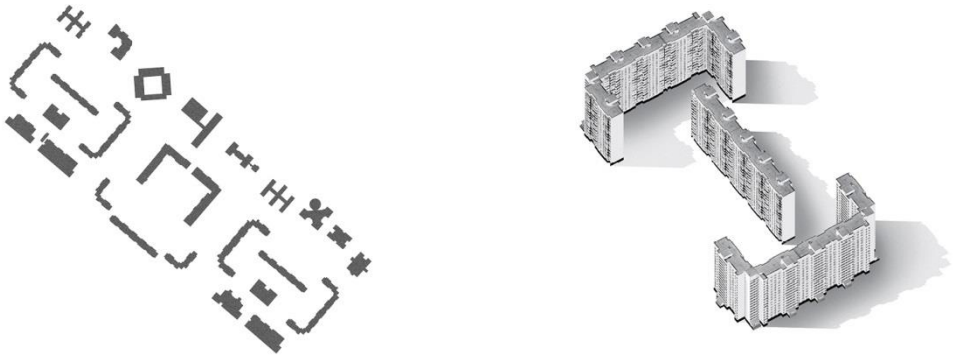


Figure 19. Typology 5

Construction of high-rise (mostly 14-25 floors) standardized buildings in Moscow commenced in the late 1960s and continues today. The group included 599 observations and scored on the same level with other microrayons in terms of mean happiness (M=6.576; SD= 1.815), but considerably higher in housing satisfaction (M=6.187; SD=2.332).

Table 12. Typology 5

		N	Mean	SD	Min	Max
Happiness	*0-10 scale*	599	6.576	1.815	0	10
Housing Satisfaction	*0-10 scale*	599	6.187	2.332	0	10
Construction year		539	1 991	11.76	1 967	2 014
Number of floors		539	17.27	2.805	13	30
Design	*0 - standard, 1 - custom*	539	0.000	0	0	0

Typology 6. Contemporary custom designed housing

Individually designed mid- and high-rise housing built after 1950

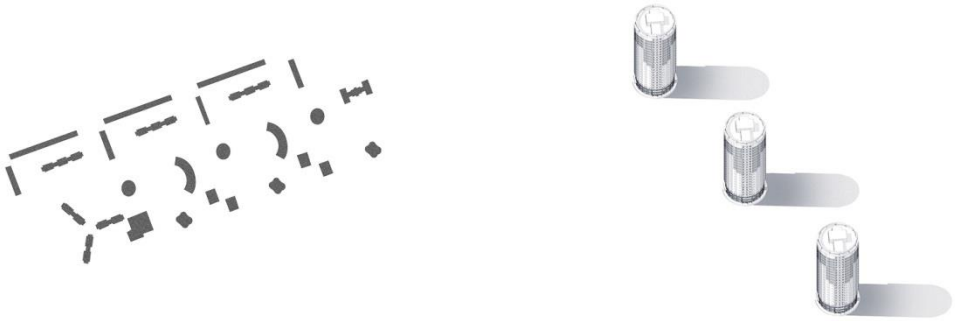


Figure 20. Typology 6

Typology 6 included all custom designed housing built during and after the introduction of the mass construction program; therefore, the majority of buildings shared the microrayon qualities of large scale and discreteness. Furthermore, a considerable number of buildings were designed within already established microrayons, and so are surrounded by standardized buildings. However, no certain generalization is possible due to the extreme heterogeneity of the group. In this sense, the importance of the typology was seen as secondary to the microrayon typologies, but was nonetheless considered as one of the main typologies in all models.

Table 13. Typology 6

		N	Mean	SD	Min	Max
Happiness	*0-10 scale*	269	6.632	1.678	0	10
Housing Satisfaction	*0-10 scale*	269	6.892	2.279	0	10
Construction year		240	1 991	18.59	1 953	2 014
Number of floors		240	17.08	7.913	8	57
Design	*0 - standard, 1 - custom*	240	0.996	0.065	0	1

Typology 7. Other

The last group contained 28 observations, representing buildings that did not match any of the described typologies characteristics and included dormitories, low-rise custom designed, or single-family housing.

Table 14. Typology 7

		N	Mean	SD	Min	Max
Happiness	*0-10 scale*	28	7.036	1.503	4	10
Housing Satisfaction	*0-10 scale*	28	6.643	2.844	0	10
Construction year		18	1 976	17.04	1 957	2 009
Number of floors		18	10.44	7.77	4	30
Design	*0 - standard, 1 - custom*	4	0.5	0.577	0	1

4.1.5 Characteristics of the built environment

In order to determine the possible effects of housing typologies on happiness and domain satisfaction, characteristics of the built environment were included in the analysis.

The objective characteristics were identified using DIT database, ArcMap software for spatial analysis, and the web service www.googlemaps.com. Discreteness, average number of floors in the area, monotony, proportion of built-up area, and average distance between buildings were considered. A detailed explanation of the indexes and methods of estimation is presented in Chapter 3.

Table 15. Objective Characteristics

		N	Mean	SD	Min	Max
Discreteness	*1-4 scale*	1 842	2.729	0.912	0	4
Height nearby		1 780	10.95	3.782	3	28.50
Monotony	*0-10 scale*	1 780	6.399	3.055	0	10
Built area		1 792	6.679	0.240	4.423	7.842
Average Distance		1 496	4.102	0.436	1.910	5.164

The subjective characteristics of the built environment were defined based on the results of the survey section on perception of living environment. Based on the reactions to three groups of statements about the neighborhood, relating to visual pleasantness, scale, and spatial arrangement of buildings, corresponding indexes were estimated. Additionally, respondents were asked about their level of satisfaction with aspects of their particular residence: apartment, hall, courtyard, and appearance of the building.

Apart from a subjective evaluation of housing, responses to the questionnaires included factual information about buildings that were partly attributable to housing typologies (building material, presence of a functioning elevator, satisfaction with the living area of the apartment).

Table 16. Subjective Characteristics/ Building

		N	Mean	SD	Min	Max
Building Appearance	*0-10 scale*	1 968	5.197	2.923	0	10
Court Yard Satisfaction	*0-10 scale*	1 968	5.290	2.737	0	10
Hall Satisfaction	*0-10 scale*	1 968	5.111	2.848	0	10
Apartment Satisfaction	*0-10 scale*	1 968	6.536	2.546	0	10
Neighborhood Appearance	*1-5 scale*	1 947	3.118	0.857	1	5
Neighborhood Size	*1-5 scale*	1 947	3.622	0.806	1	5
Neighborhood Space	*1-5 scale*	1 947	3.159	0.858	1	5
Court Yard Index	*0-10 scale*	1 968	5.488	2.498	0	10
Appearance/ Size/ Space	*1-5 scale*	1 947	3.300	0.685	1.167	5
Building material	*1-brick, 0-other*	1 630	0.318	0.466	0	1
Elevator	*0-no, 1-yes*	1 960	0.835	0.372	0	1
Living area		1 962	3.830	1.196	1	6
Area Satisfaction	*1-no, 2-yes*	1 968	1.532	0.499	1	2

The following table illustrates the correlation between the objective characteristics of the neighborhood environment and its perception by residents. As expected, monotony displayed a considerably negative relationship with the index of visual appearance (-39%), and average height and distance between buildings negatively correlated with the index of optimal dimensions. Discreteness and the proportion of built-up area were shown to have a relatively weak connection to the subjective indexes. Annex 3 includes a correlation table of other crucial indicators.

Table 17. Objective and Subjective Characteristics of the Neighborhood

	Appearance	Size	Space
Monotony	-0.3892*	-0.2144*	-0.1187*
Height Nearby	-0.1676*	-0.2707*	-0.0915*
Discreteness	0.1172*	0.0269	0.0388
Average Distance	-0.1227*	-0.1105*	0.0019
Built area	0.0293	-0.0679*	0.0587*

4.1.6 Control variables

In addition to demographic information, three groups of control variables were considered. The first group was related to feelings and beliefs, and included indexes of personal freedom and recent mood, which at the same time were treated as supplementary dependent variables. The second group of variables represented the quality of the living environment not attributable to housing typology: residence period, housing tenure, satisfaction with air quality, infrastructure, and accessibility to public green spaces in the neighborhood, transport accessibility, and density of amenities. The last group included local qualities not intrinsic to housing typologies, but which nonetheless may be indirectly influenced by their attributes, namely, property value, safety, and local social relations. Annex 4 includes a table of the control variables.

4.2 Empirical Results

The purpose of empirical analysis was to characterize the relationship between housing typologies and dependent variables, and explain it by introduction of the characteristics of the typologies. The explanation was possible due to the assumption that decreased significance of a specific variable, precipitated by the introduction of another variable, occurs when the former absorbs part of the explanatory power of the latter. The groups of variables were formed based on theory and the results of pilot models testing the significance and influence of separate indicators. This section first examines the direct impact of housing typologies on happiness, and later considers the indirect relationship through effects on housing satisfaction, local social relations, health satisfaction, and recent mood.

4.2.1 Happiness and Housing Typologies

Ferrer-i-Carbonell and Frijters (2004) examined differences in the application of standard least squares regression and ordered latent response models to happiness studies and concluded that the choice of model was relatively unimportant. The dependent variable was measured on the 11-grade scale; therefore multivariate ordinary least-squares (OLS) regression was selected as the primary analysis method. In order to correct for potential heteroscedasticity and autocorrelation, a robust standard error was employed. In addition, variance inflation factor tests were completed for each model to control for possible multicollinearity, with a factor typically less than 2.

The model was initially run without control variables to determine whether living in a certain typology had any effect on happiness. Typology 2 was selected as the reference group as the hypothesis assumes that the comparison of neighborhood environment in the Stalin era housing with microrayons would reveal differences in happiness. Investigations of other reference groups showed that Typology 2 was indeed the only typology that exerted statistically significant effects on happiness.

Model 1.1 incorporates happiness as a dependent variable and dummy variables for housing typologies as predictors. The model proposes residence in Typologies 3-6 as a statistically significant predictor of lower levels of happiness, compared to Typology 2. The lowest coefficient was -0.579 for Typology 3, meaning that people living in Khrushchevki on average reported a lower level of happiness by 0.579 points out of 10 compared to residents of the Stalin housing. Residents of Typologies 4 and 5 reported generally lower levels of happiness by 0.543 and 0.547 points out of 10 respectively. As expected, all microrayon typologies showed stronger negative correlation coefficients than the custom designed housing of Typology 6, which shares many features of microrayons and thus showed a markedly negative coefficient of -0.491. The effects of Typologies 1 and 7 were not considered in this analysis due to their supplementary nature and insufficient numbers of observations. As expected, the effect of living in a certain place has a limited capacity to influence one's happiness, as the model explains only 1% of the differences in happiness observed.

Following the characterization of the relationship between happiness and housing typology, several groups of control variables were introduced interchangeably to determine whether the effects of the typologies would be preserved. Model 1.2 demonstrated that gender, age, and marital status were significant predictors of happiness, while ethnicity and citizenship were not significant. The model showed that none of the demographic data explain the effect of the independent variables, as the coefficients obtained for the microrayon typologies changed only slightly while the magnitude of the coefficient of the Typology 6 increased from 0.491 to 0.532.

Table 18. Model 1. Happiness and Housing Typologies + Control Variables

		Model 1.1 Typology	Model 1.2 Demography	Model 1.3 Economic	Model 1.4 Social	Model 1.5 Health/Mood	Model 1.6 Overall
Typology:	*1 - Historical*	-0.442	-0.358	-0.485*	-0.407*	-0.186	-0.229
		(0.276)	(0.255)	(0.264)	(0.235)	(0.165)	(0.162)
	3 - Khrushchevki	-0.579***	-0.579***	-0.488***	-0.448***	-0.244**	-0.240**
		(0.168)	(0.163)	(0.169)	(0.158)	(0.117)	(0.119)
	4 - 9-12 floor	-0.543***	-0.554***	-0.552***	-0.376***	-0.170	-0.188*
		(0.139)	(0.135)	(0.139)	(0.133)	(0.104)	(0.106)
	5 - 14-25 floor	-0.547***	-0.550***	-0.599***	-0.441***	-0.280***	-0.318***
		(0.134)	(0.132)	(0.136)	(0.128)	(0.101)	(0.105)
	6 - Custom Design	-0.491***	-0.532***	-0.616***	-0.418***	-0.267**	-0.339***
		(0.151)	(0.147)	(0.152)	(0.148)	(0.113)	(0.116)
	7 - Other	-0.0872	-0.089	-0.173	-0.148	-0.138	-0.267
		(0.301)	(0.302)	(0.317)	(0.301)	(0.245)	(0.264)
Occupation:	*Student*			0.252*			0.218*
				(0.152)			(0.124)
Not working,not seeking a job				-0.136			-0.065
				(0.163)			(0.105)
	Retired			-0.353			-0.147
				(0.295)			(0.288)
	Not working, seeking a job			-0.992***			-0.240
				(0.237)			(0.154)
Education:	*School*			-0.333*			-0.008
				(0.192)			(0.144)
	Unfinished Higher/ Vocational			-0.423***			-0.183**
				(0.130)			(0.092)
	PhD			0.168			0.046
				(0.187)			(0.136)
Income				0.117***			0.018
				(0.018)			(0.013)
Gender:	*Female*		0.178**				0.181***
			(0.083)				(0.064)
Age			-0.015***				0.002
			(0.005)				(0.005)
Marital status:	*Single*		-1.046***				-0.321***
			(0.108)				(0.084)
	Have a partner		-0.512***				-0.194***
			(0.101)				(0.074)
	Widowed/ Divorced/ Other		-1.050***				-0.629***
			(0.200)				(0.156)
Ethnicity:	*Not Russian*		0.097				0.099
			(0.130)				(0.102)
Citizenship:	*Not Russian*		0.097				0.161
			(0.291)				(0.255)
Meet Family/ Friends					0.159***		0.065**
					(0.035)		(0.027)
Walking					0.068**		-0.034
					(0.034)		(0.027)
Trust Index					0.228***		0.081***
					(0.02)		(0.016)
Felt Depressed						-0.257***	-0.237***
						(0.044)	(0.047)
Enjoyed Life						0.327***	0.318***
						(0.045)	(0.046)
Felt Happy						0.644***	0.602***
						(0.051)	(0.052)
Felt Sad						-0.164***	-0.149***
						(0.041)	(0.044)
Health Difficulties:	*yes*					-0.098	-0.064
						(0.103)	(0.104)
Health Satisfaction						0.223***	0.179***
						(0.049)	(0.053)
Personal Freedom						0.206***	0.192***
						(0.039)	(0.041)
Constant		7.123***	7.991***	6.618***	4.851***	2.996***	2.762***
		(0.111)	(0.228)	(0.171)	(0.257)	(0.312)	(0.435)
Observations		1968	1952	1810	1931	1861	1677
R-squared		0.010	0.070	0.068	0.110	0.539	0.569

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Economic-related variables were featured in Model 1.3; income, employment status, and education level were statistically significant for predicting happiness but did not depreciate the implications of the housing typologies. The introduction of economic control variables decreased the coefficient for Typology 3 and increased those of Typologies 4 and 6, suggesting that the differences in levels of happiness between residents of Khrushchevki and the Stalin housing was partly attributable to the less advantageous economic conditions of the former environment.

Model 1.4 includes social indicators such as frequency of contact with family and friends or going for a walk, and an index of social trust. All indicators were significant, positively related to happiness, and decreased the magnitude of the coefficients of microrayon typologies without fully explaining their function.

The final group of control variables represents health, indexes of personal freedom, and recent mood, a combination shown to lower the magnitude of the coefficients for all typologies, reducing the significance of living in Typologies 3 and 6 and fully explaining the statistical significance of residing in Typology 4. The impact of the place of residence on the index of recent mood and health is discussed at the end of this chapter, while the relationship between the index of personal freedom and residence in Typologies 3 and 4 might be interpreted as a detrimental effect on happiness of the inability to leave the unsatisfactory environment.

