International Journal of Innovative Technologies in Social Science

e-ISSN: 2544-9435

Scholarly Publisher
RS Global Sp. z O.O.
ISNI: 0000 0004 8495 2390

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ARTICLE TITLE	SOUNDSCAPE IN TIMES OF CHANGE: EXPLORING THE IMPACT OF COVID-19 ON THE URBAN SOUNDSCAPE OF DIDOUCHE MOURAD STREET IN CONSTANTINE, ALGERIA
ARTICLE INFO	Asma Bensaada, Soumia Bouzaher, Amira Talbi. (2024) Soundscape in Times of Change: Exploring The Impact of Covid-19 on The Urban Soundscape of Didouche Mourad Street in Constantine, Algeria. *International Journal of Innovative Technologies in Social Science*. 4(44). doi: 10.31435/ijitss.4(44).2024.3000
DOI	https://doi.org/10.31435/ijitss.4(44).2024.3000
RECEIVED	03 October 2024
ACCEPTED	18 November 2024
PUBLISHED	21 November 2024
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SOUNDSCAPE IN TIMES OF CHANGE: EXPLORING THE IMPACT OF COVID-19 ON THE URBAN SOUNDSCAPE OF DIDOUCHE MOURAD STREET IN CONSTANTINE, ALGERIA

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ABSTRACT

This research paper delves into the intricate relationship between soundscape, urban environments, and the impact of COVID-19, with a particular focus on Didouche Mourad street in Constantine, Algeria. The study aims to identify and emphasize the significance of this unique soundscape, both before and after the onset of the pandemic, by employing a multi-faceted research approach, combining site surveys, data collection tools, and an extensively administrated- questionnaire.
To understand the perception and importance of the soundscape in the lives of the inhabitants, a questionnaire was administered to 159 residents in the area, exploring how their experiences and perceptions of the soundscape changed in the wake of the pandemic. The questionnaire covered aspects such as the emotional impact of soundscapes, the recognition of sound landmarks, and their evolving roles in creating a sense of place and identity.
The survey results, along with the residents' perceptions and experiences, were considered to evaluate the changing importance of the soundscape within Didouche Mourad street in Constantine, Algeria, in the context of the COVID-19 pandemic.
This research paper sheds light on the impact of COVID-19 on the often-neglected auditory dimension of urban landscapes. By investigating the soundscape of Didouche Mourad street in Constantine and juxtaposing it with its urban features before and after the pandemic, the study uncovers the intertwined relationship between sound and place and how it evolved in response to the public health crisis. The results contribute to a deeper understanding of the dynamic nature of soundscapes in shaping urban identity and provide valuable insights for urban planning, preservation, and the enhancement of the human experience within urban spaces during and after significant disruptions like the COVID-19 pandemic.

KEYWORDS

Didouche Mourad Street, Constantine, Urban Space, Soundscape, COVID Impact, Sound-Marks

CITATION

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1. Introduction.

1.1. Soundscape: Origins and Variations.

The concept of soundscape, coined by Schäfer in 1976, aims to encompass all the sounds perceived by individuals in their environment without making a positive or negative judgment about them (Schäfer, 1993; Semidor, 2004; Semidor, 2006; Balaÿ, 2003; Porteous & Mastin, 1985). Schaefer's original definition sparked significant interest across various disciplines. Subsequently, other researchers have proposed additional

definitions to better comprehend this concept, such as Farina (Farina, 2014; Farina et al., 2014), who defines it as an acoustic composition resulting from the deliberate or spontaneous combination of natural and urban sounds (Bonesio, 2001; Li, et al., 2018; Brambilla & Fiebig, 2023).

The urban soundscape encompasses all the sounds and noises resulting from human activities in public spaces, including commercial activities, construction, leisure, and transportation. These sounds often dominate in terms of sound intensity when compared to other components of the soundscape (Botteldooren t al., 2006; Botteldooren, et al., 2006).

1.2. Urban Space: Heart of The City and Historical Narratives.

Urban spaces refer to outdoor areas situated amidst buildings, facilitating communication, transit, and social interactions among city residents (Bazant, 2009). These spaces can vary in their accessibility, categorized as public, semi-public, or private, and are typically defined by the surrounding facades of buildings or natural physical features such as bodies of water, rivers, or topographic features (Bazant, 1998).

Within these urban spaces, city inhabitants engage in various significant daily activities, commemorating past events and creating connections to the present and future, which collectively contribute to the city's historical narrative (Vogel, 1999).

«In the city the first thing are the streets and squares, collective spaces, then come the buildings and tracks. The public space defines the quality of the city, because it indicates the quality of life of the people and the quality of the citizenship of its inhabitants.» (Borja et al., 2003; Axelsson, 2015).

1.3. The Connection Between Sound-Marks and Urban Space Identification.

Sound-mark; this term, borrowed from the concept of 'landmark'; is employed in the realm of soundscape studies to denote a distinctive sound associated with a particular community. Sound-marks are characterized by their uniqueness or distinct qualities, making them especially notable and significant to the residents within that community. As such, they hold cultural and historical value and warrant efforts for preservation and protection (Aletta, et al., 2016; Mariétan, 2005).

Murray Schäfer introduced the term "sound-marks" as an extension of the concept of "landmark." This term is used to pinpoint sounds that play a pivotal role in characterizing a particular place (Schäfer, 1993). In this context, sound-marks refer to sound events that acquire a distinct informational status, primarily denotative in nature, signifying their significance as strong identifiers of place identity (Berglund & Nilsson, 2006; Lercher & Dzhambov, 2023).

1.4. COVID-19 Lockdowns and Their Impact in Algeria.

Following the outbreak of the coronavirus (COVID-19) in early 2020 and the subsequent declaration of it as a pandemic by the World Health Organization in March 2020 (Zanke et al., 2020), numerous countries worldwide implemented stringent containment measures, commonly referred to as "lockdowns." (Aletta & Osborn, 2020; Zanke, et al., 2020) These measures entailed imposing severe limitations on people's ability to travel, both between countries and cities, and even within the same city. These restrictions included prohibitions on domestic and international travel, as well as the enforcement of social distancing and curfew policies (Stockwell et al., 2021; Ben Hadj Salem & Chtara, 2018; Stockwell, et al., 2021).

Algeria has implemented a series of protective measures aimed at mitigating the spread of COVID-19. These measures encompass lockdowns and curfews designed to ensure that individuals remain within the confines of their homes. These restrictions represent some of the most stringent containment measures ever witnessed in the country. They include the closure of all party venues, Hammams, gaming facilities, and commercial areas as of March 15, 2020. Furthermore, from March 17, 2020, all public gatherings and marches were banned across the entire national territory (Hamidouche, 2020).

1.5. Research Problem and Aim.

The absence of the usual urban soundscape, brought about by the COVID-19 pandemic and its total lockdown, has raised critical questions about its dual impact – both positive and negative – on individuals and their urban environments (Fig. 01). This study seeks to address the following problematic:

To what extent has the absence of the familiar urban soundscape during the COVID-19 pandemic influenced the well-being, identity, and perception of urban spaces among Didouche street’s residents, and how can we effectively balance the positive and negative consequences of this altered acoustic environment for sustainable urban living?

Fig. 1. Didouche Mourad Street: a and b- before COVID-19 pandemic lockdowns. c and d- during COVID-19 pandemic lockdowns.

The objective of this study is to examine the impact of the altered acoustic environment, brought about by the absence of the customary soundscape in Didouche Mourad Street in Constantine, on the capacity of its residents to recognize and relate to the urban space. In other words, the study sought to investigate how the significant changes in the soundscape influenced the way the street's inhabitants perceived and connected with their immediate urban surroundings.

