

The Environmental Dimension of City Dwellers' Quality of Life and the City's Social and Spatial Variability

Abstract

The purpose of this paper is to attempt an analysis of the environmental dimension of the quality of life using quantitative surveys conducted among residents of Gdańsk. In the paper, we make reference to the theoretical assumptions ensuing from the concept of a comprehensive and integrated approach to the development of the urban environment, whilst noting the profound impact humans bring to their evaluation of the environmental components. The paper focuses primarily on the inhabitants' attitudes to the environmental values of their place of residence in relation to things such as the condition and accessibility of green areas, air quality, potable water quality and noise intensity. The surveys indicate that views on the city's environmental values are determined by numerous factors, such as the city's territorial structure (districts) and its demographic structure (sex, age), and psychosocial features, such as a subjective sense of mental well-being.

Keywords

Quality of life • environment • sustainable development

Introduction

Any discussion on the environmental dimension of the quality of life in the city should be preceded by clarifying the meaning ascribed to the term 'environment' as used in this paper. The notion of the environment carries so many meanings and encompasses so much that omitting a definition here would trigger a multitude of ambiguities and misconceptions. The tradition and evolution of the scope covered by the notion of the environment is particularly long and rich in geographical research. A canonical order of the terminology related to the environment was introduced into Polish geographical studies by Tadeusz Bartkowski (1975, 1977). In this paper, the term environment is understood as the natural environment already transformed by human presence and activity, while still providing elements of nature, in the urban habitat.

In the paper, we intend to start a discussion on the growing significance of the environmental dimension when assessing the quality of life in cities. We refer to theoretical reflections that stand in opposition to the modernist planning paradigm, which, for years, consolidated the strong tendency to consider nature alone – excluding society, and society alone – without nature. The trend was developed and boosted by a number of factors, such as the industrialisation of production, new technologies, rapid urbanisation, globalisation, expansive and uncontrolled exploitation and the quality of the natural environment (Starosta 2016).

The dynamically developing research on quality of life has been continuously reversing the order of the modernist discourse, evidencing the importance of the relations between physical, social and cultural matter (Lefebvre 1994; Jabowiecki 2010; Löw 2018).

In spite of the variety of approaches and concepts on how to define quality of life, it is commonly agreed that the notion of quality of life is made up of two mutually intertwined dimensions: psychological and environmental (Grayson & Young 1994). The factors related to inner, mental mechanisms determine the sense

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of personal satisfaction, and satisfaction with life; the factors related to external environmental conditions, on the other hand, determine internal impressions and views (Massam 2002). Terms such as the individual/personal quality of life, a subjective sense of well-being, or the level of satisfaction with life are used to identify the group of the internal factors. The external factors refer to various levels and categories of the quality of life and describe such concepts as the quality of life in cities, the quality of community life, the quality of the place, or the environmental quality of life.

The variety of factors taken into account in order to assess the quality of life is immense. It is assumed that each of the measures reflects, in a sense, the impact and importance of the specific component in the comprehensive, general sense and view of the quality of life. Meanwhile, the same assumption suggests that the notion of quality of life can be disintegrated to form a set of factors or dimensions. If the correct set of factors is compiled, it will be possible to use it to obtain a credible, comprehensive assessment of the quality of life in the city. The key lies in defining each factor in such a way as to enable its measurement and, consequently, assess its quality and durability. What is important in practice is that each measure must be clearly defined operationally in terms of its structure, so that research findings are repeatable and comparable.

Initially, researchers dealing in measuring quality of life focused primarily on social and economic indices, and attempted to develop, then accumulate statistics of various aspects of social life (Kurowska 2011). The need to develop a consistent list of objective social indices (following the example of the economic indices used to assess GDP) has led to the emergence of an entire stream of research called 'the social indices movement', which concentrates on the accumulation and analysis of statistics depicting various spheres of life (Petelowicz & Drabowicz 2016).

