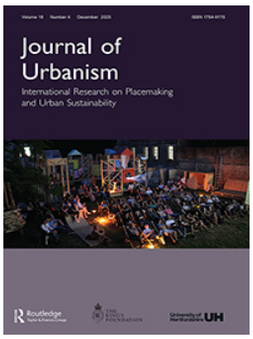

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Residential satisfaction with general characteristics of socialist and post-socialist housing estates in Croatia and Slovenia

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ABSTRACT

This study compares housing quality and residential satisfaction between socialist (old) and post-socialist (new) large housing estates (LHEs) in Croatia and Slovenia. A survey conducted in 2022 included a total sample of 2,193 participants. Residential satisfaction was assessed based on *general characteristics of the estate*, including construction density, safety, green spaces, children's playgrounds, transport connections with other parts of the city, and traffic density. In general, residents were satisfied with their built environment in housing estates, irrespective of country or estate type. However, residents in both types of housing estates in Slovenia reported generally higher levels of satisfaction than those in Croatia. Additionally, despite their age, socialist-era LHEs were not rated worse overall than post-socialist housing estates. The basic urban principles of contemporary cities — sustainability, safety, inclusivity, greenness, and resilience — are more closely aligned with the design and planning practices of old LHEs than with the market-oriented urbanism of the post-socialist period. As a result, new housing estates in the two countries, particularly in Croatia, contribute less to everyday placemaking at the neighbourhood level. However, this can be improved by aligning future development more closely with contemporary urban principles.

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Socialist and post-socialist housing estates; residential satisfaction; general characteristics of the estate, comparative analysis; Croatia and Slovenia

Introduction

Croatia and Slovenia share a common history as parts of former Yugoslavia, along with a unified housing policy that facilitated the expansion of large housing estates (LHEs) during the socialist period, which lasted from 1945 to 1990. LHEs in Croatia and Slovenia were constructed with the main aim of addressing housing needs stemming from the wider processes of post-war regeneration, state-led industrialization, and the resulting mass urbanization. The development of LHEs, primarily aimed at the newly established working and middle classes, was a response to the urgent need for adequate housing for the expanding urban population during a period of social and

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economic transformation (Bežovan 1993; Kährik and Tammaru 2010; Mandič 2010; Rogić Nehajev 1990; Sendi and Kerbler 2021). Therefore, socialist LHEs in both Croatia and Slovenia, much like those in other Central and Eastern Europe (CEE) countries, remain a significant category of housing and account for a considerable segment of the overall housing supply.[1] In these countries, limited residential mobility is also a characteristic feature, contributing to accelerated aging of the population residing in LHEs (Kabisch et al. 2022). This trend suggests that residents may have limited opportunities to relocate or may develop emotional attachments to their place of residence (Gorczyca and Grabiński 2018), making them reluctant to move. Therefore, addressing the potential deprivation of these estates should be an important task for local authorities in the near future.

The transition to a democratic, market-oriented socio-political and economic system after 1990 introduced new types of housing and planning policies. Residential construction was primarily undertaken by private and commercial entities, and in both countries – particularly in Croatia – it frequently took the form of "in-spot" or "sporadic" construction, occurring either within or adjacent to older existing estates or on the outer edges of cities. This has resulted in excessive and dense construction of residential and commercial buildings (Jukić, Mlinar, and Smokvina 2011), especially in the two largest cities in Croatia, Zagreb and Split. Thus, in contrast to the socialist LHEs, post-socialist housing estates often occupy substantial portions of public and green spaces and tend to be overbuilt with multi-family residential buildings, maximizing profit for private developers and investors.

Therefore, this paper compares levels of residential satisfaction between socialist-era (1945–1990) LHEs (referred to as "old") and post-socialist (after 1990) or "new" housing estates in Croatia and Slovenia. The main objective is to examine how two distinct housing policy approaches – from two different periods – have influenced residential satisfaction in both types of housing estates across the two countries. The current study seeks to address a gap in the literature by comparing socialist and post-socialist housing estates in Croatia and Slovenia in terms of residential satisfaction with general characteristics such as layout, green spaces, playgrounds, other outdoor public areas, and traffic density. Previous research has shown that socialist LHEs in CEE countries continue to be considered desirable places to live (Grossmann, Kabisch, and Kabisch 2017; Wassenberg 2018), while post-socialist estates often face notable urban deficiencies. Based on this, we hypothesize that residents of older LHEs in both countries remain largely satisfied with their built environment and overall quality of life, and in this regard, do not lag behind residents of post-socialist housing estates. However, in light of ongoing and significant economic and socio-spatial transformations in the post-socialist context, noticeable changes are taking place in both types of housing estates.

Furthermore, the role of the state or cities and the process of urban planning and urbanism is considerably diminished compared to the socialist era, which has reduced the influence of public policies, especially regarding housing quality and residential satisfaction at the neighbourhood level. The deterioration of the planning process over the last three decades has allowed private investors and developers to build new apartments without the obligation to provide public facilities in the surrounding housing and built environment.

These spatial norms have been gradually declining over the decades, in parallel with urban policy legislation that increasingly leaves the regulation of urban space to private investors. As a result, responsibility for public spaces has shifted to local (city) governments, which often lack adequate master plans or sufficient funding to address these needs effectively.

As a result, former public spaces have been converted into new construction zones, leading to a lack of essential public infrastructure in new neighbourhoods. This issue is particularly evident in Croatian post-socialist housing built environment, affecting residents on a daily basis. In contrast, this situation is less severe in Slovenian urban and housing areas (Gotovac, Anđelina, and Kerbler 2024; Sendi, Šeme, and Kerbler 2023) then in Croatian housing environment.