2. Materials and Methods.

This study employed a multifaceted approach for data collection and analysis, involving a site survey, an administrated questionnaire survey, and statistical analysis.

The site selection process focused on choosing Didouche Mourad Street in Constantine, Algeria, as the primary study area due to its urban significance and relevance to the research objectives.

The questionnaire survey served as the core data collection tool and was meticulously designed to gather information about the urban soundscape and its connection to residents' ability to identify with the urban space, especially in the context of the absence of the usual soundscape.

The questionnaire encompassed queries related to sound perception, recollection of the urban environment, and emotional responses to changes in the soundscape. It was administered to a diverse and representative sample of residents of the apartments facing directly onto the Didouche Mourad Street, employing in-person methods to ensure comprehensive data collection.

Collected data underwent thorough statistical analysis, including descriptive statistics to summarize responses, and inferential statistics (correlation and regression analysis) to explore relationships between variables such as changes in the soundscape, emotional responses, and the ability to identify with the urban space. Statistical software SPSS was utilized for data analysis. Ethical considerations were diligently upheld throughout the research, with informed consent obtained from all survey participants to ensure their voluntary participation, and measures in place to protect the anonymity and confidentiality of responses. This comprehensive methodological approach provided a robust framework for investigating the impact of soundscape changes on residents' connection with Didouche Mourad Street's urban environment.

3. Site Survey: Didouche Mourad Street.

Our initial investigation was designed to assess the quality of the urban soundscape within Didouche Mourad Street (formerly Rue de France) (Fig. 02). This street, exclusively pedestrian and characterized by its vibrant commercial activity, serves as our focal point.

Didouche Street, originating from 1st November square and extending to merge into June, 19th 1965 Street, which leads to the Charaâ district along the Rhumel gorges, is approximately 167 meters long. It has an entrance width of 6.50 meters, widening to 7 meters at its other extremity, where it meets the square behind the Bey Mosque. This square spans an area of 358 square meters and has a perimeter of 74 meters. The street's perimeter walls vary in height, averaging around 15 meters but reaching heights of up to 30 meters in certain sections. The primary activities along this street revolve around commerce, with a focus on ready-to-wear shops, shoe stores, pharmacies, jewelers, tourist and financial institutions, as well as various exchange services (Fezzai, 2018; Khenoucha, 2010)

Conversely, June 19th 1965 Street starts at the point where Didouche Street concludes. It encompasses a plot of land covering 358 square meters and featuring a perimeter of 78 meters, bordered by the walls of the Bey's palace, the mosque, and small retail establishments. This street, which is 418 meters in length and varies in width between 6 and 8 meters, features level terrain with a gentle incline towards its opposite end. It is paved with asphalt and flanked by 1-meter-wide sidewalks on both sides. The street serves as a nexus for various pathways, and it connects to other networked lanes leading to both high and middle sectors. The street's perimeter walls are continuous and exhibit average heights of 15 meters, with some sections reaching 20 meters (Badjadja, 2008) (Fig. 03).

Commercial activities along June 19th 1965 Street primarily focus on local crafts, copperwork, and high-quality fabrics, coexisting alongside other shops and various offices. Prominent buildings along this street include a cinematheque at its end and a secondary school. In total, the street measures 585 meters in length, with a variable width ranging from 6 to 8 meters, and the perimeter walls typically stand at heights between 15 and 30 meters.

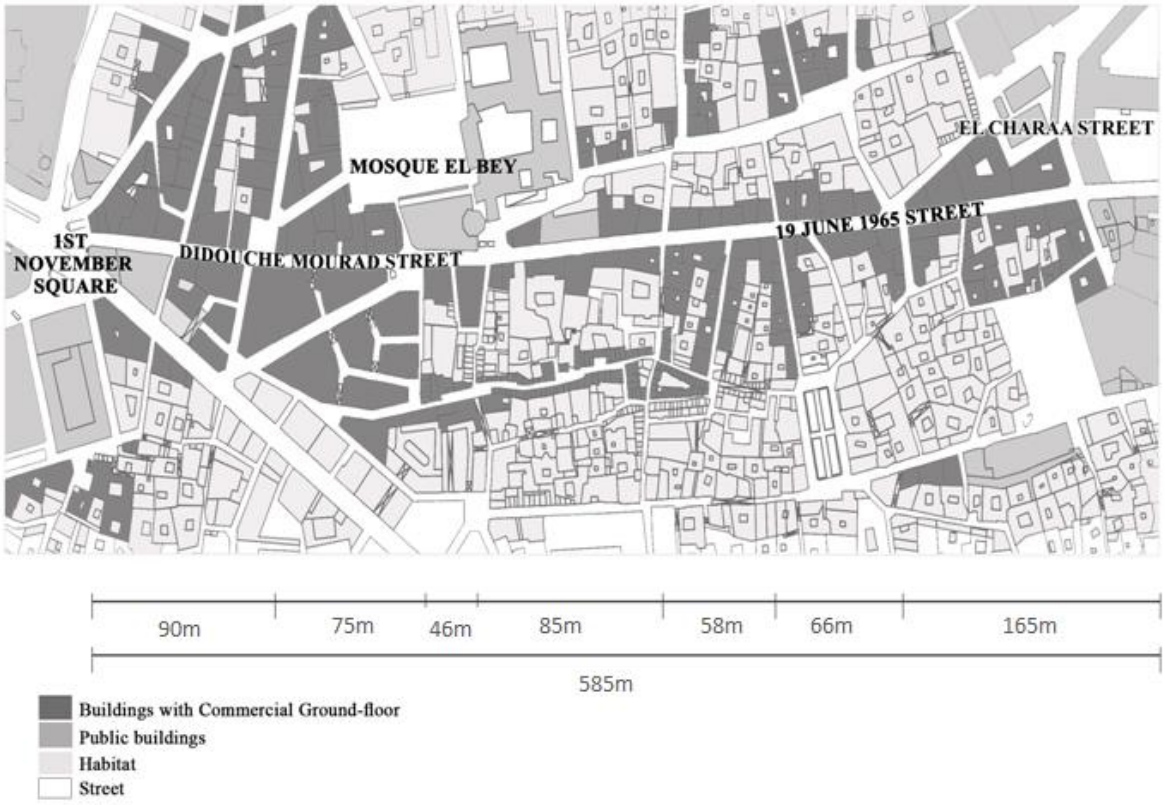

Fig 2. Site survey: Didouche Mourad Street.

4. Administrated Questionnaire Survey.

4.1. Targeting Didouche Mourad Street Residents During COVID-19.

We specifically targeted a subset of the population living along Didouche Mourad street, including both sides of the street. This selection was deliberate, as these individuals are directly exposed to the external noise emanating from the vibrant urban environment. Their proximity to the street meant that they experienced the soundscape in a particularly immersive manner, making them a crucial group to include in our research. By focusing on this segment of the population, we aimed to gain a comprehensive understanding of how the absence of the usual soundscape, as well as the introduction of new acoustic elements, had affected their perceptions and daily lives during the period of the COVID-19 pandemic.

The study was not-interventive. The researchers did not interfere with the activities performed by the participants. The participants were invited (not obliged, they could also abstain) to express, in a completely anonymous manner, their perceptions of urban sound. The researchers did not change or influence the soundscape during the experiment.