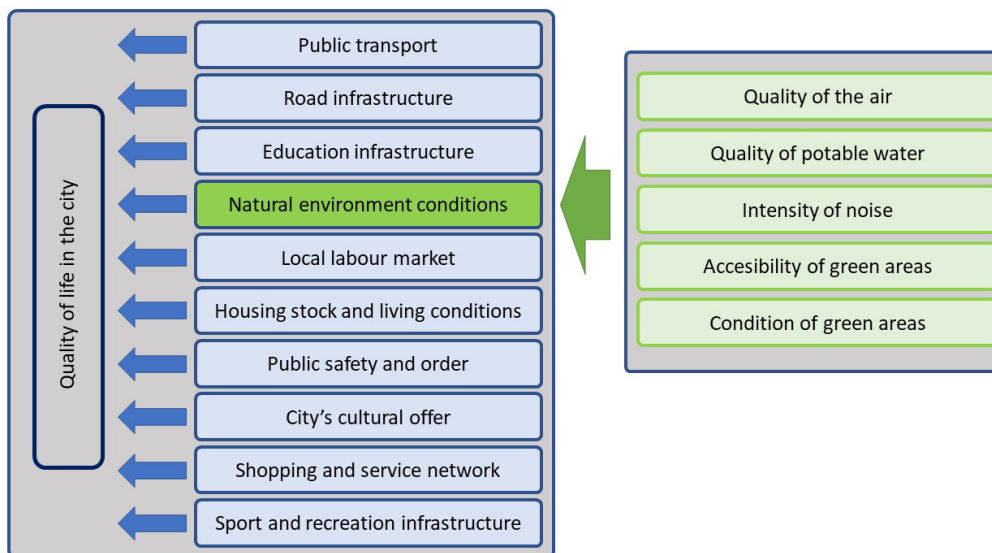


Figure 1. The dimensions of the quality of life in the city
Source: own elaboration

Research and analyses based on subjective indicators, on the other hand, have focused on the individual assessment of daily experience, and form the other extreme. According to August Campbell (1976), studies of quality of life cannot be conducted without referring to the subjective sense of satisfaction and well-being. In research of this type, the quality of life of an individual can only be determined based on the person's own assessment, bearing in mind such mental processes as perception, comparison, evaluation and assessment (Petelowicz & Drabowicz 2016). Paul Harwood (1976), for instance, defines quality of life as an individual's sense of well-being or their satisfaction with various spheres of life. Robert Gillingham and William Reece (1980) state that the individual's quality of life is the level of satisfaction they gain consuming goods and services purchased in the market, and public goods.

For empirical studies, one should adopt a possibly broad interpretation of the notion – that the quality of life is the ratio between the degree of the values present at a specific place and their desirable level, taking into account both the resources at an individual's disposal and their personal evaluations and feelings (Cummins 2000), whereas the selection of specific indices depends on the context of the surveys and the adopted assumptions (Rapley 2003).

The purpose and methodology of the survey

The authors of this paper held a quality-of-life survey of the inhabitants of Gdańsk in June 2021, using the indices of the city's spatial correlations. The survey was conducted based on a partnership contract between the University of Gdańsk and the Municipality of Gdańsk. The main purpose of the research project was to monitor changes in the values of the quality-of-life indicators among the residents of Gdańsk in both territorial (district) and socio-demographic perspectives. The field research was carried out on a representative sample of 1,509 adult residents of Gdańsk using the pen-and-paper personal interview (PAPI) method. The sample reflected the structure of the adult population of Gdańsk in terms of sex, age, education and district of residence.¹ In the conducted surveys, the respondents could

assess and score several dimensions of life in their closest neighbourhood using a six-point rating scale where 1 represented the worst and 6 the best evaluation (the scale copies the school note range). In the paper, we present only a section thereof, narrowed down to the dimension of the quality of life of interest to us and its environmental component at the place of residence (see Fig. 1).

The qualitative analysis of the obtained results was performed under descriptive and statistical methods, which enabled the significance of the relationships between the variables to be identified. The dependent variable took the form of an index made up of five detailed indices: the quality of the air, the quality of potable water, the intensity of noise, the accessibility of green areas (woods, parks), and the condition of the green areas (see Fig. 1). The so-structured index enabled the presentation of several variables with a single result (arithmetic mean), which facilitated data analysis and increased measurement reliability (Frankfort-Nachmias & Nachmias 2001). The Mann-Whitney-Wilcoxon test was employed in comparisons of the dichotomous variables, and the Kruskal-Wallis H-test for more than two groups. Whenever a statistically significant result of multiple comparisons was obtained, the Dunn's *post hoc* tests were performed with Holm's correction. The significance level accepted for analyses was $p < 0.05$.