Additionally, Croatian and Slovenian national housing policies are still trying to adapt existing European and urban sustainability trends, declared primarily in The New Leipzig Charter (see 'New Leipzig Charter- The Transformative Power of Cities for the Common Good' 2020) and the New Urban Agenda (see 'The New Urban Agenda' 2017). These basic principles for developing contemporary cities as sustainable, safe, inclusive, green, and resilient aim to enhance housing quality and overall living standards and are present differently in these countries. Also, on an everyday and neighbourhood level placemaking is more visible in the old then in new estates

Large housing estates in Western and Eastern context

Generally, LHEs were constructed throughout Europe between 1945 and 1990 typically as large and at that time modern residential settlements. They were composed of building complexes with apartments that: a) are different in shape, b) built as planned and mass, c) located in tall buildings (vertical skyscrapers) that are d) high enough (usually five or more floors) so that in accordance with the law an elevator can be installed (Hess, Tammaru, and van Ham 2018; Wassenberg 2018). LHEs of this period were designed following the principles of "The Functional City" as defined by the CIAM (*Congrès Internationaux d'Architecture Moderne*), emphasizing modernist and functional layouts intended to accommodate various social classes (Dekker et al. 2005; Van Gent 2010; Wassenberg 2018). Although Western or capitalist urban landscapes were affected by similar modernist planning ideas as Eastern ones, the scale and quality of housing estates distinguished the socialist city from the capitalist city (Kovács and Herfert 2012; Van Gent 2010; Wassenberg 2018). The "main distinct feature of socialist cities was the socio-economic profile of residents living in the housing estates and while housing estates in capitalist societies were inhabited predominantly by blue-collar workers and immigrants, housing estates in state-socialist countries had a clear middle-class character" (Kovács and Herfert 2012, 326). The population structure in CEE LHEs has, to some extent, persisted to the present day, while in Western estates, it is less stratified, as the middle class would often leave these settlements, benefiting the lower classes and immigrant populations in what are now considered deprived areas. However, the aging of the population in socialist LHEs (Gorczyca and Grabiński 2018; Sendi, Šeme, and Kerbler 2023), along with the

aging of the housing stock and its insufficient regeneration, remain the main problems of these estates, which affect their attractiveness. Furthermore, as a large proportion of city dwellers still live in socialist LHEs, a large part of them is also satisfied and do not want to move. Thus, Herfert, Neugebauer, and Smigiel (2013, 71) pointed out that socialist LHEs "cannot be generally branded as places of decline and social decay, as is too often the case from a Western European perspective."

However, from physical, architectural, and aesthetics perspectives, the construction of socialist LHEs has also been subject to criticism. At that time, LHEs were built using low-cost, rapid industrial methods that adhered to subpar building and design standards, with the use of prefabricated components as a prime example (Hess, Tammaru, and van Ham 2018; Nedučin, Škorić, and Krklješ 2019; Pojani and Baar 2016). They were often located far from the established central areas of cities or even developed as entirely new urban neighbourhoods within existing cities. This dispersed spatial arrangement contributed to spatial isolation and resulted in increased costs for infrastructure, commuting, and energy (Hegedüs and Tosics 1998; Hegedüs, Tosics, and Mayo 1996). Typical socialist LHEs featured clusters of uniformly designed buildings, primarily emphasizing residential use at the expense of other urban functions, with frequently disregarded or unfinished public and green spaces (Bolt 2018; Dekker and Van Kempen 2004; Musterd et al. 2017; Rogić Nehajev 1990; Seferagić 1988). Generally, these estates were more accessible to public infrastructure and public interests and were planned to provide an adequate built environment for inhabitants (schools, green areas, playgrounds, etc.). Today, the considerable age of old LHEs – many of which are over 50 years old – combined with inadequate maintenance, has contributed to ongoing deterioration of the built environment and public infrastructure (Černič S. Gotovac, R. Đ. Anđelina, and M. Adamović 2023; Mali et al. 2003; Sendi and Kerbler 2021), and mostly require refurbishment.

The new post-socialist housing estates, primarily developed as private residential constructions, mainly target younger middle- and upper-class families as potential buyers and residents (Svirčić Gotovac 2024). These new buildings are often more attractive and desirable, and have higher construction quality and market value. However, thirty years on, many post-socialist housing estates are overbuilt and lack basic public facilities essential for day-to-day living. Due to inadequate public and neighbourhood amenities, residents often rely on the infrastructure of nearby older estates, which were initially better planned, offering primary and accompanying services and facilities, such as schools, kindergartens, and public and green areas. In such market-oriented context, neo-liberal thinking is becoming dominant, and the state and central government have little political significance in urban planning and new legislation (Hirt 2012; Sýkora and Bouzarovski 2012; Tsenkova 2009). In light of this, it is understandable why, despite their aforementioned flaws, socialist LHEs continue to be seen as attractive and desirable places to live (Dekker et al. 2005; Grossmann, Kabisch, and Kabisch 2017; Kovács and Herfert 2012; Szafrańska 2014). Furthermore, the "large housing estate syndrome," a phenomenon recognized in Western Europe in the 1980's and defined as negative image of an estate (Szafrańska 2014, 80), mostly depends on local conditions and the functioning of the local and national housing market but it is generally not perceived negatively in the post-socialist context.

Residential satisfaction with the estate or neighbourhood

Residential satisfaction can be defined as a state in which a person's expectations about housing are met. Residential satisfaction is thus an evaluation of how housing units and neighbourhood environment are meeting residents' housing needs, expectations, and aspirations (Adewale et al. 2019). Satisfaction with the estate or neighbourhood is more strongly influenced by individual experiences than by the actual presence of services (e.g. playgrounds, schools, or green spaces) (Dekker et al. 2011; Gruber and Shelton 1987). Lu (1999, 268) points out that the "residents' perception rather than the actual configuration of residential conditions" plays an important role in determining residential satisfaction. Therefore, subjective measures (perceptions) are often stated to be stronger predictors of residential satisfaction than objective ones (Parkes, Kearns, and Atkinson 2002; Kabisch et al. 2022). Thus, satisfaction with the estate on a subjective level can show residents' perception of their estates as immediate neighbourhood and its relation to urban everyday life (Graham and McFarlane 2015). Residential satisfaction is also defined as a measure of the gap between residents' actual and aspired needs, called the aspiration-gap approach (Emami and Sadeghlou 2020; Galster 1987). In this context, tenants may differ in their aspirations depending on socio-demographic characteristics, such as age or gender. Furthermore, higher levels of residential satisfaction may be associated with the high share of homeownership (Boschman 2018; Harris 2001), typical of housing estates in both Croatia and Slovenia.[2]

On the other side, Dekker et al. (2011) point out that individual opinions concerning problems in and around the estate (e.g. crime, hygiene, noise) have a greater impact on estate satisfaction than residents' opinions on services (e.g. public transport, shopping facilities, or playgrounds for children). Thus, neighbourhood satisfaction is particularly strongly associated with perceived safety (Cao and Wang 2016; Kabisch et al. 2022). Residential satisfaction, namely, as "perceived residential quality and residential attachment" (Fornara, Bonaiuto, and Bonnes 2010, 172), can also determine resident's intentions to move (Amérigo and Ignacio Aragonés 1997). Resident's decision to move or to stay is also influenced by their comparisons with other types of residential neighbourhoods, reflecting both the "individual situation and external conditions in urban regions" (Herfert, Silvia Neugebauer, and Smigiel 2013, 58). In that context, the layout and characteristics of the neighbourhood and built environment are very important, especially from an architectural and urbanistic perspective. This signifies the adequacy of public or green spaces in the neighbourhood, whether they are well-maintained or neglected, and the satisfaction of residents with these spaces. Therefore, our analysis begins with the neighbourhood layout and examines general estate characteristics, such as general arrangement or urban landscape, density of construction, safety, green spaces, children's playgrounds, and traffic arrangements, including traffic density. Thus, we compare residents' satisfaction and perceptions of the neighbourhood between old and new estates in Croatia and Slovenia.