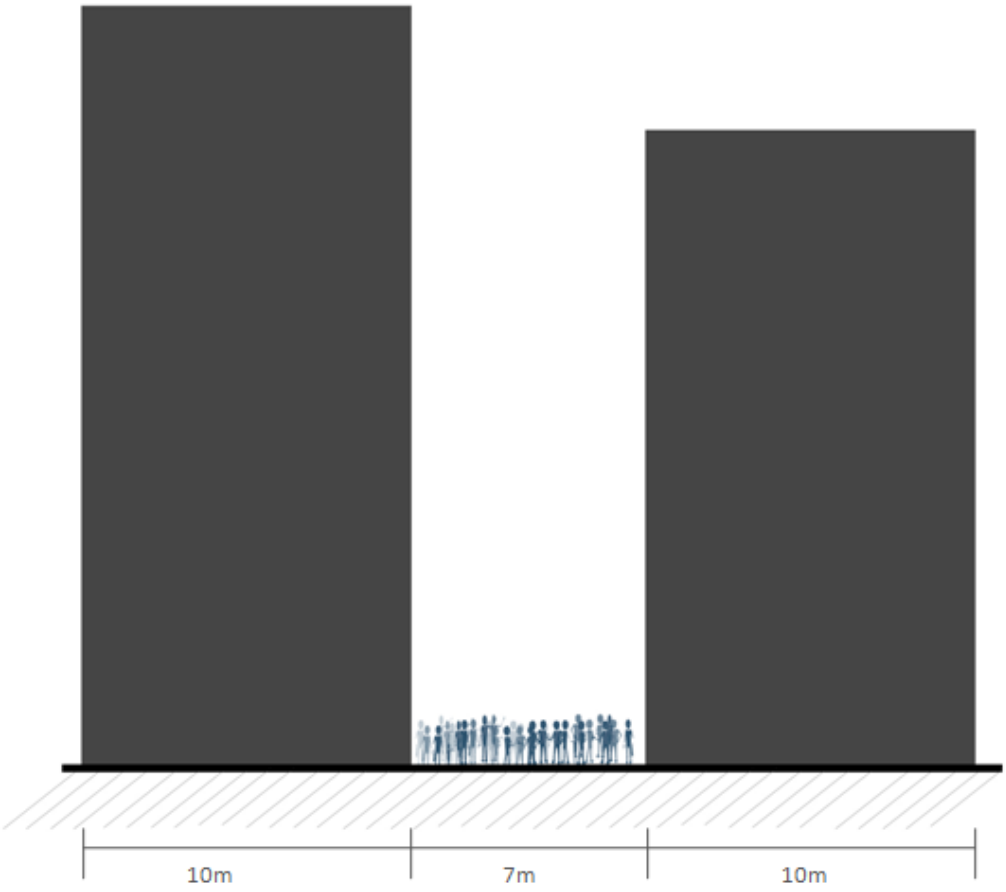

Fig. 3. A cross-section of Didouche Mourad Street.

4.2. A Targeted Soundscape Questionnaire.

To comprehensively explore the impact of the urban soundscape on residents' connection with Didouche Mourad Street, a meticulously designed questionnaire served as our primary data collection tool. This instrument delved into participants' subjective experiences, capturing their perceptions of urban sounds, recollections of the street, and emotional responses to changes in the soundscape. By doing so, the questionnaire played a pivotal role in revealing nuanced dynamics between the auditory environment and residents' sense of place.

In response to this unique context, we executed a targeted investigation during a specific period (July, 2020 to November, 2020). Employing a directed questionnaire approach, we engaged 159 residents from various sections of the street, ensuring representation across diverse age groups and durations of residence. The careful selection of respondents aimed to acquire precise and nuanced results.

The initial phase of the questionnaire focused on the conditions of participants' immediate environment and its typical characteristics before the lockdown period. It provided a concise description of this customary state, followed by a brief assessment of the sound environment and the level of acoustic comfort, rated on a LIKERT scale. Respondents then gauged their satisfaction with this established level of comfort.

Transitioning into the lockdown period, the questionnaire aimed to ascertain the extent of change in the atmosphere between the two phases. It explored respondents' satisfaction or dissatisfaction with the altered soundscape. Finally, participants shared personal opinions about their experiences during this unique time and whether they desired a recurrence of the same situation, specifically in terms of sound. Data analysis was conducted using SPSS software.

4.3. Silent Streets During Lockdown: Resident’s Perspactives.

The results of our questionnaire can be organized by factors. This methodical approach facilitates understanding emerging trends, significant correlations, and subtle nuances in our results, providing a clear and organized perspective on various dimensions of our study.

- Age: Participants were stratified based on age, yielding a broad spectrum encompassing different life stages—from young adults in their early twenties to seniors aged over 65. By examining the diverse age groups within our study, we anticipate uncovering how age may play a role in shaping individual perceptions and responses to the changing acoustic environment, contributing valuable insights to our research (Erfanian, et al., 2020).
- Duration of residence: Participants were categorized based on the duration of their residence, revealing a diverse representation across various time frames—ranging from less than 2 years to over 20 years. This demographic information will offer insights into how the duration of residence might influence perceptions of the urban environment during lockdown.
- Time spent at home outside of lockdown: In examining residents' daily routines, participants were asked about their typical time spent at home outside of the lockdown period. Responses varied, with participants indicating preferences for either day or night, and some highlighting a balance between the two. These trends provide context for understanding the temporal dynamics of residents' experiences.
- Description of immediate environment before lockdown: When asked to describe their immediate environment before the lockdown in three words, participants commonly used descriptors such as "too much nuisance," "polluted," and "congested." These terms reflect a prevailing sentiment of overcrowding and dissatisfaction with the pre- lockdown state of the urban environment.
- Description of immediate environment during lockdown: Conversely, participants described their immediate environment during the lockdown in terms like "empty," "too quiet," and "boring." The shift in descriptors suggests a notable change in the urban soundscape during the lockdown period, characterized by emptiness and perceived quietness.

4.4. Instruments: Data Collection and SPSS Analysis.

- *Software utilised*

In the realm of data analysis, the powerhouse at our disposal was the Statistical Package for the Social Sciences (SPSS). This robust software played a pivotal role in unraveling the intricacies of our dataset. The raw data underwent a meticulous journey through SPSS, where it was subjected to a series of statistical tests and analyses.

To commence the process, the data was imported into SPSS, ensuring a seamless transition into a structured and analyzable format. Descriptive statistics were employed to unveil the fundamental characteristics of the variables, offering a snapshot of the data's central tendencies and dispersions.

The utilization of SPSS brought not only efficiency but also a level of rigor to our analysis, ensuring that the results were not random occurrences but were based on statistical validity. Its user-friendly interface and diverse analytical capabilities facilitated a comprehensive exploration of our data, empowering us to draw meaningful conclusions and contribute substantively to our scientific inquiry.