The overall model includes all groups of control variables not related to the place of living and has an R-squared value of over 56%. Both the statistical significance of living in Typologies 3 and 4 and the magnitude of coefficients for all typologies are reduced, but a pronounced effect of the main typologies in question persists. Specifically, residents of Krushchevki are, on average, 0.240 points out of 10 less happy than the inhabitants of the Stalin residences, with economic, social, and demographic characteristics, mood and health being equal. In general, the residents of standardized 9-12 floor housing report a 0.188 point lower happiness than the residents of Typology 2, other things being equal. The effects of living in the mid-rise Typologies 3 and 4 were comparable to the coefficient of being in an informal relationship as opposed to official marriage (-0.194). For high-rise typologies, the levels of happiness observed were lower than those of the reference group by 0.318 and 0.339 out of 10 respectively, when controlled for the fundamental aspects of life. These coefficients approached the effect of being single compared to being married, which causes a reduction in happiness of 0.321.

A comparison of these outcomes with the results of the Model 1.1 demonstrated that the control variables were causing the highest inflation of living in Typologies 3 and 4. The highest risk of inflation among all groups of control variables was attributable to mood, health, personal freedom, and social indicators.

Further analysis addressed the effects of the housing typologies on happiness through particular characteristics of the living environment. Model 2.1 appraises the characteristics of a residence, unrelated to the architectural qualities of the built environment such as proximity to public transport, local property value, safety, satisfaction with infrastructure, green spaces, and air quality. All variables introduced were found to be significant, and decreased the coefficients of microrayon typologies as well as the statistical significance of living in Typology 4; the function of the typologies was not thoroughly explained, however. The safety variable was included in the group following separate testing that showed its inability to explain the typology effects. The only non-architectural factor in this model that overcame the typology effects was the index of local property value, in turn reflecting not only the

conventional notion of remoteness from the city center, but also the housing typologies constituting the district, hence the inflation of the typologies coefficients.

Table 19. Model 2. Happiness and Neighborhood Characteristics

		Model 2.1 Control	Model 2.2 Community	Model 2.3 Objective 1	Model 2.4 Objective 2	Model 2.5 Subjective 1	Model 2.6 Subjective 2
Typology:	*1 - Historical*	-0.235	-0.353	-0.271	-0.407	-0.424	-0.348
		(0.266)	(0.258)	(0.269)	(0.297)	(0.264)	(0.272)
	3 - Khrushchevki	-0.453***	-0.311*	-0.247	-0.614***	-0.191	-0.475***
		(0.167)	(0.162)	(0.194)	(0.195)	(0.166)	(0.162)
	4 - 9-12 floor	-0.345**	-0.209	-0.232	-0.588***	-0.045	-0.317**
		(0.143)	(0.135)	(0.170)	(0.165)	(0.138)	(0.137)
	5 - 14-25 floor	-0.408***	-0.301**	-0.220	-0.550***	-0.033	-0.283**
		(0.142)	(0.131)	(0.173)	(0.182)	(0.137)	(0.136)
	6 - Custom Design	-0.461***	-0.360**	-0.392**	-0.615***	-0.154	-0.203
		(0.152)	(0.148)	(0.158)	(0.183)	(0.148)	(0.151)
	7 - Other	-0.381	-0.202	-0.163	-0.174	0.192	0.069
		(0.298)	(0.296)	(0.309)	(0.283)	(0.306)	(0.305)
Infrastructure Satisfaction		0.119***					
		(0.021)					
Ecology Index		0.093***					
		(0.021)					
Transport		-0.305***					
		(0.079)					
Property Value		0.544***					
		(0.199)					
Safety		0.226***					
		(0.069)					
Community Satisfaction			0.100***				
			(0.021)				
Social Opportunities			0.036*				
			(0.021)				
Attachment			0.114***				
			(0.041)				
Neighbors Help			0.196***				
			(0.054)				
Monotony				-0.060***			
				(0.020)			
Hybrid:	*yes*			-0.777**			
				(0.393)			
Height Nearby					-0.005		
					(0.017)		
Average Distance					-0.104		
					(0.116)		
Built Area					0.006		
					(0.207)		
Discreteness					-0.060		
					(0.057)		
Neighborhood Appearance						0.580***	
						(0.054)	
Neighborhood Scale							0.072
							(0.063)
Neighborhood Space							0.435***
							(0.058)
Constant		2.568**	5.418***	7.307***	7.767***	4.937***	5.301***
		(1.052)	(0.192)	(0.126)	(1.387)	(0.231)	(0.277)
Observations		1762	1966	1780	1494	1947	1947
R-squared		0.112	0.098	0.017	0.011	0.074	0.056

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Model 2.2 encompasses indicators of local social relations that are possibly mediated by attributes of housing typologies such as satisfaction with local community, opportunities to meet new people and make friends, attachment to the area, and helpfulness of neighbors. As expected, the magnitude of the coefficients of all typologies were diminished; therefore, the effect of living within certain typologies can be partly attributed to local social relations,

particularly when comparing the reference group with Typologies 3 and 4. The effect of the built environment attributes on social relations is discussed in Section 4.2.3.

The following two models demonstrate the effects of the intrinsic objective characteristics of microrayons on happiness in the typology context. Model 2.3 includes only the most prominent aspect, monotony, which substantially diminished the coefficients of all typologies and explained the statistical significance of all microrayon groups. However, the supplementary dummy variable, "Hybrid", was introduced to control for 29 addresses that shared the qualities of Typologies 2 and 3 (otherwise, the effect of Typology 3 is not fully explained, but instead diminished).

Model 2.4 contains the objective characteristics of the neighborhood environment that, unexpectedly, were insignificant as happiness level predictors in any combination, such as the average height and distance between adjacent buildings, the ratio of built up area to empty plots, and discreteness of the built environment. None of the control variables had a significant impact on happiness, and their presence only increased the magnitude of coefficients for most housing typologies.

Furthermore, subjective evaluations of the neighborhood's visual and spatial qualities were introduced, including perceptions of the attractiveness of the neighborhood, spatial arrangement of buildings, and their size. Aesthetic appearance and beauty of the neighborhood accounted for differences in happiness between the reference group and all other typologies. The introduction of this index substantially decreased the coefficients and significance of all typologies, particularly in the case of Typologies 4 and 5 as the negative effect they exerted on happiness fell from over 0.5 to under 0.05 points. The index of visual pleasantness was statistically significant and predicted an increase in happiness by 0.58 (on a scale from 0 to 10) per every increase in the visual pleasantness of the neighborhood by 1 (on a scale from 1 to 5).

Other indexes of subjective evaluation of the neighborhood environment, namely optimal spatial and dimensional design, led to a certain decrease in typology coefficients, but fully explain only the statistical effect of the non-microrayon high-rise Typology 6 with minor changes in the significance of Typologies 4 and 5.

Models 3.1 to 3.5 sought to determine the impact of different typologies on happiness through overall satisfaction with housing and particular aspects on the scale of the building. Firstly, the hypothesis that housing satisfaction mediates the effect of the microrayon environment was tested and was supported by the finding that, on average, every increase in housing satisfaction by 1 point out of 10 results in an additional 0.271 points out of 10 in the happiness levels of respondents. The introduction of this factor led to a dramatic reduction in the magnitude of typology coefficients, fully negating the significance of Typologies 3 to 5 and of Typology 6, to some degree.

Satisfaction with building appearance was similar to housing satisfaction but exerted a less pronounced effect on happiness and the inflation of typologies factors (see Model 3.2). Model 3.3 demonstrated that satisfaction with one's apartment contributes to happiness to a similar extent as overall residential satisfaction and reduced the coefficients of all typologies, specifically accounting for the differences between the reference group and Typologies 3 and 4. In the case of Typology 3, this difference can be explained by satisfaction with the living area of the apartment (see Model 4.4), a logical outcome given the compact layout as attributed to Typology 3.

Table 20. Model 3. Happiness and Housing Satisfaction

		Model 3.1 Housing	Model 3.2 Appearance	Model 3.3 Apartment 1	Model 3.4 Apartment 2	Model 3.5 Hall/ Courtyard
Typology:	*1 - Historical*	-0.227	-0.376	-0.337	-0.401	-0.266
		(0.247)	(0.260)	(0.236)	(0.267)	(0.261)
	3 - Khrushchevki	-0.029	-0.209	-0.130	-0.269	-0.373**
		(0.161)	(0.167)	(0.158)	(0.177)	(0.163)
	4 - 9-12 floor	0.021	-0.140	-0.144	-0.312**	-0.299**
		(0.134)	(0.141)	(0.136)	(0.148)	(0.137)
	5 - 14-25 floor	-0.146	-0.210	-0.319**	-0.437***	-0.456***
		(0.127)	(0.136)	(0.126)	(0.137)	(0.133)
	6 - Custom Design	-0.281**	-0.396***	-0.421***	-0.512***	-0.511***
		(0.140)	(0.148)	(0.144)	(0.153)	(0.150)
	7 - Other	0.191	0.072	0.007	0.003	-0.064
		(0.277)	(0.281)	(0.287)	(0.300)	(0.283)
Area Satisfaction:	*no*				0.197**	
					(0.090)	
Living area					0.137***	
					(0.044)	
Housing Tenure:	*Mortgage*				0.330**	
					(0.142)	
	Live free of charge				0.010	
					(0.264)	
	Rent				-0.106	
					(0.123)	
	Other				-0.004	
					(0.230)	
Residence Period					-0.299***	
					(0.067)	
Housing Satisfaction		0.271***				
		(0.019)				
Building Appearance			0.147***			
			(0.016)			
Apartment Satisfaction				0.249***		
				(0.018)		
Court Yard Index						0.121***
						(0.021)
Hall Satisfaction						0.086***
						(0.02)
Constant		5.047***	6.084***	5.249***	7.100***	5.899***
		(0.176)	(0.155)	(0.175)	(0.275)	(0.155)
Observations		1968	1968	1968	1951	1968
R-squared		0.129	0.058	0.122	0.033	0.077

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The final model in this section illustrated that satisfaction with the courtyard and hall areas of the building had a positive and significant relationship with happiness, reducing the magnitude of coefficients and statistical significance of Typology 3 and 4 habitations, but exhibiting a modest effect in terms of Typologies 5 and 6. This is most likely due to the observation that newer buildings typically have better maintained halls and courtyards; therefore the reference group 2 held a less advantageous position in this context.

Models 4.1 to 4.4 thus portray how the most significant indicators influence overall regression with control variables. When controlled for non-architectural factors, satisfaction with one's apartment and building appearance remained significant, but the coefficients of these factors were reduced. Nonetheless, the magnitude of the typologies factors was diminished profoundly, explaining the statistical significance of Typologies 3 and 4 and slightly modifying the significance of Typology 5 (see Models 4.1 and 4.2).

Table 21. Model 4. Happiness and Housing Characteristics + Control Variables

		Model 4.1 Appearance	Model 4.2 Apartment	Model 4.3 Monotony	Model 4.4 Subjective
Typology:	*1 - Historical*	-0.161	-0.178	-0.187	-0.166
		(0.178)	(0.174)	(0.174)	(0.178)
	3 - Khrushchevki	-0.120	-0.095	-0.0461	-0.042
		(0.129)	(0.126)	(0.134)	(0.135)
	4 - 9-12 floor	-0.116	-0.120	-0.0477	-0.040
		(0.115)	(0.111)	(0.125)	(0.128)
	5 - 14-25 floor	-0.242**	-0.279**	-0.192	-0.191
		(0.115)	(0.108)	(0.127)	(0.130)
	6 - Custom Design	-0.366***	-0.379***	-0.348***	-0.366***
		(0.119)	(0.117)	(0.119)	(0.122)
	7 - Other	-0.155	-0.182	-0.100	-0.091
		(0.271)	(0.281)	(0.288)	(0.303)
Gender:	*Female*	0.193***	0.178***	0.180***	0.183***
		(0.065)	(0.065)	(0.065)	(0.065)
Age		-0.003	-0.003	-0.004	-0.004
		(0.005)	(0.005)	(0.005)	(0.005)
Marital status:	*Single*	-0.420***	-0.448***	-0.449***	-0.463***
		(0.086)	(0.086)	(0.086)	(0.087)
	Have a partner	-0.224***	-0.253***	-0.246***	-0.242***
		(0.076)	(0.076)	(0.076)	(0.077)
	Widowed/ Divorced/ Other	-0.517***	-0.509***	-0.489***	-0.499***
		(0.166)	(0.160)	(0.159)	(0.159)
Occupation:	*Student*	0.255**	0.237*	0.233*	0.229*
		(0.128)	(0.129)	(0.129)	(0.130)
	Not working,not seeking a job	-0.019	0.001	-0.008	-0.016
		(0.108)	(0.106)	(0.107)	(0.107)
	Retired	-0.134	-0.118	-0.126	-0.118
		(0.307)	(0.297)	(0.298)	(0.303)
	Not working, seeking a job	-0.274	-0.237	-0.242	-0.248
		(0.167)	(0.163)	(0.164)	(0.164)
Education:	*School*	-0.117	-0.098	-0.097	-0.094
		(0.150)	(0.147)	(0.148)	(0.148)
	Unfinished Higher/ Vocational	-0.262***	-0.238**	-0.231**	-0.227**
		(0.100)	(0.100)	(0.100)	(0.101)
	PhD	0.059	0.006	0.050	0.047
		(0.132)	(0.134)	(0.130)	(0.130)
Income		0.024*	0.012	0.011	0.009
		(0.013)	(0.013)	(0.013)	(0.013)
Meet Family/ Friends		0.038	0.041	0.038	0.042
		(0.027)	(0.028)	(0.028)	(0.028)
Trust Index		0.077***	0.069***	0.067***	0.069***
		(0.016)	(0.016)	(0.016)	(0.016)
Mood Index		1.232***	1.204***	1.200***	1.203***
		(0.050)	(0.052)	(0.051)	(0.052)
Health Satisfaction		0.201***	0.185***	0.191***	0.196***
		(0.050)	(0.051)	(0.051)	(0.051)
Personal Freedom		0.146***	0.136***	0.131***	0.131***
		(0.043)	(0.043)	(0.043)	(0.043)
Infrastructure Satisfaction		0.026*	0.022	0.021	0.023
		(0.014)	(0.014)	(0.014)	(0.015)
Air Satisfaction		0.028**	0.025*	0.027**	0.030**
		(0.013)	(0.013)	(0.013)	(0.013)
Transport		-0.109*	-0.110*	-0.115**	-0.113*
		(0.058)	(0.058)	(0.058)	(0.059)
Apartment Satisfaction			0.087***	0.085***	0.087***
			(0.015)	(0.015)	(0.015)
Residence Period			-0.090**	-0.080*	-0.077*
			(0.044)	(0.045)	(0.045)
Building Appearance		0.046***			
		(0.013)			
Monotony				-0.017	-0.0220
				(0.014)	(0.014)
Scale/ Space/ Appearance					-0.061
					(0.064)
Constant		0.338	0.589*	0.690*	0.824**
		(0.362)	(0.357)	(0.368)	(0.391)
Observations		1615	1610	1602	1584
R-squared		0.561	0.569	0.568	0.569
Robust standard errors in parentheses:			*** p<0.01, ** p<0.05, * p<0.1		

Introduction of the monotony index to the previous model accounts for the effect of all microrayon typologies in terms of magnitude of coefficients and statistical significance, the monotony index itself is not statistically significant when controlled for other groups of variables and apartment satisfaction. The final model examined the effects of the aggregate index of visual, spatial, and dimensional subjective characteristics of the neighborhood environment. The component performed similarly to the previously discussed monotony index.

Interestingly, none of the variables in the models 4.1 to 4.4 succeeded in accounting for the differences observed between the reference group and non-microrayon high-rise Typology 6. The R-squared value of all final models approached 56-57 %, but was generally slightly lower than that observed in Model 1.6 due to the exclusion of some variables in order to avoid multicollinearity.

4.2.2 Housing Satisfaction and Housing Typologies

The original hypothesis predicted that housing satisfaction would function as the primary mediating variable between housing typology and happiness, as demonstrated in Model 3.1. In order to examine this relationship more thoroughly, the next section describes models similar to those previously described, with housing satisfaction employed as the dependent variable.

Model 5 examined the effects of typologies on overall residential satisfaction without any control variables. Table 22 shows that, depending on the reference group, residence in various typologies explained between 10 to 16% of differences in housing satisfaction. Unlike the previous models, when testing the impact on housing satisfaction, all reference groups showed significant differences between the typologies. The only exception was the comparison between Typologies 3 and 4, which had no significant differences in influencing happiness. Similar to the happiness findings, Typology 2 had the highest probability of increasing the dependent variable, followed by Typology 6, while living in microrayons was associated with lower levels of housing satisfaction. For example, people living in Typology 4 were typically 2.084 points out of 10 less satisfied with their place of living, and those living in Typology 3 were 2.033 points less satisfied compared to Typology 2.