Methodology

To address the research aim of comparing resident satisfaction across different types of housing estates in Croatia and Slovenia, a mixed-methods approach was adopted,

combining quantitative and qualitative strategies. This approach was chosen to enable both breadth and depth of insight into residential satisfaction – an issue influenced by measurable physical features (such as layout, green spaces, or traffic density) as well as subjective interpretations and lived experiences. The quantitative component provided structured, comparable data across subsamples, allowing for generalizable insights based on standardized indicators. The qualitative component, conducted through focus group discussions, offered a complementary, nuanced understanding of how residents interpret and evaluate their living and built environments. Thus, the mixed-methods approach ensures a comprehensive analysis that is well-suited for exploring the complex interplay between urban form, residential satisfaction, and socio-demographic characteristics.

The selection of 11 specific indicators of residential satisfaction (please, see Table 3) for the survey was grounded in a thorough review of the urban studies literature and prior research on housing quality and satisfaction (for an overview, please refer to Emami and Sadeghlou 2020). These indicators represent core physical and social attributes commonly associated with the quality of housing and built environments, ensuring conceptual consistency with established research. They were also chosen to encompass both potential problem areas (e.g. traffic, safety, overcrowding, overconstruction) and strengths (e.g. green space, cleanliness, peacefulness, connectivity to public transport) of the housing estate types under consideration. Furthermore, to better understand how individual characteristics mediate perceptions of the built environment, these satisfaction indicators were correlated with key demographic variables – gender, age, tenure, and length of residence. This allowed identifying both between-group and within-group patterns that may inform the interpretation of satisfaction trends.

To complement the survey findings and provide a richer contextual understanding, we conducted qualitative strand of the study – specifically, focus groups with residents of both types of housing estates in both countries. Participants were asked about their satisfaction with their estate, the functionality and layout of the neighbourhood, and whether their daily needs could be met locally. Thematic analysis of these discussions enabled the capture of dimensions of residential experience that are not always evident in quantitative data, particularly those related to subjective values and perceived strengths or shortcomings of the neighbourhood. Together, these methods provide a robust and multidimensional basis for comparing the advantages and disadvantages of socialist and post-socialist housing estates in the two countries. They enable a systematic evaluation of residents' perceptions of their living and built environments, many of which were shaped by distinct historical planning (urbanism) paradigms and development periods.

Quantitative survey

The survey data were gathered between April and June 2022 as part of the Slovenian-Croatian bilateral project, *Quality of Living in the Housing Estates of the Socialist and Post-socialist Era: a Comparative Analysis between Slovenia and Croatia* (see Gotovac, Anđelina, and Kerbler 2024; Sendi, Šeme, and Kerbler 2023). The survey questionnaire was designed customarily, based on a review of relevant literature on residential satisfaction and quality of housing (Emami and Sadeghlou 2020). All analysed variables were measured on the Likert-type agreement scale ranging from 1 – *not satisfied at all* to 5 – *very satisfied*. The

Table 1. Sample structure according to the country, city, and type of estate.

Country	City	Type of estate					
		Old (1945–1990)		New (after 1990)		Total	
		n	%	n	%	n	%
Croatia	Zagreb	400	64.41	221	35.59	621	100.00
	Split	242	65.76	126	34.24	368	100.00
	Rijeka	155	61.26	98	38.74	253	100.00
	Osijek	164	65.34	87	34.66	251	100.00
	Total	961	64.37	532	35.63	1493	100.00
Slovenia	Ljubljana	453	86.45	71	13.55	524	100.00
	Maribor	161	91.48	15	8.52	176	100.00
	Total	614	87.71	86	12.29	700	100.00
Total		1575	71.82	618	28.18	2193	100.00

research in Croatia was conducted in the four largest cities: Osijek, Rijeka, Split, and Zagreb, while in Slovenia two largest cities, Ljubljana and Maribor, were included. The research participants ($N = 2{,}193$) were residents (aged 18 and above) of multi-family buildings in selected old and new estates. The detailed sample structure by the country, city, and type of estate is presented in Table 1.

In Croatia, there are no official statistical records at the level of individual multi-family buildings or housing estates. For this reason, sampling respondents from two types of estates in Croatia relied on available data, which indicate that 62% of the total multi-family building stock at the national level was constructed during the socialist period (until 1990), and 26% in the post-socialist period (after 1990) (Ministry of Physical Planning, Construction and State Assets 2021). Accordingly, the similar ratio of respondents from old and new housing estates was sampled for all four Croatian cities included in the study. Additionally, the sample was disproportionate at the level of individual cities but generally accounted for the size of each city. The largest share of participants came from Zagreb, the largest of the four cities, while the smallest share came from Osijek, the smallest among the included cities.

As part of preparing the sample, a field visit was conducted to assess whether the estates were old or new, complete or incomplete in terms of housing units, and well-equipped or poorly equipped. Based on these criteria, the estates were selected for research. The sample includes estates with at least 1,000 inhabitants, built across all decades from post-World War II to the present. Overall, there were 39 estates in the sample, 21 old (approximately 30–45 respondents) and 18 new (approximately 20–30 respondents) and with more residents in socialist ($N = 961$) then in post-socialist estates ($N = 532$) (approx. 60–40%).