- *Statistical analysis results*

Descriptive statistics were computed to provide a comprehensive understanding of key variables. The demographic profile of participants revealed a diverse age distribution, with ages ranging from less than 18 to more than 65 years; indicating a relatively varied sample. (Fig. 04)

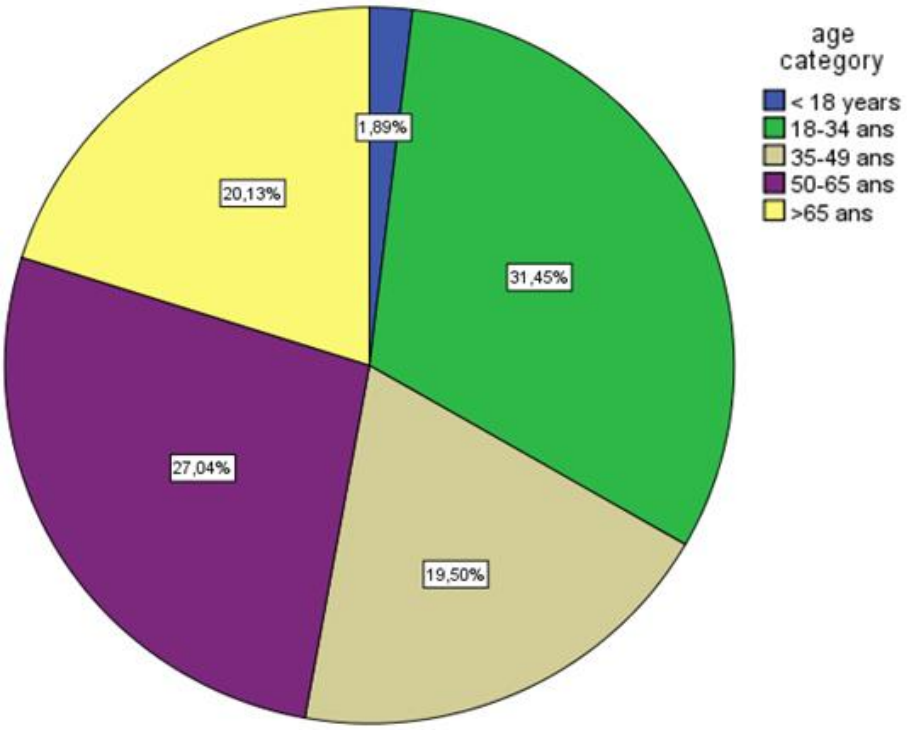

Fig. 4. The demographic profile of the questionnaire participants.

The duration of residence also exhibited considerable variability, spanning from 2 years to more than 20 years. This wide range suggests a heterogeneous representation of participants with varying levels of familiarity with their residential surroundings. (Fig.05)

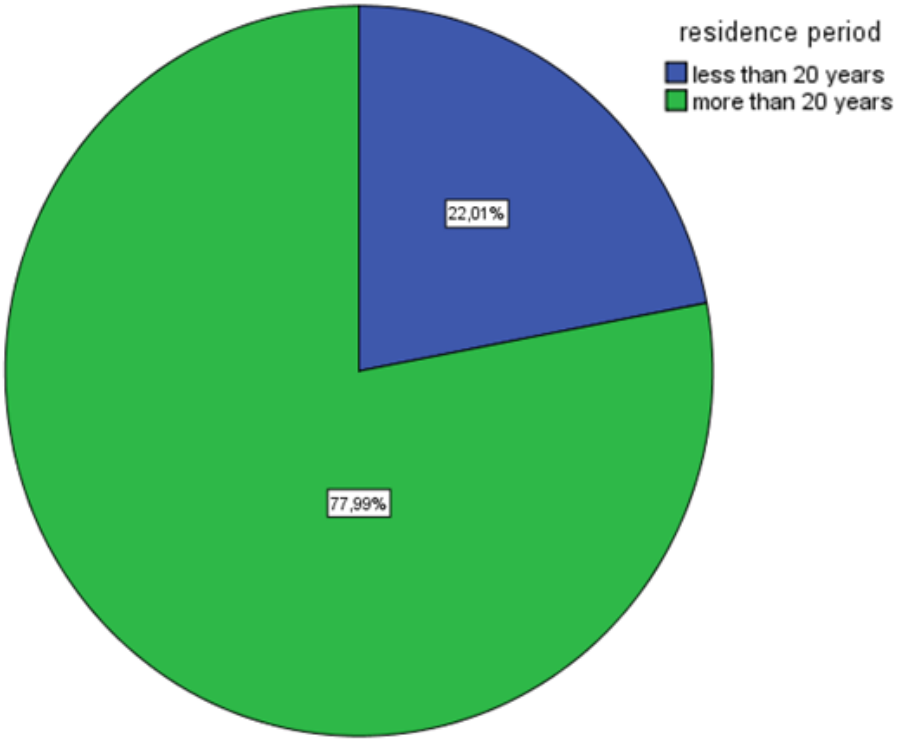

Fig. 5. The duration of residence of the questionnaire participants.

Participants reported spending an average of 12 hours per day at home outside of lockdown. The distribution of this variable demonstrated a normal distribution, with the majority of participants clustering around the mean, indicating a typical daily routine for the sample.

In assessing perceptions of the immediate environment before lockdown, participants employed various descriptors (three different terms per participant), with 'noisy' being the most commonly used term by the (54% of respondents). Other prevalent descriptors included 'polluted' (34.6%) and 'crowded' (40.2%), reflecting a prevalent sentiment of dissatisfaction with the pre-lockdown state of the urban environment. Notably, five different terms were used to describe 'noise' or the sounds surrounding them, with a total of 220 out of 432 responses (51%) related to the soundscape, and 98.4% of participants used at least one of these terms. (Table 01; Fig. 6 and 7)

Table 1.
Describing the urban environment before lockdown.

	Age category/ years					Residence period/ years	
Description	**<18**	**18-34**	**35-49**	**51-65**	**>65**	**Less than 20**	**More than 20**
Noisy	2	22	13	28	21	16	70
Friendly	0	0	0	3	4	0	7
Nuisance	1	13	13	6	4	8	29
Too much nuisance	1	13	8	7	4	8	25
Very noisy	0	18	14	5	11	7	41
A lot of noise	1	4	3	8	0	10	6
Crowded	2	14	10	23	15	14	50
Cluttered	1	12	2	10	7	4	28
Polluted	1	21	10	19	4	16	39
Dirty	0	8	14	9	12	6	37
Normal	0	5	1	0	0	2	4
Warm	0	0	0	0	5	0	5

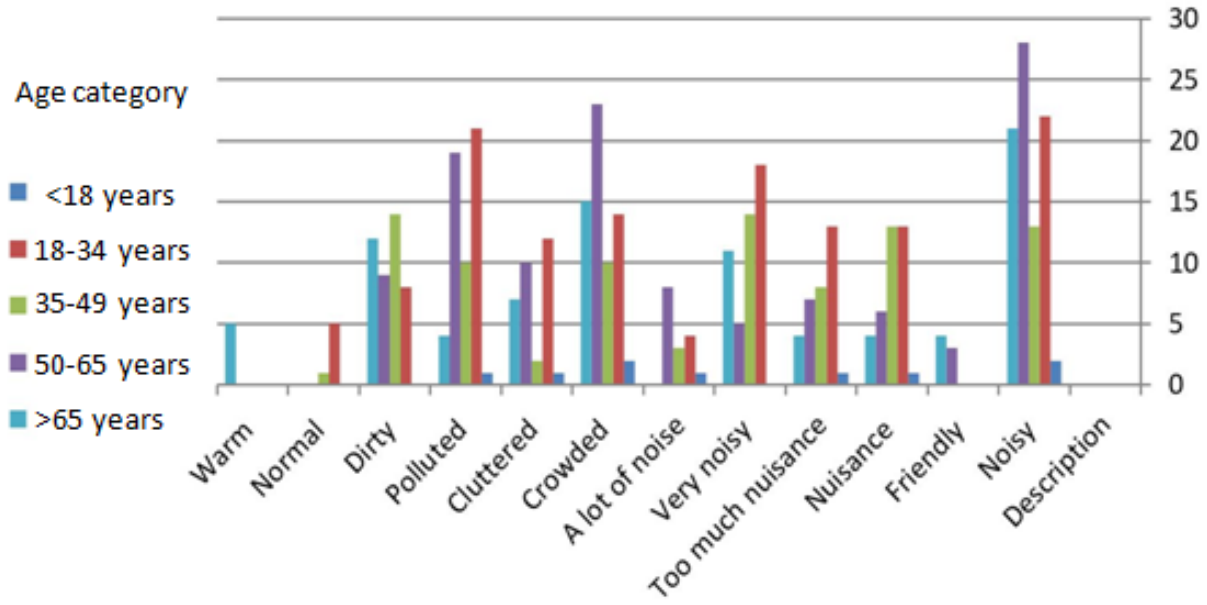

Fig. 6. Graphs describing the urban environment before lockdown based on age category.