The environmental aspects of quality of life as viewed by the inhabitants

The weight and significance of the factors making up the sphere of the environment are growing dynamically when assessing the quality of life (e.g. Degórski 2017).

Due to public attitudes, the issue of the environment is becoming increasingly prominent in urban policies (Stephens et al. 2019). A new approach to the urban environment and the necessity to calculate the risks posed by climatic changes have triggered a change in the approach to the quality-of-life indicators. The

over the entire city and reflected the demographic cross-section of the whole population. In effect, the structure of the sample in terms of social and demographic features was as follows: sex – female (58.1%), male (41.9%); age – 18–24 (16.5%), 25–39 (28.0%), 40–59 (23.4%), >59 (32.1%); education – primary, basic vocational, lower secondary (in aggregate) – 10.5%, secondary – 42.9%, higher – 46.4%.

¹When selecting the sample, the existing division of the city into 35 ancillary units (districts) was utilised. The method guaranteed a uniform distribution of the respondents

Table 1. Evaluation of the environmental conditions in the city district of residence

	Rating scale: 1–6						Hard to say	Average against the scale of 1–6
	1	2	3	4	5	6		
Accessibility of green areas	5.6	5.9	13.7	30.3	27.1	15.3	2.1	4.16
Quality of potable water	2.5	2.9	11.5	33.8	22.5	6.8	20.2	4.14
Condition of green areas	5.8	6.1	16.7	34.9	24.9	8.8	2.8	3.96
Quality of the air	5.2	6.7	18.2	40.4	20.2	5.9	3.5	3.84
Intensity of noise	11.1	16.6	27.2	27.2	11.2	3.6	3.2	3.22
IN AGGREGATE								3.84

Source: own elaboration

environmental diagnosis, which consists in broadly construed attempts at describing the environment and its components, utilises the measurements classified as objective indices, namely the Environmental Quality Index (EQI). The indices themselves are nothing more than objective physical measurements, and the 'quality' term suggests subjective evaluation. Considering that the aim does not always come down to discovering the presence of a physical component of the environment, but rather to capturing the perceived quality of the environment, in this paper we shall refer to the subjective evaluation of the quality of the environment. Therefore, with the intertwining social and environmental phenomena, the conceptualisation of the quality of life as a category, comprising various sets of elements, requires the adoption of objective and subjective views.

The surveys, held in 2015 in Gdańsk, reveal that nearly half the population (46%) believe that Gdańsk stands out among other large cities in Poland in terms of the values of its natural environment, and this represents one of the vital components of the city's identity (Załęcki 2020). The fact that the main axis of the city's historical development runs between the coastline of the Bay of Gdańsk and the edge zone of the wooded moraine uplands gives Gdańsk the advantage of the continuum of sea beaches on one end and the Tri-City Landscape Park on the other, and that creates a unique potential for the development of the leisure and recreation function. The linear layout of the city's downtown areas puts the benefits of nature 'within the reach' of a substantial part of the population. The status of both belts is that of spaces rooted in the physical environment, and the features of their significance are comprehended without any effort or special reflection (Bierwaczonok et al. 2017).

Wooded land accounts for 18% of Gdańsk's entire area, and plays not only a protective role but also a recreation and leisure function. There are five nature reserves set up in the woodlands (occupying 270 ha in aggregate). On top of that, there are 448 ha in total of cultivated green within the city itself, including 300 ha that comprise 18 city parks (minimum 2 ha each), and numerous green areas and squares that add up to 148 ha (Studium ... 2018). Hence, not surprisingly, accessibility of green areas is evaluated highest by the city dwellers ($\bar{x}=4.16$), though their condition in terms of cleanliness and aesthetics is assessed slightly lower ($\bar{x}=3.96$). Gdańsk offers relatively good conditions concerning water management, particularly the supply of potable water to the inhabitants. Potable water is supplied from 10 intakes, including 8 of the deep type, and 2 of the surface type, all meeting the high EU standards. Water evaluated at 4.14 is, hence, along with green areas, a major environmental value of Gdańsk.