Sampling in Slovenia was based on official data on housing estates (building constructions and their residents) obtained from the Real Estate Register (Portal Prostor Portal Space 2021) and the Central Population Register (Statistical Office of the Republic of Slovenia, (2012). The sample included respondents from 110 housing estates. Eighty-seven of them were built during the socialist period and 23 during the post-socialist period. The explored socialist LHEs have 4,237 dwellings and 3,279 residents, and the post-socialist housing estates 258 dwellings and 647 residents. Depending on the construction period of the housing estates, 87.6% of respondents lived in buildings from the socialist period, while 12.4% lived in

Table 2. Descriptive statistics of respondents in the sample.

	Croatia		Slovenia	
Variable	Old (1945–1990)	New (after 1990)	Old (1945–1990)	New (after 1990)
Housing status (%)				
Owner/co-owner	60.71	52.63	91.04	77.91
Tenant	24.97	27.63	7.17	18.60
Other	14.32	19.74	1.79	3.49
Sex (%)				
Male	41.62	41.17	34.36	31.40
Female	58.38	58.83	65.64	68.60
Education (%)				
Primary school	3.44	1.51	5.06	1.16
Specialized high school	–	–	7.34	1.16
High school	54.49	47.74	41.92	22.09
College or university	42.07	50.75	45.68	75.58
Average number of household members	2.33	2.87	1.94	2.24
Average length of residence (years)	17.21	9.03	35.14	17.23
Average age of respondents (years)	45.15	41.40	68.20	64.78
Average income (euros)*	1198.00	1728.00	1463.00	1993.00

Note: Unanswered questions (missing values) and "I do not know" answers are not included.
*Median values (instead of means) are presented.

buildings from the post-socialist period. The ratio between socialist and post-socialist housing construction in the entire housing stock in the selected cities in Slovenia is approximately the same (89.2% vs. 10.8%).

In Croatia, the survey was conducted by face-to face interviews with a random selection of households and respondents (in Zagreb, due to an insufficient response rate, less than 15% of the total number of interviews at the level of the city was completed by telephone survey). By employing a probabilistic design at the level of individual households and participants, it was attempted to ensure that the sample is representative according to basic socio-demographic variables (sex and age). Due to financial constraints, data in Slovenia were collected by telephone survey, by connecting addresses of apartments in selected estates with the telephone registry of the Republic of Slovenia (Kerbler and Richard 2022). The response rate to telephone survey, after excluding unanswered calls or calls to wrong numbers, was 3.7%.

Table 2 presents the sample's demographic structure by the state, city, and type of estate. The share of female respondents was higher in both types of estates in Slovenia (between 65% and 70%), compared to those in Croatia (approx. 60%). In addition, the average age of respondents was considerably higher in Slovenia (68 in old and 65 years in new estates) than in Croatia (45 and 41 years, respectively).[3] Despite the high average age, it should be emphasised that in the Slovenian part of the sample, there were significantly younger respondents from post-socialist housing estates. The share of those under 60 years old was 41%, compared to 24% in old LHEs. Respondents in socialist LHEs have also lived there for a longer period than those in post-socialist ones, and this difference was also more pronounced in Slovenia. In both countries, respondents living in socialist apartments are more often owners of these apartments than those living in post-socialist apartments. However, the percentages of homeowners are higher in estates in Slovenia than in corresponding ones in Croatia (Table 2).

Qualitative focus groups

In addition to the survey, eight focus groups were conducted in both countries. In Croatia, five focus groups were conducted (36 participants in total, 28 from old LHEs), four in Zagreb and one in Rijeka. In Slovenia, there were three focus groups (with 26 participants in total, 23 from old LHEs), two of which were staged in Ljubljana and one in Maribor. Residents were asked how satisfied they were with their estate and its layout, and whether their needs can mostly be met at the level of own neighbourhood. Thematic analysis of focus group discussions supplemented the quantitative comparison of advantages and disadvantages of old and new housing estates and neighbourhoods.

Results

Our main goal was to compare four types of housing estates – old and new, in Croatia and Slovenia – based on residents' satisfaction with 11 general characteristics: general orderliness, construction density, layout, safety, peacefulness, cleanliness, green areas, playgrounds, other outdoor public spaces, transport connections with other parts of the city, and traffic density. However, before conducting this analysis across four subsamples, we performed within-subsample analyses by correlating each of the 11 indicators with four residents' attributes: gender, age, tenure (owner vs. tenant), and length of residence in the estate. Testing these correlations was intended to contribute to the existing literature by examining how residents' attributes might shape their perceptions of the urban environment, specifically socialist and post-socialist housing estates. Furthermore, if the pattern and magnitude of these effects are similar across the four subsamples, it would demonstrate a satisfactory level of homogeneity for further comparisons, despite methodological differences in their construction.

Accordingly, in the following section we will first present results of correlational analysis, and then commence to comparisons between different types of estates (subsamples). To reduce the probability of a Type I error, due to the large number of variables – and consequently, tests – all analyses were conducted at an $\alpha = .01$ level (with an $\alpha = .02$ level indicating marginal significance).

Satisfaction with general characteristics of the housing estate

Table 3 presents descriptive statistics for 11 individual indicators of residents' satisfaction with general characteristics of the housing estate along with their correlations with four residents' attributes.

For the first predictor, residents' gender, systematically higher levels of satisfaction among female compared to male respondents were observed specifically in old estates in Slovenia, with nine out of eleven indicators showing significant associations; no significant correlations were found in other subsamples. Furthermore, higher age was associated with increased residential satisfaction only in the old and new estates in Slovenia, whereas in Croatia, residents' age was, if anything, negatively correlated with satisfaction regarding general characteristics of the estate. Neither were the effects of homeownership universal, as it showed positive correlations with only six individual indicators of

Table 3. Satisfaction with general characteristics of the housing estate and correlations with residents' attributes, according to the state and type of estate.