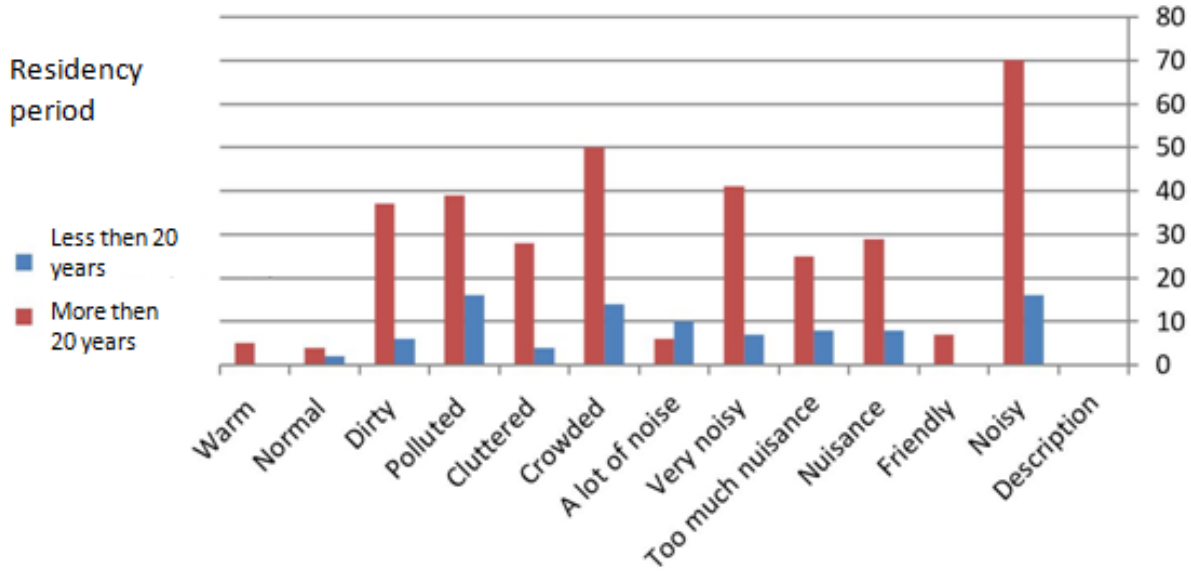

Fig. 7. Graphs describing the urban environment before lockdown based on residence period.

During lockdown, participants used different descriptors (3 terms per participant), with 'calm' emerging as the most frequent (31.4% of respondents), same as 'quiet' (31.4%) and 'void' (17.6%). This shift in descriptors suggests a notable change in the urban soundscape during the lockdown period, characterized by emptiness and perceived quietness. As before, five different terms were used to describe the 'absence of noise' or the sounds around them, with a total of 169 out of 384 responses (44%) relating to the soundscape, and 100% of participants used at least one of these terms. (Table 02; Fig. 8 and 9)

Table 2.
Describing the urban environment during lockdown.

	Age category/ years					Residence period/ years	
Description	**<18**	**18-34**	**35-49**	**51-65**	**>65**	**Less than 20**	**More than 20**
Bizarre	1	3	0	7	1	0	11
Very calm	1	14	3	7	10	12	23
Awkward	1	4	10	5	4	7	17
Void	1	14	3	3	7	6	22
Empty	0	10	2	7	4	4	19
Odd	0	10	5	7	10	10	22
Calm	2	16	5	20	7	11	39
Quiet	0	9	20	11	10	7	43
Calmness	0	9	5	6	2	6	16
Emptiness	1	14	4	14	2	8	27
Dead space	0	6	8	4	5	4	24
Monotone	0	3	2	4	3	0	12
Terrible	0	0	1	4	6	1	10
Strange	0	5	1	4	0	0	10
Dead	0	3	8	1	1	0	13

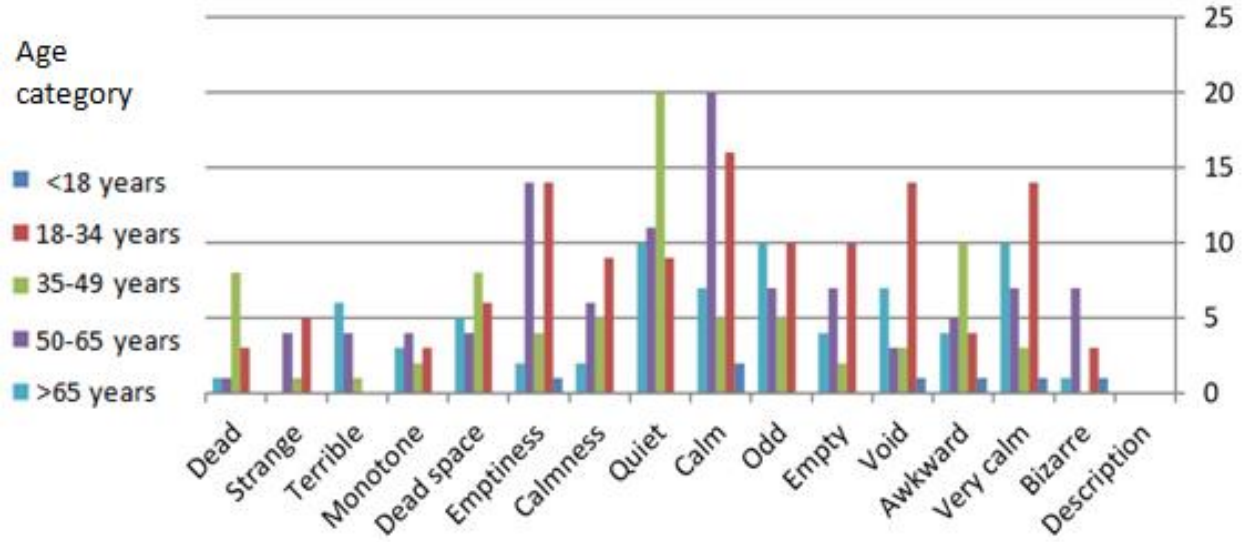

Fig. 8. Graphs describing the urban environment during lockdown based on age category.