Table 22. Model 5. Housing Satisfaction and Housing Typologies

		Model 5.1 Typology 2	Model 5.2 Typology 3	Model 5.3 Typology 4	Model 5.4 Typology 5	Model 5.5 Typology 6
Typology:	*1 - Historical*	-0.794**	1.239***	1.289***	0.688**	-0.017
		(0.326)	(0.345)	(0.326)	(0.321)	(0.336)
	3 - Khrushchevki	-2.033***		0.050	-0.551***	-1.256***
		(0.194)		(0.193)	(0.185)	(0.211)
	4 - 9-12 floor	-2.084***	-0.050		-0.601***	-1.307***
		(0.158)	(0.193)		(0.146)	(0.178)
	5 - 14-25 floor	-1.483***	0.551***	0.601***		-0.705***
		(0.147)	(0.185)	(0.146)		(0.169)
	6 - Custom Design	-0.777***	1.256***	1.307***	0.705***	
		(0.179)	(0.211)	(0.178)	(0.169)	
	7 - Other	-1.027*	1.007*	1.057*	0.456	-0.249
		(0.541)	(0.552)	(0.540)	(0.537)	(0.547)
	2 - Stalin		2.033***	2.084***	1.483***	0.777***
			(0.194)	(0.158)	(0.147)	(0.179)
Constant		7.669***	5.636***	5.586***	6.187***	6.892***
		(0.112)	(0.158)	(0.111)	(0.095)	(0.139)
Observations		1968	1968	1968	1968	1968
R-squared		0.080	0.080	0.080	0.080	0.080

Robust standard errors in parentheses: *** p<0.01, ** p<0.05, * p<0.1

Table 23 includes Models 6.1 to 6.6 and explains the typology effects at the neighborhood level. The first model shows that the effects were diminished but preserved for all typologies when controlled for non-architectural factors. In particular, living in Typologies 4 and 5 was still associated with a considerable decrease in housing satisfaction by 1.238 and 1.220 points respectively. In Model 6.2, the monotony index was introduced, explaining the effects of Typologies 5 and 6 but only slightly influencing the coefficients of Typologies 3 and 4. Other objective characteristics of the built environment, the average height and distance between nearby buildings, the ratio of built up areas to empty plots, and the discreteness of the built environment, only slightly reduced the typology coefficients and accounted for the significance of Typology 6 (see Model 6.3). The only statistically significant factor (with a negative coefficient) among the characteristics was the distance between buildings. However, the removal of the typologies from the model resulted in a large increase in significance and magnitude of the discreteness index, leading to the assumption that discreteness is among the characteristics of microrayons that are responsible for the differences in housing satisfaction among typologies.

The visual appearance of the neighborhood is considered a key factor in predicting residential satisfaction and explains the significance of Typologies 5 and 6 in Model 6.5, while the coefficients of Typologies 3 and 4 remained significant with moderate decreases in weight.

The last model demonstrates the high significance of the introduced indexes, with the influence of spatial and dimensional characteristics of the neighborhood mostly attributable to Typologies 5 and 6.

Table 23. Model 6. Housing Satisfaction and Neighborhood Characteristics

		Model 6.1 Control	Model 6.2 Objective 1	Model 6.3 Objective 2	Model 6.4 Objective 3	Model 6.5 Subjective 1	Model 6.6 Subjective 2
Typology:	*1 - Historical*	-0.435	-0.337	-0.479*		-0.251	-0.338
		(0.266)	(0.257)	(0.279)		(0.272)	(0.265)
	3 - Khrushchevki	-1.238***	-0.965***	-1.192***		-0.866***	-1.146***
		(0.187)	(0.198)	(0.207)		(0.180)	(0.186)
	4 - 9-12 floor	-1.220***	-0.856***	-1.082***		-0.726***	-0.986***
		(0.156)	(0.187)	(0.183)		(0.156)	(0.159)
	5 - 14-25 floor	-0.694***	-0.305	-0.591***		-0.200	-0.400**
		(0.157)	(0.190)	(0.205)		(0.151)	(0.161)
	6 - Custom Design	-0.360**	-0.243	-0.247		-0.066	-0.138
		(0.172)	(0.175)	(0.205)		(0.169)	(0.179)
	7 - Other	-0.990*	-0.494	-0.651		-0.446	-0.697
		(0.539)	(0.523)	(0.595)		(0.572)	(0.579)
Gender:	*Female*	0.266***	0.282***	0.265**	0.230**	0.232**	0.221**
		(0.100)	(0.100)	(0.107)	(0.109)	-0.096	-0.099
Age		0.025***	0.022***	0.024***	0.026***	0.021***	0.021***
		-0.007	-0.007	-0.008	-0.008	-0.007	-0.007
Marital status:	*Single*	0.232*	0.236*	0.321**	0.341**	0.228*	0.175
		(0.135)	(0.134)	(0.146)	(0.149)	(0.129)	(0.132)
	Have a partner	0.156	0.162	0.261*	0.268*	0.149	0.135
		(0.124)	(0.124)	(0.135)	(0.138)	(0.119)	(0.124)
	Widowed/ Divorced/ Other	-0.080	-0.044	0.091	0.084	-0.033	-0.076
		(0.201)	(0.199)	(0.227)	(0.222)	(0.194)	(0.192)
Ethnicity:	*Not Russian*	-0.104	-0.103	-0.145	-0.148	-0.061	-0.045
		(0.154)	(0.152)	(0.161)	(0.168)	(0.142)	(0.150)
Citizenship:	*Not Russian*	0.173	0.179	0.005	0.101	0.142	0.179
		(0.459)	(0.468)	(0.463)	(0.467)	(0.454)	(0.466)
Occupation:	*Student*	0.140	0.147	0.130	0.179	0.131	0.067
		(0.174)	(0.171)	(0.187)	(0.194)	(0.167)	(0.169)
	Not working,not seeking a job	-0.449**	-0.466**	-0.412**	-0.388*	-0.492***	-0.437**
		(0.185)	(0.186)	(0.207)	(0.212)	(0.175)	(0.181)
	Retired	-0.578*	-0.513	-0.617	-0.640	-0.398	-0.629*

	(0.349)	(0.357)	(0.477)	(0.489)	(0.340)	(0.346)
Not working, seeking a job	-0.268	-0.235	-0.174	-0.165	-0.227	-0.240
	(0.253)	(0.250)	(0.262)	(0.263)	(0.241)	(0.248)
Income	0.047**	0.042*	0.039	0.047*	0.051**	0.039*
	(0.022)	(0.022)	(0.024)	(0.024)	(0.021)	(0.022)
Meet Family/ Friends	-0.067*	-0.084**	-0.083**	-0.083**	-0.085**	-0.090**
	(0.038)	(0.038)	(0.042)	(0.042)	(0.037)	(0.038)
Trust Index	0.0	-0.011	-0.006	-0.011	-0.002	-0.006
	(0.025)	(0.025)	(0.028)	(0.029)	(0.024)	(0.025)
Mood Index	0.218***	0.212***	0.230***	0.234***	0.161**	0.198***
	(0.072)	(0.072)	(0.080)	(0.081)	(0.068)	(0.071)
Health Satisfaction	0.083	0.082	0.086	0.096	0.121	0.112
	(0.085)	(0.085)	(0.091)	(0.093)	(0.079)	(0.084)
Health Difficulties		-0.007	-0.043	-0.039	-0.013	0.031
		(0.156)	(0.171)	(0.174)	(0.149)	(0.154)
Personal Freedom	0.141**	0.140**	0.098	0.107*	0.097*	0.109*
	(0.058)	(0.058)	(0.062)	(0.063)	(0.054)	(0.057)
Greenery Satisfaction	0.070***	0.073***	0.083***	0.084***	0.043**	0.049**
	(0.021)	(0.022)	(0.023)	(0.023)	(0.020)	(0.022)
Infrastructure Satisfaction	0.128***	0.133***	0.150***	0.142***	0.093***	0.105***
	(0.025)	(0.025)	(0.027)	(0.027)	(0.024)	(0.025)
Air Satisfaction	0.113***	0.111***	0.095***	0.087***	0.076***	0.088***
	(0.021)	(0.021)	(0.023)	(0.023)	(0.020)	(0.021)
Amenities	-0.066	-0.088	-0.112	-0.108	-0.126*	-0.075
	(0.072)	(0.072)	(0.083)	(0.081)	(0.069)	(0.072)
Transport	0.019	0.019	0.000	0.040	0.073	0.049
	(0.096)	(0.097)	(0.103)	(0.103)	(0.093)	(0.096)
Property Value	0.494*	0.147	0.814***	1.222***	0.181	0.698***
	(0.253)	(0.277)	(0.291)	(0.284)	(0.248)	(0.257)
Safety	0.272***	0.283***	0.283***	0.315***	0.150**	0.222***
	(0.078)	(0.079)	(0.085)	(0.088)	(0.075)	(0.078)
Social Index	0.238***	0.237***	0.229***	0.254***	0.142***	0.214***
	(0.043)	(0.043)	(0.047)	(0.049)	(0.042)	(0.043)
Attachment	0.369***	0.353***	0.344***	0.343***	0.213***	0.327***
	(0.051)	(0.051)	(0.057)	(0.058)	(0.051)	(0.052)
Housing Tenure: *Mortgage*		0.051	0.055	0.059	0.032	0.060
		(0.169)	(0.184)	(0.193)	(0.172)	(0.171)
Live free of charge		-0.443*	-0.532**	-0.653**	-0.411*	-0.473*
		(0.242)	(0.256)	(0.271)	(0.239)	(0.251)
Rent		-0.367**	-0.351**	-0.446***	-0.312**	-0.362**
		(0.145)	(0.158)	(0.159)	(0.138)	(0.145)
Other		-0.811**	-0.549	-0.603*	-0.870***	-0.818**
		(0.333)	(0.335)	(0.349)	(0.325)	(0.338)
Residence Period	-0.180**	-0.263***	-0.279***	-0.336***	-0.206***	-0.270***
	(0.072)	(0.081)	(0.090)	(0.089)	(0.076)	(0.079)
Discreteness			-0.049	-0.154**		
			(0.061)	(0.060)		
Height Nearby			-0.006	0.010		
			(0.020)	(0.016)		
Built Area			-0.204	-0.149		
			(0.223)	(0.225)		
Average Distance			-0.286**	-0.201		
			(0.133)	(0.134)		
Monotony		-0.088***				
		(0.025)				
Health Difficulties: *yes*	-0.012					
	(0.156)					
Neighborhood Appearance					0.951***	
					(0.081)	
Neighborhood Scale						0.261***
						(0.072)
Neighborhood Space						0.314***
						(0.083)
Constant	-2.035	0.599	-0.502	-4.083**	-1.413	-3.820***
	(1.375)	(1.560)	(1.928)	(1.912)	(1.352)	(1.419)
Observations	1579	1568	1312	1312	1557	1557
R-squared	0.442	0.452	0.454	0.432	0.497	0.464

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 24. Model 7. Housing Satisfaction and Building Characteristics

	Model 7.1 Courtyard	Model 7.2 Appearance	Model 7.3 Apartment 1	Model 7.4 Apartment 2	Model 7.5 Elevator	Model 7.6 Brick
Typology: *1 - Historical*	-0.368	-0.394	-0.338	-0.312	-0.297	-0.319
	(0.250)	(0.244)	(0.248)	(0.244)	(0.242)	(0.276)
3 - Khrushchevki	-0.547***	-0.317**	-0.316*	-0.320*	-0.265	-0.237
	(0.173)	(0.161)	(0.173)	(0.173)	(0.218)	(0.224)
4 - 9-12 floor	-0.469***	-0.329**	-0.317**	-0.273*	-0.308*	-0.122
	(0.155)	(0.142)	(0.154)	(0.156)	(0.167)	(0.193)
5 - 14-25 floor	-0.060	-0.069	0.010	0.050	0.020	0.230
	(0.152)	(0.142)	(0.151)	(0.152)	(0.165)	(0.212)
6 - Custom Design	-0.199	-0.169	-0.0987	-0.0487	-0.0611	-0.142
	(0.163)	(0.147)	(0.163)	(0.165)	(0.175)	(0.243)
7 - Other	-0.498	-0.660	-0.356	-0.317	-0.319	-0.259
	(0.493)	(0.467)	(0.472)	(0.467)	(0.468)	(0.804)
Gender: *Female*	0.243***	0.175**	0.248***	0.203**	0.198**	0.195**
	(0.092)	(0.084)	(0.091)	(0.090)	(0.090)	(0.099)
Age	0.020***	0.013**	0.020***	0.017***	0.017**	0.015**
	(0.007)	(0.006)	(0.007)	(0.007)	(0.007)	(0.007)
Marital status: *Single*	0.243*	0.087	0.146	0.099	0.103	0.035
	(0.124)	(0.112)	(0.122)	(0.120)	(0.120)	(0.132)
Have a partner	0.204*	0.088	0.157	0.151	0.148	0.127
	(0.115)	(0.105)	(0.113)	(0.113)	(0.113)	(0.126)
Widowed/ Divorced/ Other	0.003	0.010	-0.064	0.001	0.000	-0.040
	(0.188)	(0.175)	(0.186)	(0.183)	(0.184)	(0.193)
Ethnicity: *Not Russian*	-0.068	-0.020	-0.034	-0.032	-0.036	0.017
	(0.136)	(0.128)	(0.134)	(0.133)	(0.133)	(0.145)
Citizenship: *Not Russian*	0.147	-0.036	0.068	0.121	0.114	-0.103
	(0.434)	(0.387)	(0.413)	(0.402)	(0.402)	(0.406)
Occupation: *Student*	0.144	0.0210	0.131	0.0988	0.0915	0.0801
	(0.157)	(0.136)	(0.152)	(0.149)	(0.150)	(0.166)
Not working,not seeking a job	-0.369**	-0.242	-0.343**	-0.348**	-0.354**	-0.362**
	(0.164)	(0.151)	(0.161)	(0.159)	(0.159)	(0.174)
Retired	-0.615*	-0.462	-0.744**	-0.741**	-0.736**	-0.645*
	(0.340)	(0.301)	(0.341)	(0.339)	(0.339)	(0.352)
Not working, seeking a job	-0.309	-0.234	-0.314	-0.288	-0.241	-0.333
	(0.254)	(0.229)	(0.247)	(0.248)	(0.247)	(0.262)
Income	0.047**	0.005	0.041**	0.034*	0.033*	0.007
	(0.019)	(0.018)	(0.019)	(0.019)	(0.019)	(0.020)
Meet Family/ Friends	-0.095***	-0.110***	-0.099***	-0.098***	-0.095***	-0.085**
	(0.036)	(0.033)	(0.036)	(0.035)	(0.035)	(0.039)
Trust Index	0.013	-0.006	0.009	0.008	0.007	0.003
	(0.023)	(0.020)	(0.022)	(0.022)	(0.022)	(0.024)
Mood Index	0.151**	0.036	0.148**	0.161**	0.165**	0.145**
	(0.067)	(0.059)	(0.067)	(0.067)	(0.067)	(0.074)
Health Satisfaction	0.096	0.042	0.093	0.095	0.093	0.078
	(0.076)	(0.068)	(0.075)	(0.074)	(0.074)	(0.081)
Health Difficulties: *yes*	-0.054	-0.021	-0.014	-0.014		
	(0.142)	(0.135)	(0.139)	(0.136)		
Personal Freedom	0.095*	0.058	0.089*	0.075	0.067	0.073
	(0.053)	(0.047)	(0.052)	(0.051)	(0.051)	(0.055)
Greenery Satisfaction	0.069***	0.069***	0.063***	0.034*	0.037*	0.020
	(0.019)	(0.018)	(0.019)	(0.019)	(0.019)	(0.021)
Infrastructure Satisfaction	0.091***	0.063***	0.088***	0.067***	0.065***	0.072***
	(0.023)	(0.021)	(0.022)	(0.023)	(0.023)	(0.024)
Air Satisfaction	0.083***	0.076***	0.088***	0.081***	0.080***	0.080***
	(0.019)	(0.018)	(0.019)	(0.019)	(0.019)	(0.020)
Amenities	-0.064	-0.063	-0.075	-0.054	-0.053	-0.045
	(0.069)	(0.061)	(0.068)	(0.067)	(0.067)	(0.074)
Transport	0.020	0.024	0.022	0.047	0.042	-0.027
	(0.0892)	(0.0818)	(0.0873)	(0.0857)	(0.0857)	(0.0939)
Property Value	0.796***	0.859***	0.851***	0.901***	0.864***	0.852***
	(0.237)	(0.211)	(0.233)	(0.236)	(0.239)	(0.267)
Safety	0.318***	0.238***	0.306***	0.297***	0.307***	0.370***
	(0.073)	(0.067)	(0.073)	(0.071)	(0.071)	(0.075)
Social Index	0.108***	0.078**	0.097**	0.071*	0.066*	0.091**
	(0.041)	(0.037)	(0.041)	(0.040)	(0.040)	(0.043)
Attachment	0.322***	0.257***	0.324***	0.323***	0.326***	0.323***
	(0.049)	(0.042)	(0.048)	(0.048)	(0.048)	(0.052)
Housing Tenure: *Mortgage*	-0.045	0.022	-0.037	-0.025	-0.027	-0.132
	(0.148)	(0.142)	(0.148)	(0.151)	(0.151)	(0.182)