						Correlation with residents' attributes[†]			
Country	Estate type	General estate characteristics	n	M	SD	Gender	Age	Tenure (owner vs. tenant)	Length of residence in the estate
Croatia	a) Old (1945–1990)	General orderliness[c]	958	4.00	.87	−.02	.00	−.04	.01
		Construction density	958	3.79	1.01	.00	−.01	−.06	.05
		Appearance[b]	959	3.92	.86	−.01	.07	−.05	.06
		Safety	958	4.14	.85	−.05	−.02	−.05	**.09**
		Peacefulness	956	3.94	.98	−.04	−.04	−.05	.05
		Cleanliness[b,c]	957	3.52	1.11	−.01	**−.10**	.01	−.04
		Green areas[b,c]	953	4.03	.98	−.06	.07	−.09	.08
		Playgrounds[b]	926	3.98	.91	−.06	.04	**−.15**	.07
		Other outdoor public spaces[b]	958	3.93	.83	−.02	−.02	−.08	.03
		Transport connections with other parts of city[b,c]	958	4.28	.83	.00	.06	−.04	.06
		Traffic density	956	3.58	1.08	−.01	−.06	.04	−.03
Croatia	b) New (after 1990)	General orderliness	526	3.96	.97	.02	**−.17**	.02	−.06
		Construction density	530	3.68	1.03	−.01	−.10	.04	**−.13**
		Appearance[a]	532	4.02	.89	−.03	**−.14**	.03	−.09
		Safety	531	4.16	.82	−.07	**−.15**	−.10	−.06
		Peacefulness	529	3.93	.88	−.01	−.09	**−.14**	−.11
		Cleanliness[a,d]	532	3.67	1.03	−.02	−.10	−.08	−.10
		Green areas[a,d]	522	3.62	1.10	−.03	−.02	.08	.08
		Playgrounds[a]	504	3.77	1.02	−.01	−.08	.04	**.13**
		Other outdoor public spaces[a]	528	3.78	.95	.01	**−.12**	.07	.00
		Transport connections with other parts of city b,c	532	4.14	.91	.05	−.03	−.02	−.02
		Traffic density	526	3.52	1.05	−.03	−.10	−.02	**−.16**
Slovenia	c) Old (1945–1990)	General orderliness[a,d]	608	3.90	.88	**.15**	.05	.04	.03
		Construction density	605	3.87	.94	**.11**	**.15**	**−.11**	**.16**
		Appearance	606	4.00	.83	**.21**	**.17**	−.01	**.14**
		Safety	601	4.22	.80	**.12**	−.07	.09	−.07
		Peacefulness	605	4.04	.92	**.14**	.09	.00	.03
		Cleanliness[a]	606	3.98	.84	**.15**	.07	−.02	.03
		Green areas[a]	598	4.29	.88	**.12**	**.13**	.04	.08
		Playgrounds	545	3.91	1.09	.08	.04	.00	.03
		Other outdoor public spaces	572	3.80	1.01	.02	.01	.04	−.02
		Transport connections with other parts of city b,c	602	4.49	.74	**.13**	−.06	−.02	−.02
		Traffic density	604	3.50	1.10	**.14**	**.17**	−.02	.08
	d) New (after 1990)	General orderliness[c]	85	4.18	.77	.12	**.28**	−.12	**.30**

(*Continued*)

Table 3. (Continued).

Country	Estate type	General estate characteristics	n	M	SD	Correlation with residents' attributes[†]			
						Gender	Age	Tenure (owner vs. tenant)	Length of residence in the estate
		Construction density	86	3.77	1.14	.08	**.33**	−.21	.21
		Appearance	85	4.08	.90	.15	**.37**	−.12	.20
		Safety	85	4.28	.95	.04	.21	**-.30**	.09
		Peacefulness	84	4.10	1.00	−.14	.24	**−.35**	.19
		Cleanliness[b]	85	4.11	.87	.00	**.31**	**−.31**	.26
		Green areas[b]	84	4.21	1.07	.14	**.42**	−.27	.18
		Playgrounds	78	3.67	1.08	−.06	.17	−.21	−.07
		Other outdoor public spaces	81	3.94	1.02	.09	**.30**	−.18	.11
		Transport connections with other parts of city[b,c]	83	4.45	.84	.05	.05	−.22	−.04
		Traffic density	84	3.56	1.15	−.01	.20	−.28	.28

[†]Coding of categorical predictor variables: Gender, 1 – Male, 2 – Female; Tenure, 1 – Homeowner, 2 – Tenant (only these two categories were included in the analyses).
[a,b,c,d] Letters in superscript indicate significant difference (at α = .01) between corresponding categories of housing estates.
Correlation coefficients printed in bold are significant at $p < .01$.

satisfaction across all subsamples. Similarly, length of residence in a neighbourhood was positively correlated with only five individual indicators overall, regardless of subsample, while negative correlations were observed for two indicators – *construction density and traffic density* – in new estates in Croatia.

Nevertheless, the correlations were generally low in magnitude, with only six correlations – all in the subsample of new estates in Slovenia – exceeding a value of .30. This suggests that, even without accounting for potential overlap, the four predictors explain relatively small percentages of the variance in individual indicators of residential satisfaction. This finding was further supported by regression analyses of composite residential satisfaction scores, which were calculated by averaging scores across individual indicators. Simple regression analyses were conducted in each subsample using the same four predictors (gender, age, tenure, and length of residence in the estate). The percentages of explained variance in the composite score of residential satisfaction were 1.9% for old estates in Croatia, 2.3% for new estates in Croatia, and 4.5% for old estates in Slovenia. In new estates in Slovenia, the percentage was notably higher at 18.3%; however, the only significant predictor was tenure, with $\beta = -.31$. This suggests that residents' attributes are not crucial factors for residential satisfaction with general estate characteristics. This also implies that the validity of further comparisons among the four types of housing estates in our study is not compromised, regardless of potential demographic differences. We will now proceed with these comparisons.

The four subsamples included in the study varied considerably in size, resulting in subsequent variance inhomogeneity. Therefore, non-parametric tests were employed for statistical hypothesis testing. First, for comparisons across all four subsamples – two types of housing estates in both countries – Kruskal–Wallis omnibus tests were used at an $\alpha = .05$ level of significance. If these tests indicated significant differences, planned comparisons within pairs of individual housing estate categories were carried out using Mann–Whitney tests. There were four planned comparisons in total: two cross-country comparisons – old vs. old and new vs. new – between Croatia and Slovenia, and two comparisons of old vs. new estates, one within each country.

Safety, green areas, and *traffic connections with other parts of the city* emerged as the highest-rated indicators in all subsamples, except for the new estates in Croatia (Table 3). This specific subsample stood out by ranking *green areas* among the worst indicators, placing the *layout* of the estate among the top three instead. Conversely, the *density of construction* and *traffic density* were consistently among the least favoured indicators across all subsamples, along with *cleanliness*, which ranked low in both types of estates in Croatia.