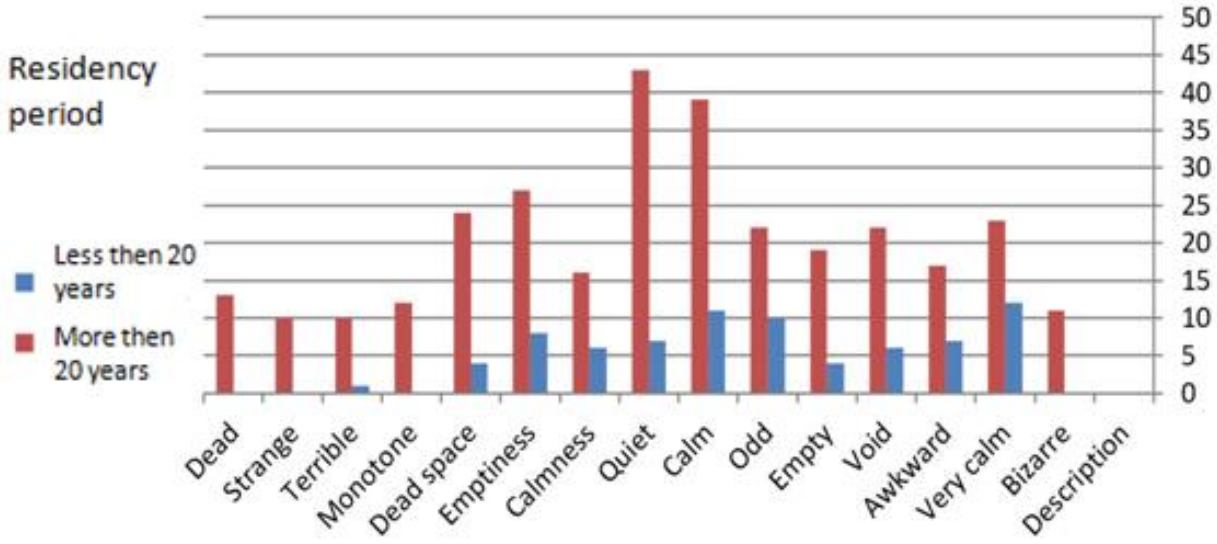

Fig. 9. Graphs describing the urban environment during lockdown based on residence period.

The evaluation of the degree of change in satisfaction levels with the acoustic ambiance before and during the lockdown period, along with the satisfaction levels themselves, reveals intriguing patterns. Using a Likert scale question, a significant majority of participants (72%) rated the changes in acoustic ambiance as "very different" between the two periods, indicating a complex array of experiences and perceptions. Additionally, 26% perceived the changes as "different," while 2.5% perceived them as "normal." The options "not very different" and "not different at all" received 0% each (Fig. 10).

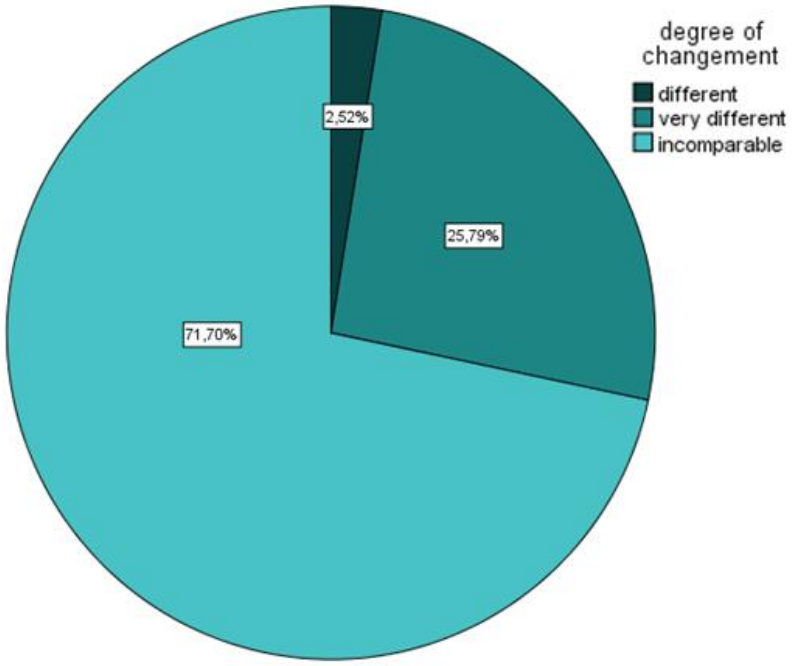

Fig. 10. The degree of change in acoustic ambiance satisfaction levels before and during the lockdown period.

The results underscore the diverse range of experiences individuals had regarding the acoustic ambiance before and during the lockdown. For this question, we used a Likert scale. Before the lockdown, (39.62%) of participants found the ambiance "dissatisfactory," (25.1%) found it "very dissatisfactory," (15.72%) were "neutral," (15.09%) were "satisfied," and (4.40%) were "very satisfied" (Fig. 11).

Meanwhile, after the lockdown, (23.27%) of participants found the ambiance "dissatisfactory," (5.66%) found it "very dissatisfactory," (23.27%) were "neutral," (31.45%) were "satisfied," and (16.35%) were "very satisfied" (Fig. 12).

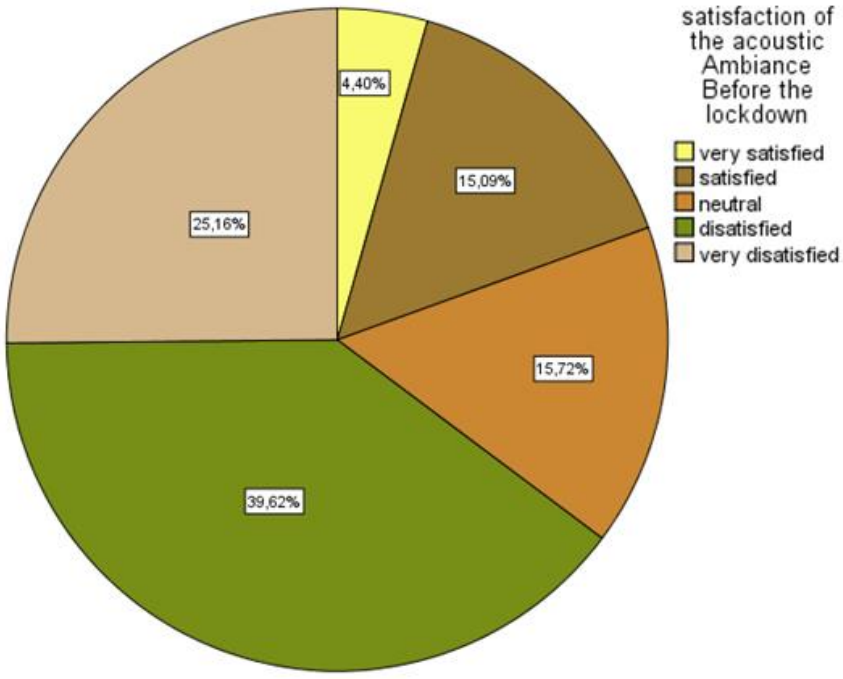

Fig. 11. The satisfaction of the acoustic ambiance before the lockdown.

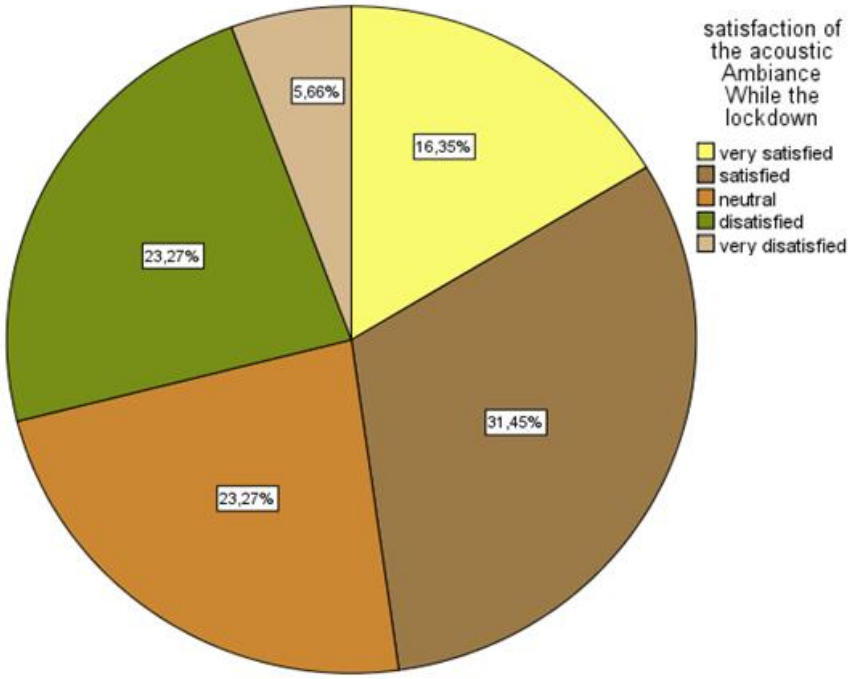

Fig. 12. The satisfaction of the acoustic ambiance during the lockdown.