Live free of charge		-0.289	-0.119	-0.304	-0.389*	-0.398*	-0.416*
		(0.211)	(0.196)	(0.206)	(0.208)	(0.209)	(0.228)
Rent		-0.252*	0.054	-0.300**	-0.274**	-0.278**	-0.362**
		(0.134)	(0.121)	(0.133)	(0.132)	(0.133)	(0.152)
Other		-0.746**	-0.178	-0.634**	-0.703**	-0.713**	-0.622**
		(0.306)	(0.277)	(0.291)	(0.295)	(0.295)	(0.292)
Residence Period		-0.221***	-0.072	-0.199***	-0.181**	-0.190***	-0.262***
		(0.073)	(0.065)	(0.072)	(0.071)	(0.071)	(0.080)
Appearance Satisfaction		0.295***	0.198***	0.279***	0.244***	0.245***	0.237***
		(0.020)	(0.019)	(0.020)	(0.020)	(0.021)	(0.022)
Apartment Satisfaction			0.352***				
			(0.0241)				
Area Satisfaction:	*no*			0.662***	0.634***	0.622***	0.611***
				(0.089)	(0.088)	(0.089)	(0.098)
Court Yard Satisfaction					0.127***	0.127***	0.130***
					(0.023)	(0.023)	(0.025)
Health Difficulties						-0.022	-0.021
						(0.136)	(0.147)
Elevator:	*yes*					0.092	
						(0.200)	
Brick:	*yes*						0.214
							(0.152)
Constant		-4.091***	-4.521***	-4.499***	-4.745***	-4.557***	-4.256***
		(1.314)	(1.182)	(1.298)	(1.309)	(1.323)	(1.463)
Observations		1575	1575	1575	1575	1569	1328
R-squared		0.537	0.622	0.552	0.563	0.564	0.565

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Following the explanation of the effect of typologies at the neighborhood level, the components of the building were considered. Model 7.1 examines satisfaction with the building's appearance, a factor which partly explains the impact of all typologies and fully negates the statistical significance of living in Typologies 5 and 6. Likewise, all typologies were affected in a certain way when apartment satisfaction was introduced (see Models 7.2). Model 7.3 demonstrated that satisfaction with the living area of the apartment affected other variables in a similar manner.

The last three models sought to explain the residual significance of Typologies 3 and 4. Model 7.4 showed that, following introduction of courtyard satisfaction, the significance of living in Typology 4 was somewhat diminished. Furthermore, the introduction of the dummy variable for the functioning elevator in the building explained the remaining variations for Typology 3, but increased the magnitude of the coefficient of Typology 4 (see Model 7.5). Finally, the dummy variable for building material was introduced in Model 7.6, mitigating the effect of living in Typology 4.

4.2.3 Other Effects of Housing Typologies

According to the hypothesis, housing typologies are expected to exert a small but significant effect on life domains other than housing satisfaction. Previous models showed that health satisfaction, indexes of mood, and indicators of local social relations reduced the influence of the typologies on happiness. In the following section, these variables are evaluated for influence by housing typologies and characteristics.

Firstly, the effect on local social relations requires consideration. Model 8.1 revealed the ongoing effect of typologies on the aggregate index of local social relations, when controlled for the trust index, the frequency of walking, and contact with family and friends. All assessed typologies exerted a negative impact on social relations in the neighborhood compared to the reference typology. Residence in Typology 4 produced the most prominent drop in the index, 0.716 points out of 7.5. The model explained 24% of the variation in the index of local social relations, of which 3% were attributable to the typologies effects.

Table 25. Model 8. Local Social Relations and Housing Typologies

	Model 8.1 Control	Model 8.2 Objective 1	Model 8.3 Objective 2	Model 8.4 Objective 3	Model 8.5 Subjective 1	Model 8.6 Subjective 2
Typology: *1 -Historical*	-0.147	-0.056	0.049		-0.143	-0.017
	(0.176)	(0.193)	(0.209)		(0.171)	(0.176)
3 - Khrushchevki	-0.645***	-0.304**	-0.522***		-0.071	-0.521***
	(0.128)	(0.151)	(0.153)		(0.119)	(0.118)
4 - 9-12 floor	-0.716***	-0.341**	-0.546***		0.005	-0.458***
	(0.110)	(0.143)	(0.136)		(0.105)	(0.103)
5 - 14-25 floor	-0.508***	-0.112	-0.486***		0.247**	-0.208**
	(0.107)	(0.142)	(0.146)		(0.101)	(0.101)
6 - Custom Design	-0.207*	-0.048	-0.165		0.234**	0.113
	(0.126)	(0.138)	(0.156)		(0.115)	(0.116)
7 - Other	0.356	0.345	0.403		0.631***	0.399
	(0.306)	(0.366)	(0.409)		(0.227)	(0.265)
Walking	0.136***	0.150***	0.138***		0.099***	0.117***
	(0.025)	(0.026)	(0.028)		(0.022)	(0.024)
Trust Index	0.268***	0.255***	0.273***	0.280***	0.196***	0.210***
	(0.016)	(0.017)	(0.018)	(0.017)	(0.014)	(0.015)
Meet Family/ Friends	0.190***	0.204***	0.195***	0.236***	0.128***	0.129***
	(0.026)	(0.028)	(0.030)	(0.027)	(0.022)	(0.024)
Discreteness			0.004	-0.077**		
			(0.043)	(0.036)		
Height nearby			0.012			
			(0.013)			
Average Distance			0.023			
			(0.091)			
Monotony		-0.062***				
		(0.016)				
Built area		0.337**				
		(0.152)				
Neighborhood Appearance					0.905***	
					(0.037)	
Neighborhood Scale						-0.030
						(0.044)
Neighborhood Space						0.728***
						(0.041)
Constant	1.037***	-1.199	0.630	1.261***	-1.502***	-0.717***
	(0.197)	(1.043)	(0.415)	(0.162)	(0.200)	(0.229)
Observations	1931	1748	1469	1813	1911	1911
R-squared	0.243	0.248	0.241	0.201	0.431	0.374

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Among the objective characteristics of the built environment, the monotony index and share of the built-up area negated all typology coefficients and partly explained the statistical significances of Typologies 3 and 4; Typologies 5 and 6 were rendered completely insignificant (see Model 8.2). Unexpectedly, Model 8.3 showed that objective features such as discreteness, average height of buildings in the vicinity, and distance between buildings were insignificant both for predicting growth of local social relations and for explaining the significance of the typologies. However, if the typologies are removed from the model, the discreteness was found to be significant, a finding in line with the assumption of Section 4.2.2 that discreteness was among the features having a moderate indirect impact on happiness (see Model 8.4).

Model 8.5 illustrates that the significance of Typologies 3 and 4 can be explained by the index of neighborhood visual pleasantness, which has a predicted power to increase the index of social relations by 0.905 out of 10 with each increase in the index by 1 point out of 5.

In Model 8.6, the introduction of the indexes of building size and spatial arrangement partly accounted for the effects of all typologies, especially those of the high-rise Typologies 5 and 6.

Table 26. Model 9. Effects on Health and Mood

	Health Satisfaction		Recent Mood Index			
	Model 9.1 Control	Model 9.2 Subjective	Model 9.3 Control	Model 9.4 Objective	Model 9.5 Subjective 1	Model 9.6 Subjective 2
Typology: *1 - Historical*	-0.034	-0.055	-0.147	-0.049	-0.153	-0.120
	(0.107)	(0.110)	(0.113)	(0.109)	(0.106)	(0.110)
3 - Khrushchevki	-0.125**	-0.092	-0.206***	-0.107	-0.034	-0.164**
	(0.062)	(0.065)	(0.077)	(0.087)	(0.077)	(0.075)
4 - 9-12 floor	-0.122**	-0.081	-0.202***	-0.072	0.018	-0.101
	(0.055)	(0.058)	(0.064)	(0.083)	(0.064)	(0.064)
5 - 14-25 floor	-0.130**	-0.085	-0.163***	-0.032	0.067	-0.037
	(0.053)	(0.057)	(0.062)	(0.084)	(0.062)	(0.063)
6 - Custom Design	-0.102*	-0.0661	-0.140**	-0.080	0.009	-0.008
	(0.060)	(0.062)	(0.068)	(0.073)	(0.068)	(0.069)
7 - Other	0.033	0.038	-0.075	-0.141	0.055	0.000
	(0.097)	(0.097)	(0.180)	(0.224)	(0.177)	(0.175)
Income	0.053***	0.052***				
	(0.007)	(0.007)				
Age	-0.009***	-0.010***				
	(0.002)	(0.002)				
Air Satisfaction	0.035***	0.032***				
	(0.006)	(0.007)				
Greenery Satisfaction	0.013**	0.009				
	(0.006)	(0.007)				
Neighborhood Appearance		0.050**			0.265***	
		(0.025)			(0.024)	
Monotony				-0.023**		
				(0.010)		
Neighborhood Space						0.184***
						(0.026)
Neighborhood Scale						0.060**
						(0.028)
Constant	3.415***	3.283***	3.709***	3.769***	2.716***	2.824***
	(0.093)	(0.117)	(0.051)	(0.058)	(0.103)	(0.125)
Observations	1805	1785	1967	1779	1946	1946
R-squared	0.100	0.102	0.006	0.009	0.070	0.053

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Models 9.1 to 9.6 focused on the possible influence of housing typologies on health satisfaction and mood index as the most probable mediators between visual and spatial characteristics of the built environment and health. According to Model 9.1, housing typologies exerted a moderately significant effect on health satisfaction when controlled for age, income, and satisfaction with local air quality and greenery. The effects of all typologies were fully explained by the introduction of the index of visual attractiveness of the neighborhood (see Model 9.2).

Model 9.3 indicated that mood index was influenced by typologies to a greater extent, especially in the case of Typologies 3 and 4. Introduction of the monotony index invalidated the significance of the typology variable across all groups. Likewise, the index of visual pleasantness explained the impact of all typologies, while building size and organization of space rendered the coefficients of all mid- and high-rise typologies (except Typology 3) insignificant.

Overall, the typology effect accounted for a modest variation in health satisfaction and mood, but the introduction of the subjective characteristics of the built environment increased the explanatory power of the model, in particular when predicting mood (5-7%).

4.2.4 Robustness checks

The primary limitations to the external validity of the findings concern non-representative samples in terms of age, possible interference of socially desirable behavior, or the

interviewer effect. Furthermore, a considerable number of missing addresses or hybrid typologies sharing the qualities of multiple groups were identified. In order to examine the influence of these factors on the results, additional models with reduced combinations of data were run, interchangeably excluding the following groups:

- respondents older than 45,
- respondents residing in hybrid typologies,
- extreme responses (more than three answers of "0" or "10"),
- responses obtained through interviews,
- responses from income group 9 (due to abnormal distribution),
- responses associated with a missing or non-identifiable address, and
- responses from residents of New Moscow.

The exclusion of these observations did not significantly affect the performance of the model as the main relationship trends were preserved, with minor variations in the levels of significance of the variables. However, a tendency for stronger depreciation of the typologies effect was observed in Models 1.4 to 1.6, and 2.1. These changes in significance were mostly caused by the introduction of indexes of recent mood, personal freedom, and local property value.

Additionally, models weighted according to respondent age per typology, compared to the age distribution of the general Moscow population, were run. This resulted in a depreciation of differences between Typologies 2 and 3 in predicting happiness, but the difference remained strong in the model using housing satisfaction as the dependent variable. In other respects, the main relationship patterns were preserved.

4.2.5 Summary

The most important indicators explaining the differences in happiness between typologies are summarized in Table 27, with highlighted rows indicating the baseline models and the following rows displaying changes in the coefficients of typologies caused by the introduction of the explanatory variables to the baseline models.

In this research, Model 1.1 first addressed the sub-question "Does the fact of living in microrayons have a direct impact on happiness?" Data obtained in this study indicated a direct effect on happiness of living in microrayons compared to Stalin housing, an effect shown to be negative and statistically significant for all considered typologies. On average, a change in the place of living from a Stalin block to a microrayon resulted in a decrease in the level of subjective well-being by more than 0.5 out of 10 points (if not controlled for other life circumstances).

The table also illustrates that, in models without control variables, neighborhood features such as the quality of local social relations, monotony of the built environment, and subjective evaluation of the visual appearance of the area contributed to a reduction in magnitude statistical significance of all typology coefficients. This outcome indicated that the effect on happiness of living in microrayons could be explained by the aforementioned factors. In turn, perceptions of the spatial and dimensional qualities of the local environment mostly contributed to the differences in happiness observed between the Stalin architecture and high-rise Typologies 5 and 6.

Furthermore, evidence showed that overall satisfaction with the place of living mediated the effects on happiness of living in different typologies, as demonstrated in Model 3.1. Among the characteristics of a building, resulting in happier residents of Typology 2 housing than the inhabitants of microrayons, were satisfaction with one's apartment, courtyard, and appearance of the building. The explaining potential of satisfaction with an apartment and a courtyard, however, was mainly attributable to Typologies 3 and 4, with the effect of

satisfaction with building appearance present in all typologies; notably, this type of satisfaction had less explanatory power than the index of pleasantness of the entire neighborhood.