The total means, combining all indicators together, were 3.92 ($SD = .97$) for old, and 3.85 ($SD = .98$) for new estates in Croatia, compared to the values of 4.00 ($SD = .95$) and 4.03 ($SD = 1.02$) for corresponding estates in Slovenia. These values were statistically different from each other (omnibus Kruskal–Wallis test was significant at the $p < .001$ level). More precisely, general characteristics of the estate were in total rated significantly better in both types of estates in Slovenia than in the corresponding ones in Croatia ($p < .001$, both for old and new estates). Furthermore, in Croatia, residents in old estates were more satisfied than the ones in new estates ($p < .001$), while in Slovenia this difference was not statistically significant ($p > .05$).

Accordingly, descriptive comparisons of individual indicators between the two countries revealed a notable pattern of higher levels of satisfaction in Slovenia than in Croatia. In the category of old estates, Croatian participants were at least slightly more satisfied with *general orderliness, playgrounds*, *other outdoor public spaces*, and *traffic density*, while all remaining criteria were rated higher in Slovenia. For new estates, Slovenian residents were more satisfied according to all observed criteria, except *playgrounds*.

Despite minimal differences in some of the indicators, a descriptive comparison between the two types of estates in Croatia indicated a general trend of higher levels of satisfaction in old estates as opposed to the new ones. Residents in old estates were more satisfied with *general orderliness*, *construction density*, *peacefulness, green areas*, *playgrounds*, *other outdoor public spaces*, *transport connections with other parts of the city*, and *traffic density*, in comparison with residents in new estates who were more satisfied with *layout*, *safety*, and *cleanliness*. In Slovenia, on the contrary, all but two elements – *general orderliness* and *playgrounds* – were rated at least slightly higher in new than in old estates.

Some of these differences have reached statistical significance. The omnibus Kruskal–Wallis tests were significant (all $ps < .05$) for nine out of 11 observed criteria; the only exceptions were the *safety* and *traffic density*, which, accordingly, were excluded from the following planned analyses.

In cross-state comparisons of old housing estates, *general orderliness* was rated higher in Croatia (at the level of marginal significance of $p = .013$), while *cleanliness, green areas*, and *transport connections with other parts of the city* received higher ratings in Slovenia (all $ps < .001$). Similarly, in the category of new estates, the same three criteria – *cleanliness*, *green areas*, and *transport connections with other parts of the city* – were also rated significantly better in Slovenia than in Croatia (all $ps < .001$).

In Croatia, residents of old estates were significantly more satisfied than residents of new estates with *green areas*, *playgrounds*, *other outdoor public spaces, and transport connections with other parts of the city* (all $ps \leq .008$), while the opposite was the case for *layout* and *cleanliness* (at the level of marginal significance of $p = .012$ and $p = .011$, respectively). In Slovenia, residents of new estates were significantly more satisfied with *general orderliness* of their estates, compared to the residents of old estates ($p = .005$).

Findings from focus groups

In focus groups, residents of new estates, compared to those in old estates, more often reported shortcomings than advantages regarding their estates. Their more pronounced dissatisfaction was directed towards insufficient green and public areas, but also overbuilding and inadequate infrastructure, which does not correspond with residents' needs. A resident of the Zagreb new estate (Figure 1) at the city periphery pointed out the mass and excessive construction that lacks public institutions and other outdoor public spaces which creates difficulties to them as a family in everyday life.

> A hoard of buildings were built, which are of much better quality, but the infrastructure does not follow what is necessary for a family to live a normal life – that you can know that your child is safe, that you can have your doctor, and that all of this is within a pedestrian area, which I all had in the old building. (F, Jaruščica, new estate, Zagreb)

Figure 1. New Zagreb's estate – Jaruščica. Source: authors.

Similar observations are given by a resident of a Zagreb old estate, which is also overbuilt with new and "in spot" housing construction, thus making the residents dissatisfied and afraid of further construction, because of the old estates losing their former urbanistic layout and housing standard.

> We have the embankment, we got a dog park, two kindergartens and plenty of green areas, but it worries me that they will all be razed to the ground and overrun by new concrete buildings. School is being built now, but a new building is being raised right next to it. It's a pity because it used to be a green area. (F, Savica, old estate, Zagreb)

Such opinion can be found in most of the new housing, which was mixed with the old buildings and built "in spot" within or near the old estates. Despite such new estates often being overbuilt, discussions with residents revealed that they are perceived much better than the new estates that are located on the periphery and completely dislocated. The examples are two Zagreb estates built in post-socialism and reliant on old estates:

> The construction started nicely – we are in the first building, and now the tenth is built, and it's overcrowded – I don't think it can be closer. The rest of the old neighbourhood – it has many parks, small buildings, and was built according to a plan. (M, Ferenščica, new estate, Zagreb)

> On the big central square there is a children's playground that became lively these past years. It was quite a big children's playground out of function and during the last three to five years a lot was invested in the replacement of children's equipment, everything was repaired, electricity was brought and the playground was illuminated. Now it is full of life, with many children and parents. (M, new estate, Vrbik, Zagreb)

In the city of Rijeka, residents of new estates also pointed out the shortcomings of the estates and emphasised that they are overbuilt. They were developed at the expense of

cutting down a forest and green vegetation, which has left an impression of very partial care for housing, unsatisfactory architecture and partial urbanism. A resident of a Rijeka new estate reported:

> And here is a typical Croatian problem: the forest that was there and was dense was brutally 'beaten' and simply, the density of these buildings is too high and there is absolutely not enough green vegetation. To me it is a typical example of fake architecture. (M, Gornja Drenova, new estate, Rijeka)

Furthermore, focus group discussions corroborated obtained results that point out more advantages of old housing estates, especially those in Zagreb and Ljubljana, and more shortcomings of new estates, particularly in Zagreb and Rijeka. The participants emphasised especially green areas, playgrounds, other outdoor public spaces, and transport connections with other parts of the city in old estates. All these amenities are accessible within a few minutes from one's apartment, based on urbanistically planned standards for old estates (Figure 2) as housing units:

> Travno is conceptualised in such a way that 90% of buildings are built so that children do not need to cross the street when going to school. The connectivity with the city centre is also great, by car, bus and tram. (F, Travno, old estate, Zagreb)

In Rijeka also, residents emphasise satisfaction with living in old estates, with enough facilities and a solid connectivity to all parts of the city:

> I give 8 out of 10 to my neighbourhood with regard to connectivity and facilities, and even the demographic picture. Podmurvice is literally at a walking distance from everything, large shopping centres, the city centre, east, north . . . . (M, Podmurvice, old estate, Rijeka)

Figure 2. Old Zagreb's estate – Travno. Source: authors.