The picture is unfortunately poorer for the two other environmental elements: the quality of the air ($\bar{x}=3.84$) and noise intensity ($\bar{x}=3.22$) (Badach et al. 2021). The main contributors to air pollution are manufacturing plants, traffic and indoor air pollution. For years on end, too, intense and intolerable smells from the Waste Processing Plant in Gdańsk-Szadółki have remained a major air-related issue. The environmental conditions are further determined by the intensity of noise. Although noise falls below the permissible threshold over a major part of the city, there are areas exposed to the risk of excessive noise levels, including the neighbourhoods around the main traffic routes, the airport, and the vicinities of the port and the industrial estates.

The environmental issue, which is of significance in the inhabitants' subjective perception, is reflected in the Gdańsk development strategy. This transpires in the conducted empirical studies, which reveal evident relationships between natural values and the identity dimension of experiencing the city, as well as high scores given to individual components of the environmental conditions. In the latter respect, however, the city of Gdańsk is not a uniform organism. With the superimposed territorial diversity, expressed as a subdivision into districts, differences transpired between individual sub-areas in their subjective evaluation of the environmental conditions.

Evaluation of the environmental conditions in the city's territorial structure

The environmentally friendly city captured in the slogan of 'the green city' comes down to the project of shaping the city so as to follow the line of development deemed desirable by most inhabitants. However, the methods used to implement the green city idea means that not all inhabitants can benefit equally from the effects of the needed and anticipated policy of creating green public spaces and maintaining elements of the green infrastructure. Inhabitants' access to green areas, green facilities or waterfront areas is ever more frequently disputed as a factor of social segregation and injustice in the city space (Anguelovski & Connolly 2022). While some districts benefit from green projects and the introduction of greenery into urban development, others remain neglected and deprived of easy access.

This access to open public spaces, the existential significance of which was revealed during the pandemic, should be common in all residential districts instead of being confined to privileged downtown areas (Sagan 2021). Currently, however, the gentrification of districts subject to the process of revitalisation and restoration is an issue of far more social weight; the process includes making districts much more attractive to live in thanks to