Table 27. Summary table

	Control Variables	Model/Explaining variables	Typology 3	Typology 4	Typology 5	Typology 6
Happiness	none	**none/ baseline model**	**-0.579***** (0.168)	**-0.543***** (0.139)	**-0.547***** (0.134)	**-0.491***** (0.151)
		Local Social Relations	-0.311* (0.162)	-0.209 (0.135)	-0.301** (0.131)	-0.360** (0.148)
		Monotony	-0.247 (0.194)	-0.232 (0.170)	-0.220 (0.173)	-0.392** (0.158)
		Neighborhood appearance	-0.191 (0.166)	-0.0450 (0.138)	-0.0328 (0.137)	-0.154 (0.148)
		Neighborhood space&scale	-0.475*** (0.162)	-0.317** (0.137)	-0.283** (0.136)	-0.203 (0.151)
		Overall housing satisfaction	-0.0285 (0.161)	0.0209 (0.134)	-0.146 (0.127)	-0.281** (0.140)
		Building appearance	-0.209 (0.167)	-0.140 (0.141)	-0.210 (0.136)	-0.396*** (0.148)
		apartment satisfaction	-0.130 (0.158)	-0.144 (0.136)	-0.319** (0.126)	-0.421*** (0.144)
		courtyard satisfaction	-0.373** (0.163)	-0.299** (0.137)	-0.456*** (0.133)	-0.511*** (0.150)
	demographic, economic, social, health, mood, personal freedom, infrasrtucture and air satisfaction, transport nodes proximity	**none/ baseline model**	**-0.240**** (0.119)	**-0.188*** (0.106)	**-0.318***** (0.105)	**-0.339***** (0.116)
		building appearance	-0.120 (0.129)	-0.116 (0.115)	-0.242** (0.115)	-0.366*** (0.119)
		apartment satisfaction	-0.095 (0.126)	-0.120 (0.111)	-0.279** (0.108)	-0.379*** (0.117)
		monotony	-0.046 (0.134)	-0.048 (0.125)	-0.192 (0.127)	-0.348*** (0.119)
		area appearance&space&scale	-0.042 (0.135)	-0.04 (0.128)	-0.191 (0.130)	-0.366*** (0.122)
Housing Satisfaction	demographic, economic, social, health, mood, personal freedom, infrasrtucture and air satisfaction, transport nodes proximity, property value, safety, attachment	**none/ baseline model**	**-1.238***** (0.187)	**-1.220***** (0.156)	**-0.694***** (0.157)	**-0.360**** (0.172)
		monotony	-0.965*** (0.198)	-0.856*** (0.187)	-0.305 (0.190)	-0.243 (0.175)
		Neighborhood appearance	-0.866*** (0.180)	-0.726*** (0.156)	-0.200 (0.151)	-0.066 (0.169)
		Neighborhood scale&space	-1.146*** (0.186)	-0.986*** (0.159)	-0.400** (0.161)	-0.138 (0.179)
		building appearance	-0.547*** (0.173)	-0.469*** (0.155)	-0.06 (0.152)	-0.199 (0.163)
Community	frequency of walking, seeing family and friends, trust index	**none/ baseline model**	**-0.645***** (0.128)	**-0.716***** (0.110)	**-0.508***** (0.107)	**-0.207*** (0.126)
		monotony	-0.304** (0.151)	-0.341** (0.143)	-0.112 (0.142)	-0.048 (0.138)
		Neighborhood appearance	-0.071 (0.119)	0.005 (0.105)	0.247** (0.101)	0.234** (0.115)
		Neighborhood scale&space	-0.521*** (0.118)	-0.458*** (0.103)	-0.208** (0.101)	0.113 (0.116)
Health	age, income, air satisfaction, greenery satisfactuin	**none/ baseline model**	**-0.125**** -0.062	**-0.122**** -0.055	**-0.130**** -0.053	**-0.102*** -0.06
		monotony	-0.092 -0.065	-0.081 -0.058	-0.085 -0.057	-0.066 -0.062
Mood	none	**none/ baseline model**	**-0.206***** -0.077	**-0.202***** -0.064	**-0.163***** -0.062	**-0.140**** -0.068
		monotony	-0.107 -0.087	-0.072 -0.083	-0.032 -0.084	-0.08 -0.073
		Neighborhood appearance	-0.034 -0.077	0.0179 -0.064	0.067 -0.062	0.009 -0.068
		Neighborhood scale&space	-0.164** -0.075	-0.101 -0.064	-0.037 -0.063	-0.008 -0.069

The following models suggested that the main predictors of differences in happiness between typologies performed similarly when controlled for demographic, economic, social, and emotional groups of indicators, with the effects of typologies less pronounced as the weighting was partly negated by the control variables.
The sections of the table demonstrating the effects of the built environment on domain satisfactions provide further evidence in support of the assumption that housing satisfaction, social relations in the local community, health, and mood mediate the indirect effects of living in microrayons on happiness. The main indicators explaining these effects were monotony and subjective evaluation of the visual, spatial, and dimensional qualities of the neighborhood environment.

Chapter 5: Conclusions and Recommendations

5.1.1 Conclusions

That the characteristics of a living environment can influence life satisfaction and happiness to a certain extent has been considered by several researchers studying the economics of happiness (Sirgy and Cornwell, 2002, Brereton, Clinch, et al., 2008, Ballas and Tranmer, 2011). The foregoing analysis considered possible direct and indirect relationships between the visual and spatial aspects of Moscow microrayons and happiness, in comparison with custom designed housing.

The microrayon phenomenon represents a countrywide mass construction program of economic standardized housing that has provided millions of Muscovites and other Russians with the opportunity to relocate to a separate apartment from communal residences, dormitories, or the poor quality barracks of the 1960s. At that time, the prospect of "a thousand adequate apartments instead of seven hundred good ones" was generally embraced (Urban, 2013, p. 129), but due to low standards of construction and compact size and rigid layout of the apartments, early microrayons were soon subjected to criticism and acrimony, as were later, improved versions which were still perceived as low quality housing. Moreover, modernist-style residential complexes, the precursors of microrayons, were stigmatized as a failure both among architects and public opinion in many countries.

Regardless, the spatial principles of new residential construction continued to be modeled on Soviet practices until relatively recently. At the same time, little attention has been paid to the discussion of the role of microrayons in contemporary urban planning and their influence on the lives of ordinary people in post-Soviet cities with a postindustrial economy. Following years in which the growth of large-scale standardized estates was effectively ignored, the authorities in Moscow initiated a shift in the paradigm of urban planning and started to rigorously promote the use of the enclosed mid-rise urban block typology as opposed to discrete large-scale microrayons (Moskomarhitektura, 2015b). Such a drastic reversal of policy evoked questions on the actual role of microrayons in the contemporary city environment and whether the traditional stigmatization of these areas was still valid. Therefore, this study addressed the question of how and why Muscovites were nowadays influenced by the microrayon environment, specifically in terms of happiness, the ultimate measure of the quality of human life.

Based on a review of the literature, the view of happiness or life satisfaction as a measurable concept, affected by external factors either directly or through mediating the effects on satisfaction with particular realms of life (domain satisfactions) was adopted (Van Praag, Frijters, et al., 2003). In turn, the living environment was identified as a factor that impacted happiness in general and the gratification of certain needs, sense of belonging, shelter, security, and identity in particular (Coates, Anand, et al., 2013). The built environment of residential areas was also shown to influence the choice of outdoors activities, facilitate local navigation and, depending on the configuration of local elements, possess stimulating or restorative powers (Gehl, 1987/2011, Evans and McCoy, 1998, Ulrich, 1979, Huang, 2006). A combination of environmental qualities and scenarios was also responsible for perceived levels of stress, influencing mood and mental health (Pacione, 2003, Evans, 2003). Moreover, housing was associated with opportunities to extend the family and develop local social connections (Coates, Anand, et al., 2013, Zavisca, 2012). Many life domains were thus shown to be affected by the living environment, the most important being housing, social relations, mood, and health. With respect to the particular characteristics of the built environment that fostered a positive attitude towards housing, a healthy lifestyle with social interaction, an abundance of public green spaces, visual and functional diversity, human

scale, and walkability were cited (Gehl, 1987/2011, Ulrich, 1979, Huang, 2006, Fan and Khattak, 2009).

As a result, the characteristics of the built environment were predicted to exert an influence on life satisfaction, both directly and indirectly, through the mediation of domains such as the aforementioned housing satisfaction, social relations, mood, and health. The living environment of microrayons was hypothesized to have a detrimental effect on happiness and domain satisfactions compared to non-microrayon residential areas. To explain the effect of typologies, the distinctive features of the microrayon environment such as monotony, discreteness, and large scale (in more recent typologies) were identified and supplemented by subjective evaluations of visual, spatial, and dimensional qualities of the built environment. Furthermore, the objective and subjective characteristics at the individual building and apartment level were considered.

In order to determine the effects of residence in different typologies on happiness, an ordinary least squares regression was applied. The non-microrayon typology, represented by the Stalin residential architecture, was adopted as a reference typology. The analysis tested the effects on happiness and domain satisfactions associated with living in microrayons, and investigated how the introduction of control and mediating variables influenced the performance of the typology indicators.

Overall, the research findings supported the hypothesis and demonstrated that living in microrayons negatively contributed to the level of life satisfaction compared to the Stalin architecture. A number of aspects were shown to explain the effects of typologies, such as monotony, subjective evaluation of the visual appearance of the neighborhood, optimal spatial allocation and building size, satisfaction with one's apartment, appearance, and courtyard of the building.

However, the explanatory power of most objective characteristics of the local environment, such as the proportion of built up area, discreteness, average distance between buildings, and the number of floors in the area, was found to be extremely weak. Monotony, reflecting the number of standardized buildings in the vicinity, appeared to be the only objective characteristic of the built environment having an impact on happiness. In line with the negative influence of the monotony index, subjective evaluations of aesthetic appearance and satisfaction with the aspect of the building explained the effect on all typologies, thus underlining the importance of visual qualities of the built environment. The effect of spatial allocation and local building dimensions was limited and only attributable to the large-scale Typologies 4, 5, and 6.

The characteristics of the building, namely, apartment and courtyard appearance, further contributed to the differences in happiness observed, but with less potential to explain the differences between typologies. The role of apartment and courtyard satisfaction in explaining the differences was particularly evident for Typologies 3 and 4, the most compact and antiquated housing among all microrayon types.

Particular domains of life impacted by residence in a certain housing typology unsurprisingly included housing satisfaction, social relations in the local community, recent mood, and health satisfaction. The differences between typologies in housing satisfaction were most distinctly affected by satisfaction in the building appearance, subjective perceptions of visual pleasantness, and monotony of buildings nearby. Additionally, discreteness in the building environment, associated with microrayon typologies, was established as exerting a negative impact.

The impact of typologies on social relations was mostly influenced by visual appearance of the neighborhood, monotony, and (to some extent) by the perception of spatial organization and discreteness. Health satisfaction and mood were moderately influenced by microrayons

due to monotony in the area and the indexes of neighborhood appearance, spatial organization, and building dimensions.
Overall, the findings indicate that visual and spatial characteristics of the neighborhood environment of microrayons exerted a moderate but statistically significant negative effect on the happiness of residents. All else being equal, life in a non-microrayon environment, particularly the Stalin residential architecture, resulted in higher levels of happiness as Muscovites were more likely to be happy, satisfied with their housing and local social relations, of good mood and, consequently, more satisfied with their health when living in custom-designed buildings or in neighborhoods they considered attractive. In addition, satisfaction with one's apartment, courtyard, and building appearance mattered in terms of influence on happiness and housing satisfaction.

5.1.2 Recommendations for the Implications of Study Findings

The results of this research primarily contribute to existing knowledge on contextual factors contributing to happiness, and particularly emphasize the role of architectural quality of the living environment. The findings support the prescribed theoretical assumptions that an aesthetically pleasant environment contributes to satisfaction with the living place and facilitates social interaction, while monotony and large scale of the built environment have negative connotations with happiness, housing satisfaction, social relations and satisfaction with health. Notwithstanding the fact that the specific character of the area under consideration does not permit the expansion of the outcomes to a broader context, it may serve as a reference point for future work.

Furthermore, the findings confirm that the recent policy of the Moscow authorities, aiming to modernize housing construction combines, promote the introduction of diversified combinations of standardized elements and apply the principles of urban blocks to new developments, thus creating value in the living environment. However, no unquestionable evidence exists for the implementation of urban blocks as a universal solution. A further shift from the paradigm of standardized construction as the only method for providing affordable housing should be promoted. Therefore, with regards to all new construction plans, the role of standardized housing should be reduced to a minimum as it is no longer indispensable due to economic reasons as it was in the postwar period. Sporadic construction of custom designed buildings does not lead to the same level of success, as the monotony index (illustrating whether buildings are standardized or individually designed) has shown.
However, these measures should be accompanied by a complete review of existing regulations, given that the main principles were developed decades ago and did not permit the full-scale implementation of the new policy at the time.
In terms of the application of these results to existing microrayons in Moscow, it is necessary to include these areas as a focus of public discussion, along with the arguments around newly constructed developments. At present, this topic mainly relates to the demolition of the "disposable" series of Khrushchevki, a radical idea fraught with many constraints. Ideas about reconstruction or redevelopment of existing microrayons remain as occasional initiatives, as due to a lack of support and publicity they are seen as insufficiently strong case for future development in this direction. Among such initiatives are two implemented projects for Khrushchevki reconstruction, proposing the addition of floors and new facades at Mishina Street and Khimkinsky Boulevard, the conceptual project "Microrayon Tomorrow" by Dutch-Russian architectural bureau SVESMI, a proposal for Narodnogo Opolcheniya Street by the Russian Bureau of Local Planners, and conceptual projects by the students of the "Citizens as Customers" studio at the Strelka Institute. Despite the unprecedented number of prominent architectural competitions held by Moscow authorities in recent years, none aimed to reimagine the living conditions in existing microrayons. In view of the forthcoming

expiration of many hundreds of buildings, a timely response to this issue by the local government facilitating the involvement of the professional community on the one side and the residents and neighborhood councils on the other is required.

Based on the research findings, there are two aspects to improvements required in existing microrayons. As a priority, measures to improve living conditions in Khrushchevki (Typology 3) should be devised, as results indicated that substandard apartments were the primary contributor to lower levels of happiness, as reported by the residents. The radical program of demolition of obsolete housing currently targets only Krushchevki of the first wave, the so-called "disposable series" built between 1959-1966 using thin ribbed panels. Early brick Khrushchevki, or later series with a more solid construction scheme, were considered more comfortable and habitable. However, the survey data (including five respondents from the disposable, 120 from non-disposable, and 125 from an undefined series) showed that, even when the demolition of the disposable series approached completion, people who lived in the supposedly more comfortable series remained dissatisfied with their housing. The same observation applied to residents of Typology 4, with most buildings built in the Soviet period and a level of happiness and housing satisfaction comparable to those of Typology 3, along with the explanatory power of apartment satisfaction. Given the extraordinary proportion of Soviet buildings with an intended lifetime of 25-30 years in the current housing stock, and the demonstrated negative effects of living in such housing, the Moscow authorities should address this issue with the highest priority.

Furthermore, initiatives to enhance the aesthetic appearance and spatial organization of areas built up with high-rise standardized buildings should be implemented. Such measures as diversification of facades, increasing walkability, and development of additional green spaces are associated with positive changes in the subjective evaluation of environmental appearance. Besides, a number of successful urban practices under the umbrella of urban interventionism have been initiated worldwide in recent years, represented by inexpensive small-scale projects introducing new functions or objectives to ordinary locales (Vytuleva, 2012). These initiatives include urban gardening, mobile libraries, bulletin boards for communication, and interactive forms of outdoor art installations. Interestingly, many of these practices attempt to introduce shared facilities, reminding of such discarded concepts of the early microrayons as house kitchens, roof gardens, and "bureaus of good services". Therefore, it seems consistent to employ this approach to modern day microrayons in order to bring new dimensions to urban life, foster feelings of attachment among residents, and increase levels of social interaction.

5.1.3 Limitations of the Research

A number of underexplored issues exist in this work, attributable to both time limitations and imperfections in the survey design. Firstly, the survey required only basic personal information from residents, mostly due to the extensive size of the questionnaire. However, factors examining the relationship between one's childhood or family history and the microrayon environment profoundly affect the evaluation of the living environment. For example, people born or raised in a microrayon were unlikely to consider it a monotonous, featureless place, as they form their own emotional connections to the surroundings. Moreover, the circumstances of becoming a microrayon resident matter, such as the number of generations residing in (and emotionally connected to) that place, the previous place of living, and whether the apartment was obtained in the usual manner or one's employment, the latter usually inferring superior living conditions.

Another unexplored characteristic is whether a person resides at the given address permanently or has a second residence or dacha, a country-side seasonal house which can partly compensate for the effects of living in a microrayon. Furthermore, the physical

condition of the buildings and the infrastructure has been somewhat overlooked in the analysis. At the same time, certain physical aspects such as noise pollution, parking availability, and transport accessibility have been derived from the objective indicators (proximity to major highways and railways, parking plots in the vicinity, public transportation stops, and metro stations), resulting in an extremely poor performance of these indicators in the research model. Hence the use of subjective indicators, to the greatest extent possible, is advised for further research. The responses of residents to open questions in the survey confirmed that a number of require further examination in terms of subjective evaluation, including public transport accessibility, the availability of parking spaces, noise pollution, a barrier-free environment, and sporting and bicycle infrastructure.

The general focus of the analysis was on visual and spatial perceptions of the neighborhood environment; therefore, only basic information about housing on a small scale was considered. However, it is important to consider such exterior and interior architectural details as differences in layout between standardized series, quality of thermal and acoustic insulation, configurations and dimensions of balconies, finished color and quality, and organization of communal halls and stairs. These issues should be addressed at the next level of analysis.

Additionally, it is advisable to consider a broader range of objective characteristics of the built environment which can better reflect the subjective perception of visual, spatial, and dimensional qualities of housing. Indicators that were not fully addressed in this study due to time limitations and sample size include an alternative measure of monotony (with regards to differences between the standardized series), a manually determined average distance between buildings, and dimensions of the courtyard area. Broadening the range of subjective and objective characteristics would bring more clarity to the composition of the variables behind happiness and domain satisfaction as well as to the function of the housing typologies.