Figure 3. Old Ljubljana's estate – Fužine. Source: authors.

Residents of Slovenian old estates in Ljubljana also emphasised the advantages of their estates, especially a sufficient number of green areas (Figure 3).

> I come from an estate in which there is plenty of green areas and trees. This is definitely an advantage. Children play there and come together. Also, the accessibility of stores and other services and of the bus station is good. (M, Litostrojski bloki, old estate, Ljubljana)

> I'm from Fužine, and there's an abundance of greenery. That's the first thing that comes to my mind. There are many trees, they are already big. (F, Fužine, old estate, Ljubljana)

Residents are also satisfied with green areas in old housing estates in another Slovenian city, in Maribor respectively.

> Well, this park is beautifully landscaped. There could be more people, next to the playground, because there is also a children's playground in this park. (Ž, Soseska ob Frankolovski ulici, old estate, Maribor)

In old housing estates in Slovenia, residents are also very satisfied with adequate traffic connectivity.

> We have public bus transport, and four buses are constantly passing by and around the housing estate. We are connected to the city and also to other parts of the city of Maribor. (F, S-23, old estate, Maribor)

> I have bicycles, I have a bus, I have a taxi, I have any kind of transport, basically whatever meets my needs I can do with my feet. (M, Soseska ob Dominkuševi ulici, old estate, Maribor)

It is completely different in the new housing estates (Figure 4), where they are not satisfied with public transport.

Figure 4. New Ljubljana's estate – Mostec. Source: authors.

> The issue lies in the connectivity of housing estates to the city. It takes me ten minutes by car to reach the city, and an additional half-hour by bus, which includes getting to the bus station. If I commute to work, it takes me 40 minutes. That's too long; I waste half an hour when using public transport. (F, Mostec, new estate, Ljubljana)

Discussion and conclusion

Residents in both Croatia and Slovenia, irrespective of the type of the housing estate, old or new, expressed relatively high levels of satisfaction with the general characteristics of their estates. As an illustration, the total average rates of residential satisfaction in all four subsamples were around the value of 4.0. In all estates, the three top-rated indicators were *safety*, *traffic connections with other parts of the city*, and, with the exception of new estates in Croatia, *green areas*. Beyond their satisfaction with the urbanistic features of their estates, residents' high rates for *safety*, particularly in old LHEs, suggest that these communities have successfully avoided the trap of social decline and the "large housing estate syndrome" (Szafrańska 2014) that is characteristic of their counterparts in the West (Herfert, Silvia Neugebauer, and Smigiel 2013; Kabisch et al. 2022). However, threats have also been detected, as residents in all subsamples expressed the least satisfaction with the *density of construction* and *traffic density* in their estates, with residents from new estates in Croatia notably ranking *green areas* among the worst indicators. These results are corroborated by the thematic analysis of focus groups.

At the level of cross-country comparison, the results, despite often showing only minor differences, favoured estates in Slovenia, indicating a trend toward a higher housing standard compared to both old and new residential areas in Croatia. Specifically, at the level of total means, the general characteristics of the estate were rated significantly higher in both types of estates in Slovenia than in the corresponding Croatian ones. At the level of individual indicators, three out of four statistically significant cross-country differences in the category of old estates showed a preference for the estates in Slovenia. For new estates, all three significant differences favoured the estates in Slovenia.

Furthermore, compared to Slovenia, the distinction between the two types of estates – or more precisely, the advantage of old over new estates – was somewhat more noticeable in Croatia. Hence, in Slovenia, the total average rates for the two types of estates were not statistically different. On the level of individual indicators, new estates were rated higher only in *general orderliness*, while all other differences were not significant. In Croatia, in addition to the higher general rate, old estates were rated significantly higher at four individual indicators, whereas new estates received higher ratings in only two.

Thus, in line with our initial expectation, residents of old LHEs in both Slovenia – and especially in Croatia – remain largely satisfied with the general characteristics of their estates, in some respects even more so than residents of post-socialist housing estates. These results position Croatia and Slovenia alongside other CEE countries in terms of high levels of residential satisfaction with socialist-era estates (Dekker and Van Kempen 2004; Dekker et al. 2011; Hess, Tammaru, and van Ham 2018; Murie, Knorr-Siedow, and Van Kempen 2003). This conclusion has several theoretical and practical implications, which we will discuss in more detail.

The differences between socialist and post-socialist estates, as highlighted in the results, reflect the contrasting approaches to urbanism and the guiding principles of mass housing in these two eras. On one hand, the results indicate that the ideas behind constructing LHEs during the socialist period are still valued: providing functional housing with neighbourhood facilities and green and public spaces as a contrast to the over-constructed residential environment of new estates (Jukić, Mlinar, and Smokvina 2011; Szafrańska 2014). On the other hand, the results, particularly in Croatia, corresponds with the described features of market-oriented urbanism and private residential construction that characterized the transition period, including a lack of urban planning, overconstruction, and neglect of necessary infrastructure and equipment in the commercial context of urban development (S. Gotovac, S. U. Anđelina, and J. Vukić 2023; Vasilevska, Vranic, and Marinkovic 2014; Svirčić Gotovac, Đokić, and Kerbler 2024). Thus, study detects significant spatial issues in built environment – again, especially for Croatian new estates – such as problems of traffic density, reduced public and green spaces, overcrowding, overbuilding, which correlate with neoliberal and commercial type of urbanism (Hirt 2012; Jukić, Mlinar, and Smokvina 2011; Tsenkova 2009). This was the typical approach used to develop post-socialist overbuilt and sporadic residential areas, often taking advantage of and putting pressure on the old socialist estates where urban planning standards had been more adequately implemented. At the same time, Slovenian new estates were rated higher than those in Croatia, suggesting that Slovenia's new estates are less influenced by private, market-oriented profit patterns. In contrast, Croatia's higher concentration of post-socialist housing stock in large cities may explain the stronger impact of these patterns compared to Slovenian cities.

The results could also, at least partially, reflect decades of residents' adaptation to old estates, as indicated by low residential mobility in both countries and the still existing social mix, with no pronounced social issues such as crime or segregation (Bolt 2018; Dekker et al. 2011). In that sense, it is noteworthy that residents in both countries are mostly satisfied with the general characteristics of their LHEs, despite the advanced age of old estates, the process of demographic aging (Gorczyca and Grabiński 2018), and the frequent neglect of building maintenance and management (S. Gotovac, R. Đ. Anđelina, and M. Adamović 2023; Pojani and Baar 2016).