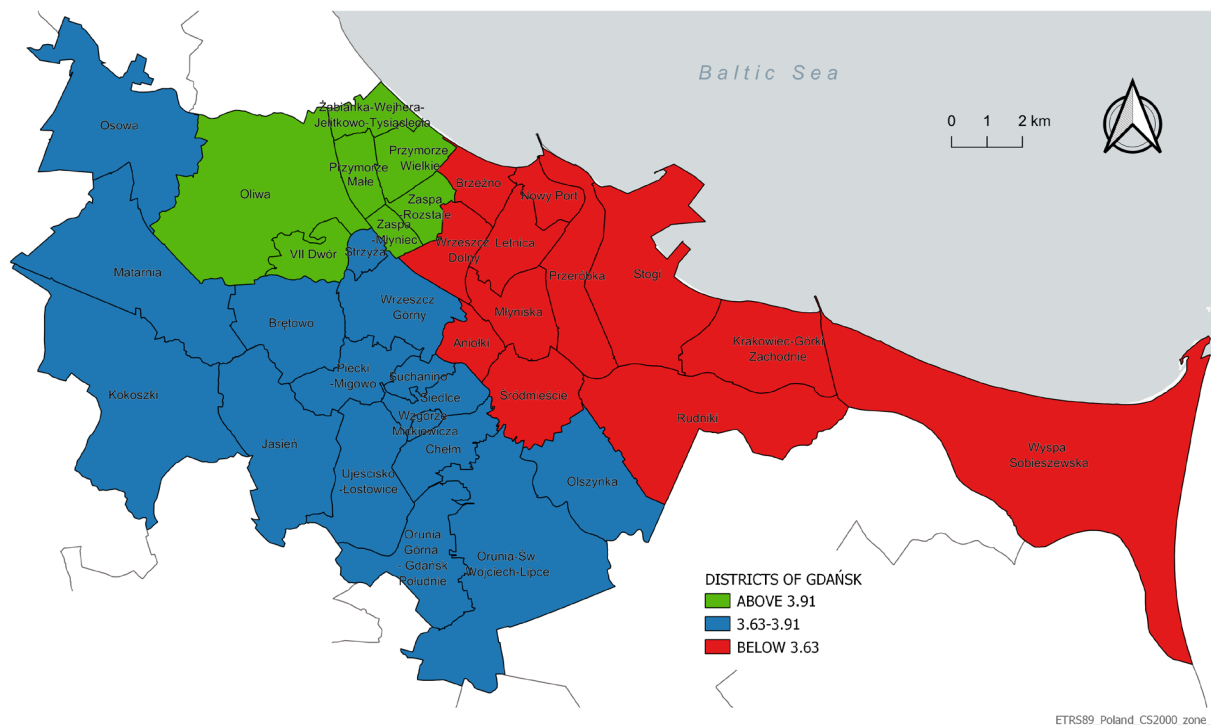


Figure 2. Evaluation of the environmental conditions in individual city districts
Source: own elaboration

the abundance of the introduced forms of greenery or arranged waterfronts (Anguelovski 2016).

Hence, analysis of the locations and their access to green areas and waterfronts in the spatial structure of the city is of paramount importance in assessing the city’s policy in the context of the inhabitants’ quality of life. In order to arrive at a more complete evaluation of the environmental dimension of the quality of Gdańsk residents’ lives, an attempt was made to estimate the distribution of the inhabitants’ opinions according to their place of residence. The results obtained in individual city districts were arranged under the frequency distribution procedure and, based thereon, three equal intervals were identified, the borders of which being the difference between the maximum and minimum values (arithmetic means). Then, three zones were identified in the city: the districts where the result (arithmetic mean) of the 1–6-point rating scale fell in the high interval (>3.92), districts with the result falling into the medium range (3.63–3.91), and districts falling in the low interval (<3.63) (Fig. 2).

An analysis of the average score distribution indicates a deep polarisation of the city’s territorial structure in terms of the environmental conditions. On one extreme, we have areas that scored highest for their environmental conditions, namely the districts located in the coastal belt that comprise a large number of city parks (including President Ronald Reagan’s Park, the largest in Gdańsk), such as Przymorze, Żabianka, Zaspas, and the districts directly beside Tri-City Landscape Park (including the ‘Oliwa woods’ and the ZOO), such as Oliwa and VII Dwór (see Fig. 2, marked in green). Thanks to their location, the above-named areas share the features of relatively low noise and fairly clean air.

At the other extreme are the areas where the environmental conditions were assessed lowest. These are the districts located either in the city centre where the built-up development is highly

concentrated and the traffic intense, and where the main traffic junctions are located (e.g. the city centre), or they are the old districts (with municipal housing predominant), neighbouring on industrial or storage estates, intended for revitalisation at a later date (Nowy Port, Brzeźno, Letnica, Przeróbka, Stogi, Olszynka) (see Fig. 2, marked in red).

The social and demographic determinants of the evaluation of the environmental conditions

In the survey, it was assumed that demographic variables such as sex and age would be the vital predictors determining the evaluation of the environmental values of Gdańsk, followed by the variables defining social status, namely education and income. Yet another variable taken into account was the length of residence in Gdańsk, and variables of psychosocial nature such as the respondents’ self-assessment in terms of their sense of happiness and their self-assessed opportunities to attain their own life goals.

The analysis performed revealed that there is no statistically significant correlation between social features, such as education or income, and the overall evaluation of environmental conditions (significance above critical value, $p > 0.05$). A relation of this kind does exist, however, in the case of demographic features – the environmental conditions at the place of residence are slightly better perceived by men than by women ($p < 0.05$), and by younger versus older people ($p < 0.001$). The best views of the environmental conditions at the place of residence are shared by people residing in Gdańsk for a period shorter than three years; the worst assessments, on the other hand, come from those who have lived here for more than ten years ($p < 0.005$). Interestingly, the environmental conditions are valued higher by those who perceive their potential to attain their life goals well and believe they are happy, contrary to those who do not share any such

Table 2. Evaluation of the environmental conditions versus the social and demographic features of the respondents