A further limitation of the analysis was related to sample underrepresentation caused by the selection of an internet based survey as the most efficient and affordable data collection method in the given timeframe. As demonstrated in the comparison between the characteristics of the sample and the general population, the proportion of young and well educated respondents significantly exceeded that of average Muscovites. This observation may have been caused by the choice of platform for survey distribution. Therefore, the results were not equally attributable to all social groups, and the role of the media, both as a tool for survey distribution and as an abstract external power defining perceptions of reality to a certain extent, should be further considered in the future.

Apart from limitations imposed by the survey design, it is necessary to mention the initial restrictions of the study, such as lack of external validity. Since microrayons feature only in post Socialist countries, results cannot be generalized to Western mass-produced modernist estates. Furthermore, the unique position of Moscow as the former capital of the USSR and the current most populous city in Europe restrict the translation of the results to countries of the former Socialist era.

Another initial restriction, caused by characteristics of the reference group used in the analysis, the Stalin typology, were not entirely identical to those of the traditional urban blocks most frequently exalted in the literature and by the present-day Moscow authorities. Despite the enclosed courtyards and unique design of these buildings, the streets intersecting the blocks do not fit the ideals of Jacobs (1961) and Gehl (2011) as they are too wide and lack multi-functionality, diversity and a complex hierarchy of spaces. Besides, buildings of this typology have at times exceeded the height of traditional urban blocks. These limitations did not permit a thorough investigation of the effects of building scale and organization of space in microrayons. Therefore, Typology 1 might be considered a superior reference option, but its small numbers of residents, exclusively central location, and heterogeneity of

characteristics precluded this historical typology from being the main comparator of microrayons.
Finally, it is necessary to note that the causality of the relationship between happiness and subjective evaluations of particular indicators is a matter of long-standing discussion. Therefore it is fair to assume that part of the association between dependent and independent variables is due to the influence that overall feelings about life have on the manner in which people assess other factors. However, the value of using the objective characteristics was unaffected by this consideration.

5.1.4 Recommendations for Future Work

This thesis creates a precedent of integration of sociological and econometric mechanisms into the field of architectural studies. As the bottom-up approach gains increasing credibility in urban planning and design, such a research model can be considered a valuable addition to the existing set of interdisciplinary research instruments. However, the scale of the study permitted only general patterns of the relationship between happiness and microrayons to be examined. The number of respondents per neighborhood and the nature of the data were insufficient to allow substantial conclusions about the processes inside microrayons to be formed, but instead provided an overview of the most critical areas. As a further step in the research process, this method could be applied at a smaller scale with a combination of quantitative and qualitative research, as econometrics has inherent limitations in terms of in-depth understanding of observed phenomena.
Supplementary schemes presented in Annex 5 illustrate the spatial allocation of problematic zones. Figure 21 shows the spatial distribution of happiness, Figure 22 displays the level of satisfaction of residents with their housing, and Figure 23 represents the aggregate index of apartment and appearance satisfaction, the subjective evaluation of aesthetical appearance, spatial and dimensional characteristics of the neighborhood, and monotony (the latter on an inverted scale). Districts including less than three respondents were excluded from the schemes and displayed as empty plots, while the other areas reveal general tendency and cannot be interpreted as fully representative.
The illustrations reflect a long-standing pattern in the public perception of Moscow districts as described by Urban (2013); the Central, Western and South-Western parts of Moscow are considered to be the most prestigious and desirable places to live, while the outskirts of Moscow, particularly in the South, South-West and North, are associated with the lowest levels of happiness, housing satisfaction, and corresponding characteristics. In this context, active expansion of the New Moscow territory is an additional catalyst for destabilizing the balance between the relatively prosperous South-West and other peripheral districts. Therefore, areas in the Northern and South-Eastern parts of Moscow should be prioritized. In order to identify the specific neighborhoods in most need of attention, such characteristics as building character and a number of factors unrelated to housing should be examined in more detail.
An expansion of the analysis at the neighborhood scale would facilitate an identification of a more representative sample, cover a broader range of indicators with the required level of in-depth investigation, and consequently develop an applied method of analysis towards a more refined and design-oriented tool.

Overall, the research has produced relatively concise results, thus indicating the potential of this method for further interdisciplinary inquiry.

Bibliography

BibliographyAbbott, P. and Sapsford, R. 2006. Life-satisfaction in post-Soviet Russia and Ukraine. *Journal of Happiness Studies,* 7 (2), pp. 251-287.

Adams, J. S., 1984. The meaning of housing in America. *Annals of the Association of American Geographers,* 74 (4), pp. 515-526. [Accessed 4/22/2015 4:05:52 PM].

Amérigo, M. and Aragones, J. I. 1997. A theoretical and methodological approach to the study of residential satisfaction. *Journal of Environmental Psychology,* 17 (1), pp. 47-57. [Accessed 4/14/2015 10:26:54 AM].

Andrew, F. M. and Withey, S. B. 1976. Social indicators of well-being. *American Perception of Life Quality, Plenum Press, New York,* pp. 3-24. [Accessed 4/19/2015 11:23:36 AM].

Arakelyan, R., 2011. Increasing of quality of residential environment regarding the traditional values of residential units. Doctor of Architecture. Moscow: Moscow Architectural Institute.

Aslam, A. and Corrado, L. 2011. The geography of well-being. *Journal of Economic Geography,* pp. lbr041. [Accessed 4/20/2015 10:18:37 AM].

Babbie, E. R., 2010. The practice of social research. Belmont, CA [etc.]: Wadsworth/Cengage Learning.

Bahry, D., Kosolapov, M., Kozyreva, P. and Wilson, R. K. 2005. Ethnicity and trust: Evidence from Russia. *American Political Science Review,* 99 (04), pp. 521-532. [Accessed 5/17/2015 9:47:45 AM].

Ballas, D., 2013. What makes a 'happy city'? *Cities,* 32 pp. S39-S50. [Accessed 4/19/2015 12:58:44 PM].

Ballas, D. and Tranmer, M. 2011. Happy people or happy places? A multilevel modeling approach to the analysis of happiness and well-being. *International Regional Science Review,* pp. 0160017611403737. [Accessed 4/19/2015 1:04:18 PM].

Bonaiuto, M., Fornara, F. and Bonnes, M. 2006. Perceived residential environment quality in middle-and low-extension Italian cities. *Revue Européenne De Psychologie Appliquée/European Review of Applied Psychology,* 56 (1), pp. 23-34. [Accessed 4/14/2015 10:27:54 AM].

Brereton, F., Clinch, J. P. and Ferreira, S. 2008. Happiness, geography and the environment. *Ecological Economics,* 65 (2), pp. 386-396.

Bronovitskaya, A., 2009. Open city: the Soviet experiment. *Volume,* 21 (3), pp. 19-25.

Campbell, D. E. and Campbell, T. A. 1988. A New Look at Informal Communication The Role of the Physical Environment. *Environment and Behavior,* 20 (2), pp. 211-226. [Accessed 4/21/2015 3:04:15 PM].

Cloutier, S., Larson, L. and Jambeck, J. 2014. Are sustainable cities "happy" cities? Associations between sustainable development and human well-being in urban areas of the United States. *Environment, Development and Sustainability,* 16 (3), pp. 633-647.

Coates, D., Anand, P. and Norris, M. 2013. HOUSING, HAPPINESS AND CAPABILITIES: A SUMMARY OF THE INTERNATIONAL EVIDENCE AND MODELS. *International Journal of Energy, Environment and Economics,* 21 (3), pp. 181.

Coley, R. L., Sullivan, W. C. and Kuo, F. E. 1997. Where does community grow? The social context created by nature in urban public housing. *Environment and Behavior,* 29 (4), pp. 468-494. [Accessed 4/21/2015 3:06:47 PM].

Cooper, C. L., Goswami, U. and Sahakian, B. J., 2009. Mental capital and wellbeing. John Wiley & Sons. [Accessed 4/14/2015 10:34:36 AM].

De Botton, A., 2008. The architecture of happiness. Vintage. [Accessed 4/14/2015 11:59:20 AM].

Dear, M., 2001. From Chicago to LA: Making sense of urban theory. Sage publications.

Diener, E., 2000. Subjective well-being: The science of happiness and a proposal for a national index. *American Psychologist,* 55 (1), pp. 34. [Accessed 5/9/2015 2:53:31 PM; 5/9/2015 2:53:31 PM].

Diener, E., Lucas, R. E. and Oishi, S. 2002. Subjective well-being. *Handbook of Positive Psychology,* pp. 63-73. [Accessed 5/9/2015 1:54:43 PM].

Diener, E., 1984. Subjective well-being. *Psychological Bulletin,* 95 (3), pp. 542-575.

Dolan, P., Peasgood, T. and White, M. 2008. Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being. *Journal of Economic Psychology,* 29 (1), pp. 94-122.

Easterlin, R. A., 2003. Building a better theory of well-being. [Accessed 5/10/2015 6:49:57 PM].

Evans, G. W., 2003. The built environment and mental health. *Journal of Urban Health,* 80 (4), pp. 536-555. [Accessed 4/14/2015 10:35:33 AM].

Evans, G. W. and McCoy, J. M. 1998. When buildings don't work: the role of architecture in human health. *Journal of Environmental Psychology,* 18 (1), pp. 85-94.

Fan, Y. and Khattak, A. J. 2009. Does urban form matter in solo and joint activity engagement? *Landscape and Urban Planning,* 92 (3), pp. 199-209. [Accessed 4/14/2015 10:39:23 AM].

Ferrer-i-Carbonell, A. and Frijters, P. 2004. How Important is Methodology for the estimates of the determinants of Happiness?*. *The Economic Journal,* 114 (497), pp. 641-659.

Florida, R., Mellander, C. and Rentfrow, P. J. 2013. The happiness of cities. *Regional Studies,* 47 (4), pp. 613-627.

Florida, R., Mellander, C. and Stolarick, K. 2011. Beautiful places: The role of perceived aesthetic beauty in community satisfaction. *Regional Studies,* 45 (1), pp. 33-48. [Accessed 4/14/2015 10:28:35 AM].

Freeman, L., 2001. The effects of sprawl on neighborhood social ties: An explanatory analysis. *Journal of the American Planning Association,* 67 (1), pp. 69-77.

Frumkin, H., 2002. Urban sprawl and public health. *Public Health Reports (Washington, D.C.: 1974),* 117 (3), pp. 201-217.

Galster, G., 1987. Identifying the correlates of dwelling satisfaction an empirical critique. *Environment and Behavior,* 19 (5), pp. 539-568. [Accessed 4/22/2015 3:16:44 PM].

Galster, G. C. and Hesser, G. W. 1981. Residential satisfaction compositional and contextual correlates. *Environment and Behavior,* 13 (6), pp. 735-758. [Accessed 4/22/2015 3:47:17 PM].

Gehl, J., 1987/2011. Life between buildings: using public space. Island Press.

Gifford, R., 2007. The consequences of living in high-rise buildings. *Architectural Science Review,* 50 (1), pp. 2-17. [Accessed 4/23/2015 4:40:58 PM].

Glebova, I. and Khabibrahmanova, R. 2014. Life Quality Evaluation in the Million-plus Population Cities of Russia: Results of Empirical Research. *Procedia Economics and Finance,* 14 pp. 236-242. [Accessed 8/21/2015 12:57:47 PM].

Goldhoorn, B. and Sverdlov, A. 2009. Microrayon. Transformations of the Soviet city under Capitalism. *Volume,* 21 (3), pp. 14-18.

Grigoryan, Y. ed., 2013. Archaeology of the periphery. Moscow: Moscow Urban Forum.

Guite, H., Clark, C. and Ackrill, G. 2006. The impact of the physical and urban environment on mental well-being. *Public Health,* 120 (12), pp. 1117-1126. [Accessed 9/3/2015 12:30:59 PM].

Guriev, S. M. and Zhuravskaya, E. 2009. (Un) happiness in Transition.

Headey, B., Veenhoven, R. and Wearing, A. 1991. Top-down versus bottom-up theories of subjective well-being. *Social Indicators Research,* 24 (1), pp. 81-100. [Accessed 9/3/2015 4:39:54 AM].

Herfert, G., Neugebauer, C. S. and Smigiel, C. 2013. LIVING IN RESIDENTIAL SATISFACTION? INSIGHTS FROM LARGE-SCALE HOUSING ESTATES IN

CENTRAL AND EASTERN EUROPE. *Tijdschrift Voor Economische En Sociale Geografie,* 104 (1), pp. 57-74. [Accessed 4/22/2015 5:15:21 PM].

Huang, S. L., 2006. A study of outdoor interactional spaces in high-rise housing. *Landscape and Urban Planning,* 78 (3), pp. 193-204. [Accessed 4/14/2015 10:37:20 AM].

Ibem, E. O. and Amole, D. 2014. Satisfaction with Life in Public Housing in Ogun State, Nigeria: A Research Note. *Journal of Happiness Studies,* 15 (3), pp. 495-501. [Accessed 4/14/2015 10:26:06 AM].

Jackson, L. E., 2003. The relationship of urban design to human health and condition. *Landscape and Urban Planning,* 64 (4), pp. 191-200.

Jacobs, J., 1961. The death and life of great American cities. Vintage.

Jandy, S., Boarnet, M., Ewing, R. and Killingsworth, R. 2002. How the built environment affects physical activity. *Views from Urban Planning.Am J Prev Med,* 23 (2S), pp. 64-73. [Accessed 4/21/2015 6:02:03 AM].

Josephson, P., 2014. Property of Communists: The Urban Housing Program from Stalin to Khrushchev by Mark B. Smith (review). *Enterprise & Society,* 15 (3), pp. 582-583. [Accessed 4/24/2015 3:32:41 AM].

Kährik, A. and Tammaru, T. 2010. Soviet prefabricated panel housing estates: Areas of continued social mix or decline? The case of Tallinn. *Housing Studies,* 25 (2), pp. 201-219. [Accessed 4/14/2015 10:42:21 AM].

Khazanova, V., 1980. Soviet architecture of the first five-year plan. Problems of the city of the future. Moscow: Nauka.

Khrushchev, N., 1954. On the extensive introduction of industrial methods, improving the quality and reducing the cost o construction. *Volume,* 21 (3), pp. 26-34.

Kornai, J., Rothstein, B. and Rose-Ackerman, S., 2004. Creating social trust in post-socialist transition. Palgrave Macmillan. [Accessed 5/17/2015 9:50:19 AM; 5/17/2015 9:50:19 AM].

Kuo, F. E., Sullivan, W. C., Coley, R. L. and Brunson, L. 1998. Fertile ground for community: Inner-city neighborhood common spaces. *American Journal of Community Psychology,* 26 (6), pp. 823-851. [Accessed 4/21/2015 3:09:22 PM].

Lawless, N. M. and Lucas, R. E. 2011. Predictors of regional well-being: A county level analysis. *Social Indicators Research,* 101 (3), pp. 341-357. [Accessed 4/19/2015 12:45:15 PM].

Lee, E. and Park, N. 2010. Housing satisfaction and quality of life among temporary residents in the United States. *Housing and Society,* 37 (1), pp. 43-67. [Accessed 4/22/2015 3:17:35 PM].

Leyden, K. M., Goldberg, A. and Michelbach, P. 2011. Understanding the pursuit of happiness in ten major cities. *Urban Affairs Review,* 47 (6), pp. 861-888. [Accessed 8/21/2015 1:37:48 PM].

Leyden, K. M., 2003. Social capital and the built environment: the importance of walkable neighborhoods. *American Journal of Public Health,* 93 (9), pp. 1546-1551.

Lindheim, R. and Syme, S. L. 1983. Environments, people, and health. *Annual Review of Public Health,* 4 (1), pp. 335-359. [Accessed 4/21/2015 6:13:34 AM].

Lizon, P., 1996. East Central Europe: The unhappy heritage of communist mass housing. *Journal of Architectural Education,* 50 (2), pp. 104-114. [Accessed 4/14/2015 10:42:59 AM].

Lu, M., 1999. Determinants of residential satisfaction: Ordered logit vs. regression models. *Growth and Change,* 30 (2), pp. 264-287. [Accessed 4/14/2015 10:24:08 AM].

MacKerron, G., 2012. Happiness economics from 35 000 feet. *Journal of Economic Surveys,* 26 (4), pp. 705-735.