Yet another part of the explanation of our results could be related to the process of residents' adaptation to their estates. As stated above, residents' perception plays a crucial role in determining residential satisfaction (Adewale et al. 2019; Dekker et al. 2011; Kabisch et al. 2022). Since new estates failed to offer significantly improved housing conditions – at least at the level of the neighbourhood – and thus did not raise criteria for assessing the residential and built environment, socialist LHEs may still be perceived as a solid foundation for establishing housing norms and standards (see Svirčić Gotovac, Đokić, and Kerbler 2024; Sendi and Kerbler 2021).

Our study further contributes to the existing literature by testing the effects of residents' individual attributes – their gender, age, tenure status, and length of residence in the neighbourhood – on residential satisfaction with specific housing environments, namely socialist and post-socialist estates. These effects, when observed, were mainly in line with existing findings (for an overview, see Emami and Sadeghlou 2020). For example, as in Herfert, Silvia Neugebauer, and Smigiel (2013), female respondents were more satisfied with their estates compared to males. Higher age has been associated with increased residential satisfaction (Emami and Sadeghlou 2020; Gorczyca and Grabiński 2018); however, in samples from Croatia, there were few opposite instances. Homeownership had positive effects on residential satisfaction, in line with, e.g. Harris (2001) and Boschman (2018). The similar was true for length of residing in a neighbourhood (see, e.g. Dekker et al. 2011; Herfert, Silvia Neugebauer, and Smigiel 2013; Kovács and Herfert 2012), although two negative correlations were observed as well. However, these particular and scattered effects were small in magnitude and did not form an overall systematic pattern (see also Gotovac, Anđelina, and Kerbler 2024). A conceptual explanation for the absence of a more systematic influence of residents' individual characteristics on their satisfaction could be that the effects of these factors are stronger at the level of more immediate surroundings, such as the dwelling or residential building, and weaker at the level of the broader environment of the estate (see Emami and Sadeghlou 2020). Another, methodological explanation specific to our study, could be that our subsamples are relatively homogeneous in terms of respondents' demographics, and due to the potential lack of variability, the correlation values failed to reach statistical significance. Thus, in prospective studies, it would be interesting to compare the magnitude of the effects these factors have on satisfaction with one's dwelling, building, and neighbourhood. Additionally, to enhance the power of the respective analyses, different sampling approaches should be considered, such as purposive selection of respondents with relevant attributes, allowing for direct comparisons (see, e.g. Dekker et al. 2011; Miletić 2015). Another, and probably the most serious, limitation of our study is also related to the sample. Specifically, the prominent differences in the sizes of individual subsamples limited the range of statistical procedures available for their comparisons, restricting them to non-parametric tests. Therefore, broader generalization of our findings if qualified.

However, our study provides valuable insights into how residents perceive their housing estates, whether socialist or post-socialist, and how satisfied they are with the general characteristics of their neighbourhoods. It can be emphasized that the foundational principles for sustainable, safe, inclusive, green, and resilient European cities ('The New Urban Agenda' 2017) are better incorporated in the old estates than

in the new ones. These urban sustainability principles for developing contemporary cities need to be better implemented in new estates so that placemaking at the everyday neighbourhood level becomes more visible and more beneficial for inhabitants.

Therefore, it is crucial to protect old estates from further private construction and densification, particularly in Croatia, as many of these estates are already showing the negative consequences that threaten their urban standards and their original integrity as cohesive housing units. In this regard, city policies should treat these estates with greater care, as old estates require urgent regeneration and protection from decay at the level of multi-family buildings. At the same time, new estates and buildings also need more thorough and strategic planning, with an emphasis on short-term solutions. For example, the lack of public and green spaces not only diminishes the value of outdoor areas for residents but also contributes to a less attractive layout of these new estates, as they are characterized by reduced and overbuilt residential environments, despite the superior construction quality of new multi-family buildings.

At both national levels, it is therefore important to define housing strategies that facilitate more controlled planning for further housing construction. Instead of solely allocating the capital gained from selling land to housing developers, cities must play a more active role in urban planning and urbanism to better serve the public interests (S. Gotovac, S. U. Anđelina, and J. Vukić 2023). Additionally, it is important to protect and preserve the existing green areas in socialist estates, as they are among their most valuable assets (Sendi, Šeme, and Kerbler 2023). Furthermore, efforts should be made to improve neighbourhood equipment and public and green spaces in new estates to align these cities with European sustainable trends and foster more resilient housing and built environments.

Notes

1. At the national level and based on the construction period, 12% of the total stock of multi-family buildings in Croatia was built before 1945, 62% between 1945 and 1990, and 26% after 1990 (Ministry of Physical Planning, Construction and State Assets 2021). In Slovenia, the percentages are 31.6% for multi-family buildings constructed before 1945, 51.8% for those built during the 1945–1990 period, and 16.6% for the period after 1990 ("P 2021).
2. The percentage of privately owned apartments is 90.5% in Croatia (Eurostat 2021) and 91.0% in Slovenia (Statistical Office of the Republic of Slovenia 2021).
3. It is assumed that there are probably two reasons for such a high average age of the respondents in Slovenia. First, the telephone numbers of landline telephones are published in the telephone registry of Slovenia, which are mostly owned by households with elderly people. Second, it is likely that only this segment of the population is willing to answer telephone surveys.

Author contributions

Conceptualisation: A.S.G., and R.Đ. Methodology: R.Đ. and A.S.G.; Formal analysis: R.Đ.; Writing: A.S.G., R.Đ., and B.K.; Review & Editing: A.S.G., R.Đ., and B.K.; Funding Acquisition: A.S.G. and B.K. All authors have read and agreed to the published version of the manuscript.

Data availability statement

The data are in the process of submission to the publicly accessible Social Science Data Archives (Arhiv družboslovnih podatkov), Faculty of Social Sciences, University of Ljubljana.

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Institutional review board statement

The study was conducted according to the guidelines of the Declaration of Helsinki (1975), and no personal data were gathered during the study and all participants were anonymized; The survey was approved by the Ethics Committee of the Institute for Social Research in Zagreb (protocol code 3/2022 and 1 April 2022 date of approval).

Informed consent statement

Informed consent was obtained from all subjects involved in the study.

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