Independent variables	Arithmetic mean against the scale (1–6)*	Standard deviation	W Wilcoxon test, H Kruskal–Wallis test	Significance
Sex				
Female	3.81	0.904	W= 255813	p < 0.05
Male	3.89	0.925		
Age				
Up to 24	4.02	0.998	H = 23.1	p < 0.001
25–39	3.90	0.830		
40–59	3.81	0.843		
60 and above	3.73	0.975		
Length of time living in Gdańsk**				
Up to 3 years	4.04	0.811	H = 10.8	p < 0.005
4 to 10 years	3.93	0.854		
Longer than 10 years	3.80	0.936		
Perceived opportunity to attain life goals				
Very good and fairly good	3.93	0.864	W = 121119	p < 0.001
Very poor or rather poor	3.53	1.060		
Declared sense of happiness				
Absolutely yes and rather yes	3.91	0.870	W = 88968	p < 0.001
Definitely no or rather no	3.50	1.020		

* the higher the mean, the higher the evaluation

** the significant difference between categories: 'up to 3 years' and 'longer than 10 years'

Source: own elaboration.

views ($p < 0.001$). In other words, mental well-being ranks among the prime correlates of a positive evaluation of the environmental values at the place of residence.

The conducted survey reveals that the subjective perception of various aspects of the city, including the environmental conditions, changes along with the inhabitants' individual experiences. The best evaluation of the environmental conditions in the city came from the dwellers of Gdańsk representing the younger age groups and those living in Gdańsk for a relatively short time (up to 3 years). Prevalingly, the latter are 'young settlers', or people who came to Gdańsk in search of a more attractive job or to take up studies, after which they decided to stay. Relying on common knowledge, one could assume that criticism of the city should decline as years go by; however, in this case, one should consider cognitive dissonance. The decision an individual makes to migrate and settle in the city results in the need to cherish a high view of its values to justify the reasonableness of the choice made.

When interpreting the evaluation of the living conditions in the city, one should also refer to the fact that in the course of experiencing space one can identify elements 'which will not be forgotten' or 'which gain particular weight' (Jewdokimow 2007). The issue gains in importance considering that what we face in the contemporary world is the dynamically advancing process of population ageing. Similar trends are observed in Poland, Gdańsk included (Czekanowski 2012; Stephens et al. 2019). This makes it even more necessary to take this fact into account in the processes of planning and developing the city space.

Conclusions

The task of urban policy is to mitigate any negative effects occurring in the 'city tissue' and counteract excessively stark disproportions between individual dimensions of the quality of life, including in terms of environmental conditions. From the perspective of the paradigm of sustainable development, the revitalisation of the most neglected areas is of high significance where such areas are found in districts of fewer environmental values. The conducted survey reveals far-reaching differences in the spatial structure of the city when it comes to the residents' perception of the values of the natural environment. In the city space, extremes that create a peculiar continuum can be identified. One extreme covers the districts located in the vicinities of woodlands and the coastline (where the scores for the environmental values are highest); the other extreme represents the older districts (the city authorities have already included them in part in the revitalisation programme) located in the neighbourhood of industrial and storage estates (where the evaluation scores are lowest).


Moreover, the results of the survey presented in the paper indicate that the perception and evaluation of the environmental values at the place of residence are determined by demographic factors such as sex and age. The survey shows that lower satisfaction with the environmental values at their place of residence is shared by women and people in the oldest age group. Even though one might presume that town planning is by no means sex-related and the city space is for everyone, the conducted survey points to the fact that women, men, the


young and the elderly use the city in different ways and have different expectations of it. Assuming that the quality of life is the ratio between the existing dwelling conditions (environmental conditions included) and the aspirations of the city dwellers, one can conclude that environmental values such as accessibility of green areas, quality of the air and noise intensity rank higher in the hierarchy of needs shared by women and the elderly, and result in their more critical views. The realisation of the ambitious goal of attaining a higher balance between spatial structures will not be an easy process. This is because looming on the horizon are the long-existent risks related to the process of spatial planning. These can include insufficient municipality-owned land, the drive shared by private investors (developers) to generate maximum profit by increasing the intensity of built-

up development at the expense of the natural environment, low environmental awareness among the decision makers, and the continually changing law, which constricts the long-term policy of protecting the public interest. As the urban population grows, the expected improvement of life quality in cities will grow too. Considering control of the climatic risk and managing it, all city users will need to be engaged in the process.

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