Marcus, C. C., 1988. Housing as if people mattered: Site design guidelines for medium-density family housing. Univ of California Press. [Accessed 4/21/2015 3:05:32 PM].

Matsuoka, R. H. and Kaplan, R. 2008. People needs in the urban landscape: analysis of landscape and urban planning contributions. *Landscape and Urban Planning,* 84 (1), pp. 7-19.

Meuser, P. and Zadorin, D., 2015. Towards a Typology of Soviet Mass Housing. Berlin: DOM.

Montgomery, C., 2013. Happy city: transforming our lives through urban design. Macmillan. [Accessed 4/14/2015 10:40:34 AM].

Morton, H. W., 1980. Who gets what, when and how? Housing in the Soviet Union. *Europe-Asia Studies,* 32 (2), pp. 235-259.

Moskomarhitektura, 2015a. Major Sobyanin is positive that the new standards of housing development will increase quality of life. Available at: http://mka.mos.ru/presscenter/news/detail/1868829.html [Accessed 2015].

Moskomarhitektura, 2015b. Moscow is heading towards the new paradigm in housing construction. Available at: http://mka.mos.ru/presscenter/news/detail/1760373.html [Accessed 2015].

Mumford, E., 1992. CIAM urbanism after the Athens Charter. *Planning Perspective,* 7 (4), pp. 391-417. [Accessed 4/23/2015 12:25:56 PM].

Okulicz-Kozaryn, A., 2013a. City life: Rankings (livability) versus perceptions (satisfaction). *Social Indicators Research,* 110 (2), pp. 433-451. [Accessed 6/2/2015 9:40:55 AM].

Okulicz-Kozaryn, A., 2013b. City life: Rankings (livability) versus perceptions (satisfaction). *Social Indicators Research,* 110 (2), pp. 433-451.

Pacione, M., 2003. Urban environmental quality and human wellbeing—a social geographical perspective. *Landscape and Urban Planning,* 65 (1), pp. 19-30.

Pallot, J. and Shaw, D. J., 1981. Planning in the Soviet Union. Croom Helm London. [Accessed 4/24/2015 5:36:33 AM].

Park, H., 2006. Housing welfare indicators for the quality of life in Korea. *Housing Studies Review,* 14 (1), pp. 5-26. [Accessed 4/22/2015 3:18:25 PM].

Pierewan, A. C. and Tampubolon, G. 2014. Spatial dependence multilevel model of well-being across regions in Europe. *Applied Geography,* 47 pp. 168-176.

Power, M., Bullinger, M. and Harper, A. 1999. The World Health Organization WHOQOL-100: Tests of the universality of quality of life in 15 different cultural groups worldwide. *Health Psychology,* 18 (5), pp. 495. [Accessed 4/22/2015 10:01:10 AM].

Reid, S. E., 2005. The Khrushchev kitchen: Domesticating the scientific-technological revolution. *Journal of Contemporary History,* 40 (2), pp. 289-316.

Rentfrow, P. J., Mellander, C. and Florida, R. 2009. Happy states of America: A state-level analysis of psychological, economic, and social well-being. *Journal of Research in Personality,* 43 (6), pp. 1073-1082. [Accessed 4/19/2015 12:43:44 PM].

Richard, L., Gauvin, L., Gosselin, C. and Laforest, S. 2009. Staying connected: neighbourhood correlates of social participation among older adults living in an urban environment in Montreal, Quebec. *Health Promotion International,* 24 (1), pp. 46-57.

Rogachev, A. V., 1999. Cheremushki - obychnye, novye i devyatyi kvartal. *Kvartira, Dacha, Ofis,* 107 .

Rubanenko, B. ed., 1959. Devyatyy kvartal: Opytno-pokazatel'noe stroitel'stvozhilogo kvartala v Moskve. Moscow: Gosstroiizdat.

Ruzhzhe, V., 1974. Sotsial'noe kachestvo zhiloy sredy. *Sotsiologicheskie Issledovaniya,* 38 (1), .

Shchukin, A., 2014. Raiony, kvartaly, zhilye massivy. Available at: http://expert.ru/expert/2014/24/rajonyi-kvartalyi-zhilyie-massivyi/ [Accessed 2015].

Shchukin, A., 2014. Urban block as anti-mikrorayon. *Project Russia,* 73 pp. 136-139.

Sirgy, M. J. and Cornwell, T. 2002. How neighborhood features affect quality of life. *Social Indicators Research,* 59 (1), pp. 79-114. [Accessed 4/20/2015 7:00:57 AM; 4/20/2015 7:00:57 AM].

Snopek, K., 2013. Belyayevo forever: preserving the generic. Moscow: Strelka Press.

Strelka Specials (unpublished) 2012. Microrayon Factbook. Student research.

SVESMI, 2009. What happened to Microrayon? Available at: https://vimeo.com/38840302 [Accessed 2015].

SVESMI, 2010. The Microrayon tomorrow. Available at: https://vimeo.com/46290993 [Accessed 2015].

Turkington, R., Van Kempen, R. and Wassenberg, F., 2004. High-rise housing in Europe: Current trends and future prospects. Delft University Press. [Accessed 4/23/2015 3:12:39 AM].

Ulrich, R. S., 1979. Visual landscapes and psychological well-being. *Landscape Research,* 4 (1), pp. 17-23.

Urban, F., 2013. Tower and slab: histories of global mass housing. Routledge. [Accessed 4/14/2015 10:41:28 AM].

Van Kamp, I., Leidelmeijer, K., Marsman, G. and De Hollander, A. 2003. Urban environmental quality and human well-being: Towards a conceptual framework and demarcation of concepts; a literature study. *Landscape and Urban Planning,* 65 (1), pp. 5-18.

Van Praag, B. M. and Ferrer-i-Carbonell, A., 2007. Happiness quantified: A satisfaction calculus approach. Oxford University Press. [Accessed 4/19/2015 11:36:06 AM].

Van Praag, B. M. and Ferrer-i-Carbonell, A., 2011. Happiness economics: A new road to measuring and comparing happiness. Now Publishers Inc. [Accessed 4/19/2015 6:22:33 AM].

Van Praag, B. M., Frijters, P. and Ferrer-i-Carbonell, A. 2003. The anatomy of subjective well-being. *Journal of Economic Behavior & Organization,* 51 (1), pp. 29-49.

Van Thiel, S., 2007. Research methods in public administration and public management. New York: Routledge.

Veenhoven, R., 2001. Are the Russians as unhappy as they say they are? *Journal of Happiness Studies,* 2 (2), pp. 111-136.

Veenhoven, R., 2009. How do we assess how happy we are? Tenets, implications and tenability of three theories. *Happiness, Economics and Politics,* pp. 45-69.

Veenhoven, R., 2010. Greater happiness for a greater number. *Journal of Happiness Studies,* 11 (5), pp. 605-629. [Accessed 4/18/2015 3:59:31 PM].

Veenhoven, R., 2013. The four qualities of life ordering concepts and measures of the good life. The four qualities of life ordering concepts and measures of the good life. 2013. The exploration of happiness. Springer. pp. 195-226.

Volkov, L., 1982. Will there be the microrayon tomorrow? *Architecture of the USSR,* 1 pp. 25-26.

Vytuleva, K., 2012. Partisan Urbanism. *Project International,* 33-34pp. 74-79.

Wagenaar, C. 1. and Hofer, E., 2004. Happy: cities and public happiness in post-war Europe. Rotterdam: NAi Publishers. Available at: http://eur.summon.serialssolutions.com/2.0.0/link/0/eLvHCXMwY2AwNtIz0EUrExLNki0MLM1TgJV5SpqBYaplWmpqollacqJpikUy5ApJpAP54ONv-A9C9PFzt3X1g52HaGsEnkMwMrPQZ2ZgNjcHre8zMgXd42AJrOTNQEd5GUNO3IHzUfakgCsUN0EGFtAmAyEGptQ8YQYeR6TRfBEGVo_EgoJKUQYZN9cQZw9doNZ46CBLPNxyIzEG3kTQ4vS8EvAmthRxBtY0YEpKFQeV7uJAa8QZOCIsvS18o4x8IVwhGFevGLzTSq-wRBxYmYAToq6pnokEg4KpaVqauWlaSpJRkqFJokGqpbGlaZp5skFqSqK5gUmKiSSDKFbXSOEQl2bggixBAY0lyEBdKAsODQCXiHAM .

Wood, L., Shannon, T., Bulsara, M., Pikora, T., et al., 2008. The anatomy of the safe and social suburb: an exploratory study of the built environment, social capital and residents' perceptions of safety. *Health & Place,* 14 (1), pp. 15-31.

Yankova, Z. A. and Rodzinskaya, I. Y. 1982. Problems of big cities. *Nauka,* pp. 63-64.

Zamanskii, P. and Kozlovskii, N. 1962. Great Position. *Ogonyok,* 12 pp. 14-15.

Zavisca, J. R., 2012. Housing the new Russia. Cornell University Press. [Accessed 4/15/2015 3:52:01 PM].

Zekri, S., 2007. Wir sind reich! Wir sind da! Süddeutsche Zeitung, September 11, 2007.

Annex 1. Lists of Control Variables

Control variables/living environment				
Concept/ variable		**Indicators**	**Scale**	**Source**
Living environment	Housing	Ownership status	nominal	questionnaire
		Monthly rent	ratio	questionnaire
		Property value	ratio	desk research
		Residence period	ratio	questionnaire
		Occupied floor number	ratio	questionnaire
		Living space	ratio	questionnaire
		Number of rooms	ratio	questionnaire
		Transport accessibility index	ratio	desk research
		Access to green recreational zones/index	ratio	desk research
		Air quality	ratio	desk research
		Noise pollution	ratio	desk research
		Housing deterioration	nominal	desk research
		Previous dwelling conditions	nominal	questionnaire
		Period of construction	interval	database
Living environment	Social capital	Opportunities to meet people	ordinal	questionnaire
		Frequency of seeing family	ordinal	questionnaire
		Frequency of seeing friends	ordinal	questionnaire

		Frequency of seeing neighbors	ordinal	questionnaire
	Health	Frequency of going out for walking	ordinal	questionnaire

Control variables/general		
Indicators	**Scale**	**Source**
Age	ratio	questionnaire
Gender	nominal	questionnaire
Ethnicity	nominal	questionnaire
Relationship status	nominal	questionnaire
Employment status	nominal	questionnaire
Education level	nominal	questionnaire
Income	ratio	questionnaire
Household composition	nominal	questionnaire
Personal freedom	interval	questionnaire
Chronic disease	nominal	questionnaire

Annex 2. Data Collection Methodology

I. Questionnaire

The questionnaire was designed based on information from the following sources:

- European Social Survey (2012), available at http://www.europeansocialsurvey.org/docs/round6/fieldwork/source/ESS6_source_main_questionnaire.pdf
- Gallup World Poll Questionnaire (2008), available at http://media.gallup.com/dataviz/www/WP_Questions.pdf
- Bonaiuto, M., Fornara, F. and Bonnes, M. 2006. Perceived residential environment quality in middle-and low-extension Italian cities. Revue Européenne De Psychologie Appliquée/European Review of Applied Psychology, 56 (1), pp. 23-34.

The questionnaire consists of 57 closed questions and 3 open questions, covering the subjective evaluation of life, its domains and living environment, as well as the objective characteristics of the living environment and personal life.

II. Database

The database of multifamily housing in Moscow was provided by the Department of Information Technology of Moscow and included 6 columns:

- Street
- House number
- Year of construction
- Number of floors
- Total area
- Standard series number

The database contained 33799 rows with information on residential multifamily buildings built from 1785 to 2015 within the present boundaries of Moscow.

The website http://feth.ru/address-to-coords-encoder was used to transform the postal addresses of the buildings built between 1917 and 1991 into geographical coordinates; therefore, two additional columns, representing latitude and longitude, were added to the database.

III. Questionnaire exemplar

1. Evaluation of life in general

Let me ask you first about your life in general.

- **Taking all things together, how happy would you say you are on a scale from 0 to 10, where 0 is extremely unhappy and 10 is extremely happy?**

Extremely unhappy **Extremely happy**

00 01 02 03 04 05 06 07 08 09 10

- **How much of the time during the past week…**

	(1) None/ almost none of the time	**(2)** Least of the time	**(3)** Somewhere in between	**(4)** Most of the time	**(5)** All or almost all of the time	**(6)** Don't know
…you felt depressed?						
…you felt happy?						
…you felt sad?						
…you enjoyed life?						

…**How is your health in general? Would you say it is:**

☐ *Very bad*

☐ *Bad*

☐ *Fair*

☐ *Good*

☐ *Very good*

- **To what extent do you agree or disagree with the following statement?**

	(1) Disagree strongly	(2) Disagree	(3) Neither agree nor disagree	(4) Agree	(5) Agree strongly
I feel I am free to decide for myself how to live my life.					

2. Perceptions towards the place of living

In this section I would like to ask you about your attitudes towards the place you live.

- **Which option better describes the house you live in?**

☐ *Multifamily building, built before 1930s*
☐ *Brick multifamily building, built in 1930s-50s, 'Stalinka'*
☐ *Standardized multifamily building, 5 floors, 'Khrushchevka'*
☐ *Brick standardized multifamily building, 9-12 floors*
☐ *Panel standardized multifamily building, 9-12 floors*
☐ *Panel standardized multifamily building, 14-25 floors*
☐ *Custom designed high-rise building*
☐ *Other*

*Please, specify*_____

- **How satisfied would you say you are on a scale from 0 to 10, where 0 is extremely dissatisfied and 10 is extremely satisfied, with your current place of living in general?**

Extremely dissatisfied ... **Extremely satisfied**

00 01 02 03 04 05 06 07 08 09 10

◆ **Would you please indicate the precise address (only street and house number, without the apartment number)?**

◆ **How satisfied would you say you are on a scale from 0 to 10, where 0 is extremely dissatisfied and 10 is extremely satisfied, with the following:**

- *the appearance of the building that you live in?*

Extremely dissatisfied										Extremely satisfied
00	01	02	03	04	05	06	07	08	09	10

- *courtyard environment in the place you live?*

Extremely dissatisfied										Extremely satisfied
00	01	02	03	04	05	06	07	08	09	10

- *public hall of your housing?*

Extremely dissatisfied										Extremely satisfied
00	01	02	03	04	05	06	07	08	09	10

- *the apartment that you live in?*

Extremely dissatisfied										Extremely satisfied
00	01	02	03	04	05	06	07	08	09	10

◆ **Now please indicate to what extent you agree or disagree with each of the following statements.**

	(1) Disagree strongly	(2) Disagree	(3) Neither agree nor disagree	(4) Agree	(5) Agree strongly
This area is aesthetically pleasant					
It's pleasant to see this area					
In this area: *Buildings are too monotonous*					
Buildings are beautiful					
Buildings are too tall					
The gaps between buildings are too large					
There's too little space between buildings					
Open and built-up areas are well-balanced					
The organization of space is comfortable					
It feels comfortable to move around					
The size of some buildings is excessive					
The dimension of buildings is oppressive					

- **How safe do you – or would you – feel walking alone in the area you live after dark?**

☐ *Very unsafe*

☐ *Unsafe*

☐ *Safe*

☐ *Very safe*

☐ *Don't know*

- **In the next 12 months, are you likely or unlikely to move away from the city area where you live?**

☐ *Likely*

☐ *Unlikely*

☐ *Don't know*

- **If you had an opportunity, which of the following options would you choose?**

☐ *To leave your neighborhood and never come back*

☐ *To leave your neighborhood but come back sometimes*

☐ *To live in your neighborhood and visit other places*

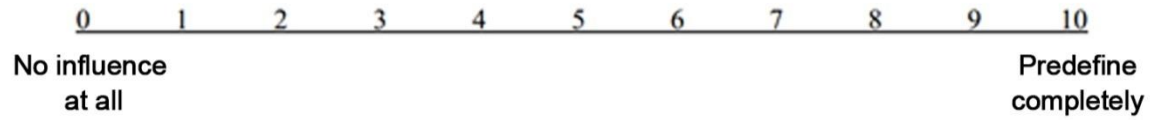
☐ *To live in your neighborhood and never leave its boundaries*

☐ *Don't know*

If you wanted to move to another part of Moscow, where would it be?