The analysis of the questionnaire results indicates that long-term residentsshowed a broader range of responses, including higher levels of satisfaction and neutrality, compared to shorter-term residents. Middle-aged and older respondents reported higher satisfaction levels than younger respondents, suggesting that age influenced perceptions of the acoustic ambiance (Fig. 13 and 14).

In contrast, during the lockdown, long-term residents were more neutral and dissatisfied, with middle-aged respondents being more satisfied than older respondents, who were more dissatisfied. This shift highlights changes in how different demographic groups experienced the acoustic environment during the lockdown (Fig. 15 and 16).

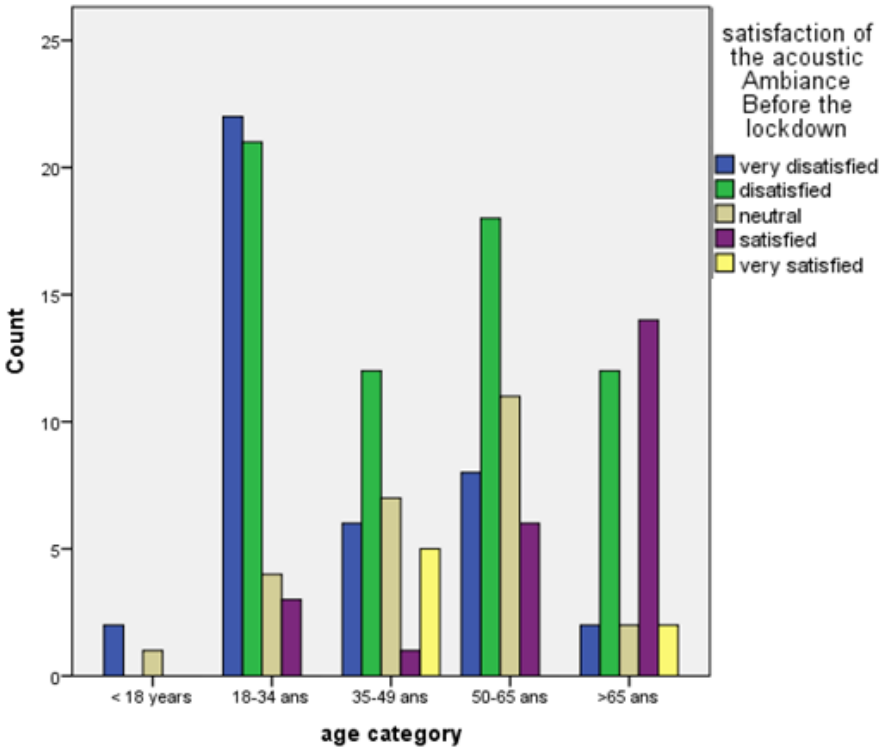

Fig. 13. The satisfaction of the acoustic ambiance before the lockdown based on age category.

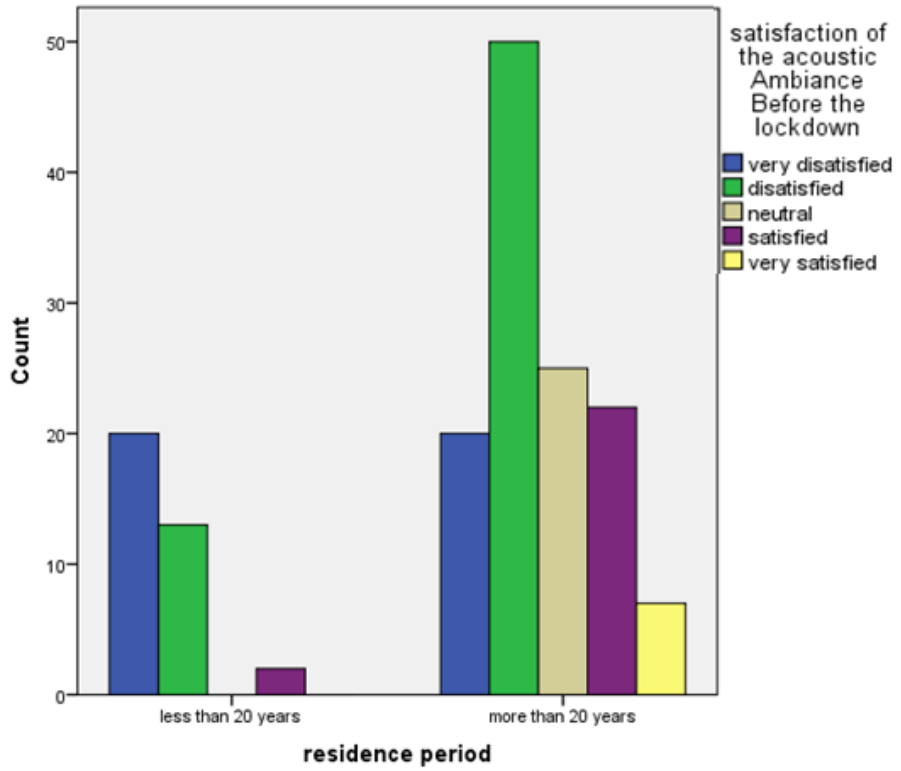

Fig. 14. *The satisfaction of the acoustic ambiance before the lockdown based on residence period.*

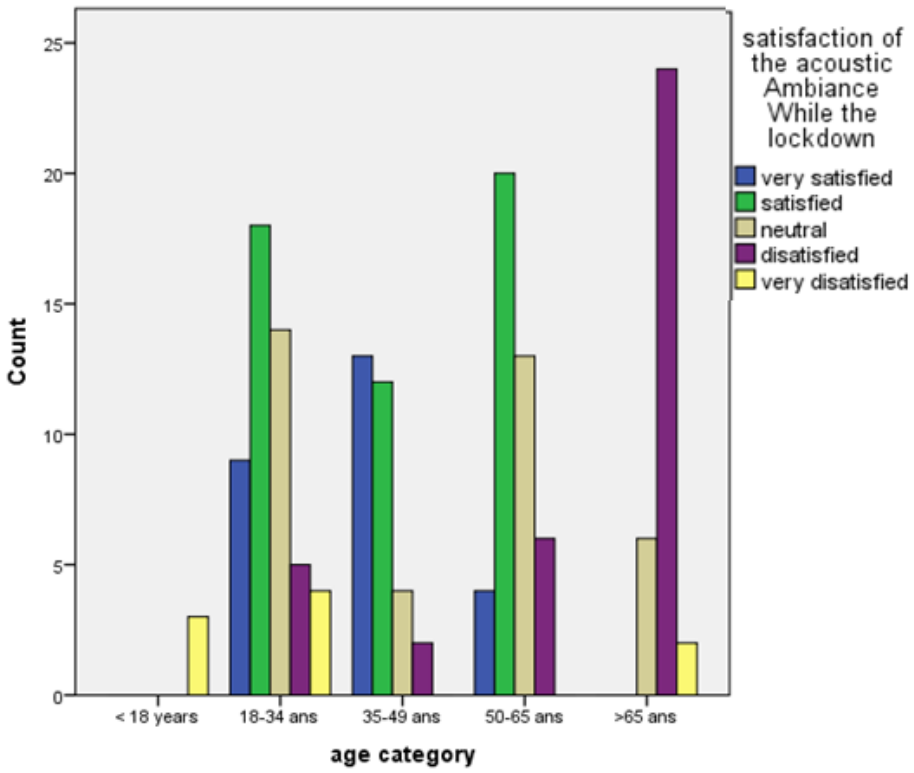

Fig. 15. The satisfaction of the acoustic ambiance while the lockdown based on age category.