_____

- **How much would your choice of a place to live be influenced by the visual characteristics of housing on a scale from 0 to 10?**



- **In the area where you live how satisfied are you on a scale from 0 to 10 with the following:**

- *quality of air?*

Extremely dissatisfied										Extremely satisfied
00	01	02	03	04	05	06	07	08	09	10

- *upkeep of your court yard and the house territory?*

Extremely dissatisfied										Extremely satisfied
00	01	02	03	04	05	06	07	08	09	10

- *infrastructure?*

Extremely dissatisfied										Extremely satisfied
00	01	02	03	04	05	06	07	08	09	10

- *opportunities to use green public spaces?*

Extremely dissatisfied										Extremely satisfied
00	01	02	03	04	05	06	07	08	09	10

- *local community?*

Extremely dissatisfied **Extremely satisfied**

00 01 02 03 04 05 06 07 08 09 10

- *opportunities to meet people and make friends?*

Extremely dissatisfied **Extremely satisfied**

00 01 02 03 04 05 06 07 08 09 10

- **Would you say that most people can be trusted, or that you can't be too careful in dealing with people?**

You can't be too careful ***people can be trusted***

00 01 02 03 04 05 06 07 08 09 10

- **Would you say that most of the time people try to be helpful or that they are mostly looking out for themselves?**

People mostly look out for themselves ***People mostly try to be helpful***

00 01 02 03 04 05 06 07 08 09 10

- **To what extent do you agree or disagree with the following statements?**

	(1) Disagree strongly	**(2)** Disagree	**(3)** Neither agree nor disagree	**(4)** Agree	**(5)** Agree strongly
People in my local area help one another.					

This area is part of me					
I feel close to the people in my local area.					

- **If you feel that some important aspects of the living environment are not covered by these questions or you have some complaints, please indicate:**

_____
_____

3. Information about housing

In this section I would like to ask you mostly not about your attitudes, but about factual information, in order to further identify the link between the two.

- **How long have you been living in this apartment?**

☐ *Less than a year*
☐ *1-5 years*
☐ *More than 5 years*

- **Including yourself, how many people – including children – live regularly as members of your household?**

_____

- **On which floor is your apartment located?**

☐ *1-3*
☐ *4-6*
☐ *7-10*
☐ *above 10*

- **Is there a functioning elevator in the house you live in?**

☐ *yes*

☐ *no*

- **What is the approximate living space in your apartment?**

☐ *under 20 m²*

☐ *21-30 m²*

☐ *31-45 m²*

☐ *46-60 m²*

☐ *61-80 m²*

☐ *more than 80 m²*

- **Do you/ your family own or rent the apartment that you live in?**

☐ *Own*

☐ *Mortgage*

☐ *Live free of charge (with friends, etc.)*

☐ *Rent*

☐ *Other*

- **If you rent the apartment that you live in, what is the monthly rent that you pay?**

☐ *less than €450*

☐ *€450-€800*

☐ *€800-€1150*

☐ *€1150-€1500*

☐ *€1500-€1850*

☐ *more than €1850*

- **Are you satisfied with the amount of living space in your apartment?**

☐*yes*

☐*no*

- **What is the number of rooms in your apartment?**

☐ *1*

☐ *2*

☐ *3*

☐ *more than 3*

4. Socio-demographic information

In the last section I would ask you to answer the questions about your personal life, which will help to better understand what else, apart from housing, influences your life satisfaction.

◆ **What is your gender?**

☐ *male*

☐ *female*

◆ **What year were you born?**

_____

◆ **What is your current relationship status?**

☐ *married*

☐ *unmarried, single*

☐ *unmarried, in relationship*

☐ *divorced*

☐ *widowed*

☐ *other*

◆ **What is your ethnicity?**

☐ *Russian*

☐ *Ukrainian*

☐ *Tatar*

☐ *Armenian*

☐ *Azerbaijanian*
☐ *Jewish*
☐ *Belarusan*
☐ *Georgian*
☐ *Uzbek*
☐ *Tajik*
☐ *Moldavian*
☐ *Other*

◆ **What is your citizenship?**

☐ *Russian Federation*
☐ *Ukraine*
☐ *Armenia*
☐ *Azerbaijan*
☐ *Belarus*
☐ *Georgia*
☐ *Uzbekistan*
☐ *Tajikistan*
☐ *Moldavia*
☐ *Other*

◆ **Which of these descriptions best describes your current employment situation?**

☐ *in paid work*
☐ *in education*
☐ *in volunteer work*
☐ *not working due to health state*
☐ *unemployed and actively looking for a job*
☐ *unemployed and not actively looking for a job*
☐ *retired but continue working*
☐ *retired*
☐ *on leave looking after children*

☐ *doing housework,looking after other persons*

☐ *other*

◆ **What is the highest level of education you have successfully completed?**

☐ *not completed secondary education*

☐ *completed basic secondary education (7-year school program before 1958, 8-year school program in 1960s-80s or 9-year school program in current situation), no vocational degree*

☐ *completed secondary education (10 years in Soviet Union, 11 yers in current situation), no vocational degree*

☐ *primary vocational education (1-2 year program)*

☐ *primary vocational education combined with secondary education (1-3 year program)*

☐ *secondary vocational education (2-4 year program)*

☐ *bachelor degree (4-year program according to the new two-stage curriculum)*

☐ *masters degree (2-year program according to the new two-stage curriculum)*

☐ *specialist degree (5-6 years in university according to the old one-stage curriculum)*

☐ *doctoral degree (candidate, doctor)*

☐ *other*

◆ **In a typical week, how often do you do each of the following without particular reason, just for recreation?**

	(1) Never	**(2)** Less than once a month	**(3)** Once a month	**(4)** Several times a month	**(5)** Once a week	**(6)** Several times a week	**(7)** Every day
See your family							
See your friends							
See your neighbors							
Go for a walk							

◆ **Please give an estimate of which option describes your household's total monthly income, after tax and compulsory deductions, from all sources?**

☐ *less than €350*
☐ *€350-€700*
☐ *€700-€1050*
☐ *€1050-€1400*
☐ *€1400-€1750*
☐ *€1750-€2100*
☐ *€2100-€2450*
☐ *€2450-€2800*
☐ *more than €2800*

◆ **Are you hampered in your daily activities in any way by any longstanding illness, or disability, infirmity or mental health problem?**

☐ *no*
☐ *if yes, please specify*_____

Thank you!

Annex 3. Correlation Matrix of Main Variables

Table 29. Correlation matrix	Happiness	Housing Satisfaction	Appearance satisfaction	Apartment satisfaction	Visual pleasantness Index	Size Index	Space Index
Housing Satisfaction	0.3562	1					
Appearance satisfaction	0.2338	0.5695	1				
Apartment satisfaction	0.3495	0.6464	0.465	1			
Visual pleasantness Index	0.2737	0.6082	0.5474	0.4106	1		
Size Index	0.1335	0.2769	0.2658	0.1944	0.4031	1	
Space Index	0.2274	0.4724	0.3433	0.3486	0.5937	0.4869	1
Monotony	-0.1057	-0.2547	-0.28	-0.164	-0.3892	-0.2144	-0.1187

Annex 4. Description of Control Variables

Table 28. Control Variables	N	Mean	SD	Min	Max
Felt Depressed	1 922	1.958	1.071	1	5
Felt Happy	1 940	3.282	1.015	1	5
Enjoyed Life	1 936	3.325	1.057	1	5
Felt Sad	1 928	2.409	0.990	1	5
Mood Index	1 967	3.554	0.837	1	5
Personal Freedom	1 964	3.870	0.920	1	5
Trust Index	1 955	4.507	2.198	0	10
Meet Family/ Friends	1 947	4.767	1.267	1	7
Walking	1 955	5.746	1.293	1	7
Safety	1 946	3.004	0.736	1	4
Infrastructure Satisfaction	1 968	6.088	2.676	0	10
Air Satisfaction	1 968	5.421	2.877	0	10
Greenery Satisfaction	1 968	6.095	2.971	0	10
Ecology Index	1 968	5.758	2.479	0	10
Property Value	1 879	5.214	0.246	4.605	5.953
Amenities	1 841	1.011	0.824	0	6.520
Transport	1 792	1.017	0.535	0	1.500

Community Satisfaction	1 968	4.611	2.767	0	10
Social Opportunities	1 968	4.220	2.894	0	10
Neighbors Help	1 968	2.801	0.937	1	5
Social Index	1 968	3.482	1.592	0.500	7.500
Attachment	1 966	2.874	1.226	1	5
Residence Period	1 963	2.473	0.675	1	3
Housing Tenure	1 961	1.783	1.303	1	5
Hybrid	1 968	0.0147	0.121	0	1

Annex 5. Spatial Distribution of Variables

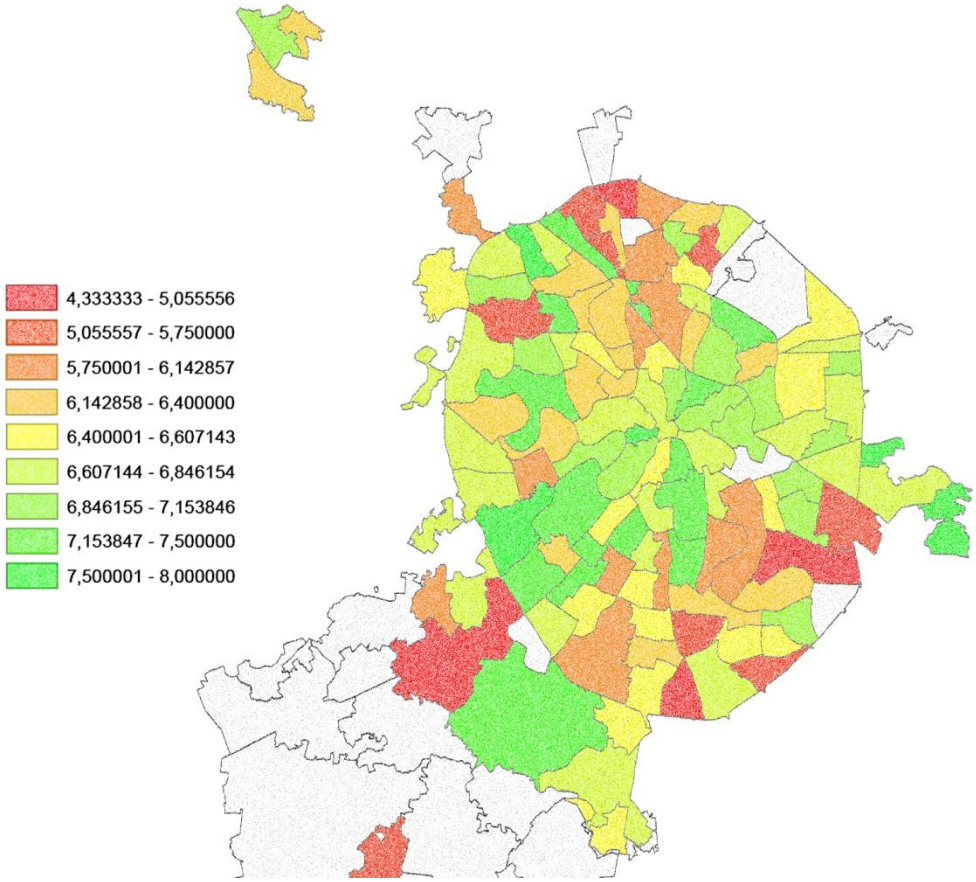


Figure 21. Happiness

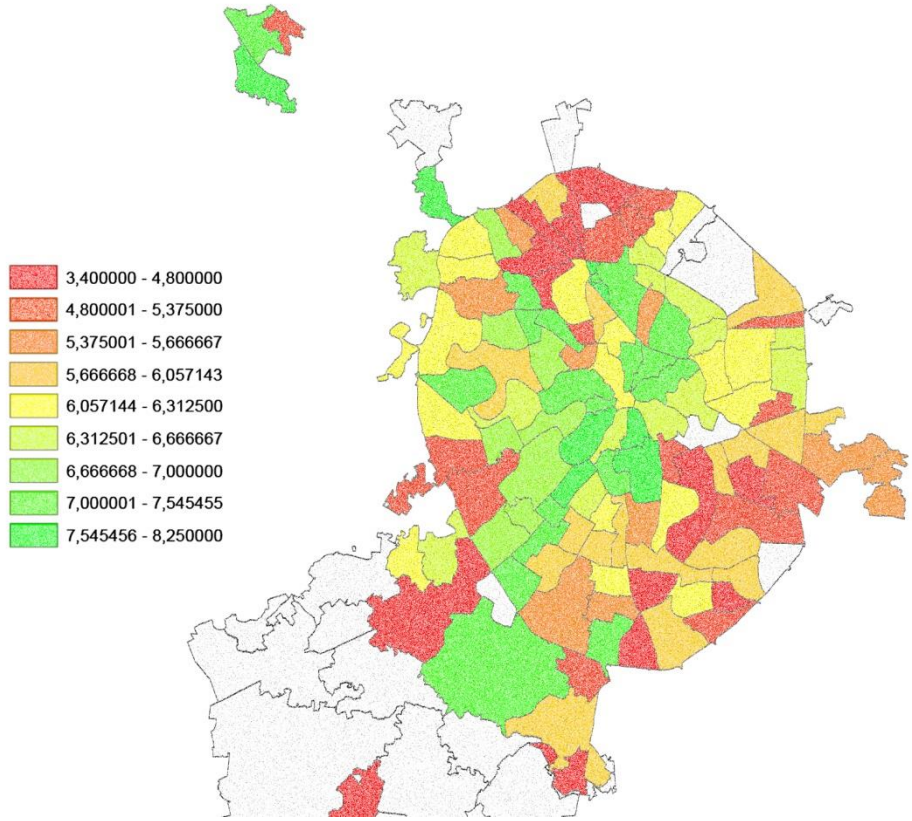


Figure 22. Housing satisfaction

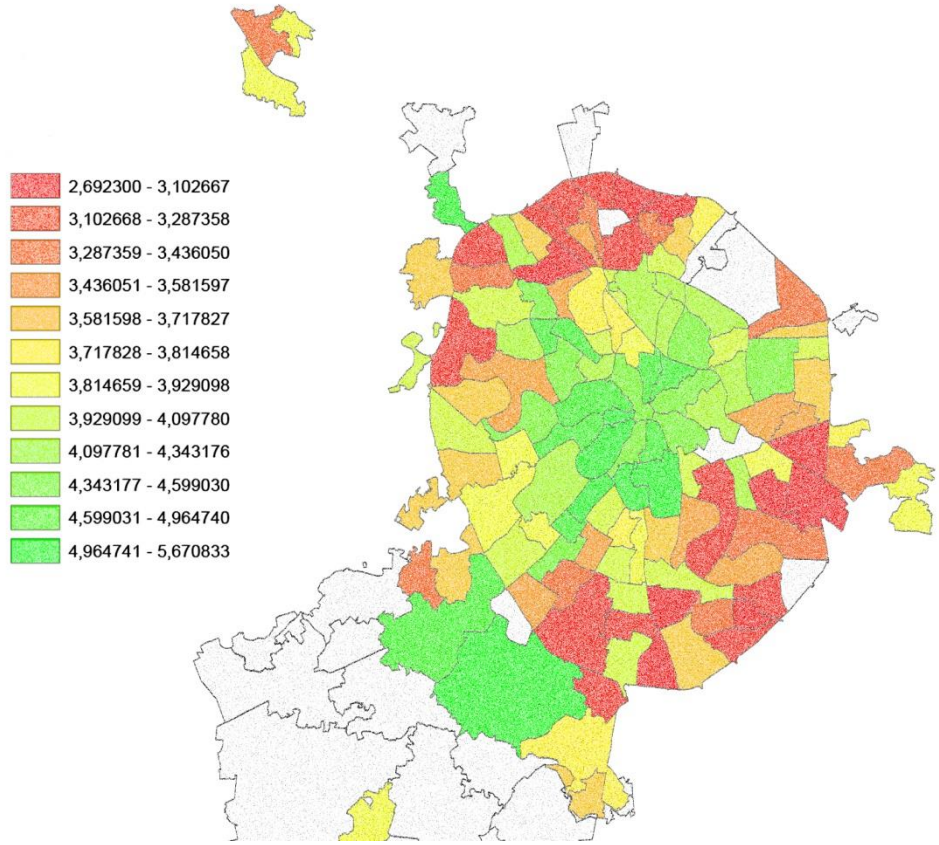


Figure 23. Aggregated Index of significant characteristics of living environment