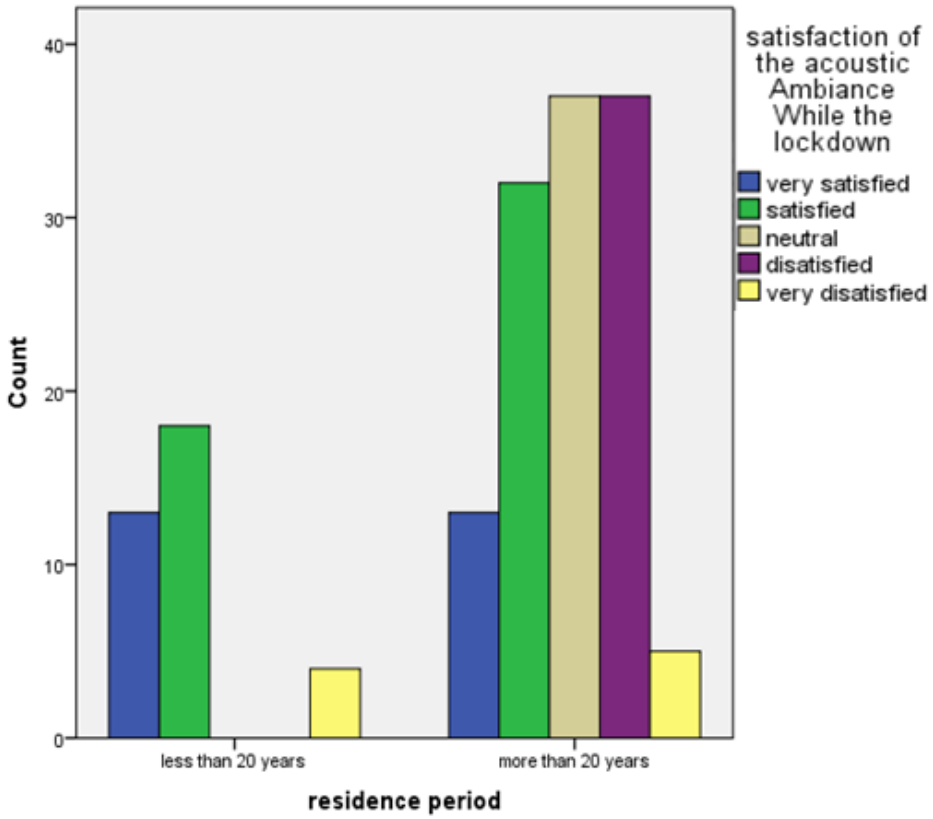

Fig. 16. The satisfaction of the acoustic ambiance while the lockdown based on residence period.

The residents of Didouche Mourad Street during the COVID-19 lockdown had markedly polarized experiences regarding the sound environment. The majority expressed negative sentiments, describing the atmosphere as an "interminable night," a "ghost town," and "like living in ruins." Some felt an overwhelming silence", leading them to constantly keep the TV on for company, or feared the unusual calm. In contrast, a minority of residents found the period remarkably positive, with some stating it was the "best time of their lives" and expressing a desire for another total lockdown. They felt more comfortable at home, enjoyed the peace, and finally found the quiet conducive to studying or relaxing. Some even appreciated the newfound ability to hear each other clearly, highlighting a significant shift from the usual noise.

These detailed descriptive statistics lay the foundation for a nuanced exploration of participant demographics and key variables, offering valuable insights into the characteristics of the sample and setting the stage for subsequent inferential analyses.

The study encountered several limitations that warrant consideration. Firstly, the direct administration of the questionnaire proved time-intensive, spanning four months, potentially impacting the dynamic nature of participant responses. Additionally, despite efforts to foster collaboration, engagement levels varied, potentially influencing the depth of qualitative insights. The COVID-19 lockdown further posed challenges, restricting the use of certain measurement devices during total lockdown periods. This limitation may have affected data comprehensiveness, particularly in areas requiring real-time monitoring. Furthermore, inherent biases in self-reported data and the context-specific nature of the study's findings suggest caution in generalizing results to diverse populations.

5. Discussion.

The descriptive statistics in this study provide a rich foundation for understanding the demographic profile and key variables among the participants, revealing significant insights into their experiences and perceptions of the acoustic ambiance before and during the COVID-19 lockdown.

- Demographic Diversity and Residential Duration : The diverse age distribution among participants (ranging from under 18 to over 65 years) and the variability in their duration of residence (from 2 to over 20 years) suggest a heterogeneous sample. This diversity is crucial as it implies that the findings reflect a wide

range of experiences and familiarity with the residential environment. Such a varied sample enhances the generalizability of the results within similar urban settings, although it may also introduce variability in responses due to differing personal and contextual backgrounds.

- Pre-Lockdown Environmental Perceptions : Before the lockdown, descriptors like 'noisy,' 'polluted,' and 'crowded' were prevalent, reflecting widespread dissatisfaction with the urban environment. These terms, which highlight specific "sound-marks" of the city, are indicative of common urban issues that affect residents' quality of life. The high percentage of participants using these descriptors underscores the challenges urban planners and policymakers face in addressing environmental concerns in densely populated areas.
- Lockdown Acoustic Environment Changes: During the lockdown, descriptors shifted dramatically to 'calm,' 'quiet,' and 'void.' This significant change highlights the impact of reduced human activity on the absence of the usual sound-marks. The lockdown provided a unique opportunity to observe how decreased noise pollution could alter residents' perceptions of their environment. The high percentage of participants noting the acoustic changes as "incomparable" or "very different" underscores the profound shift experienced during this period.
- Satisfaction with Acoustic Ambiance : The analysis of satisfaction levels revealed polarized experiences. Before the lockdown, a substantial proportion of participants were dissatisfied with the acoustic ambiance. Long-term residents showed higher satisfaction levels, while middle-aged and older respondents were generally more satisfied compared to younger participants. During the lockdown, satisfaction increased notably, with some participants expressing high satisfaction levels, suggesting that the quieter environment was a positive change for many. However, the presence of dissatisfied and neutral responses even during the lockdown indicates that while some appreciated the calm, others struggled with the silence or found it unsettling.
- Polarized Experiences: The qualitative data adds depth to the quantitative findings, illustrating the polarized nature of residents' experiences. While some found the lockdown period to be extremely negative, describing it as an "interminable night" or "ghost town," others experienced it as a positive and peaceful time. The absence of usual sound-marks contributed significantly to these perceptions. Middle-aged respondents were more satisfied than older respondents during the lockdown, highlighting the subjective nature of environmental perception and the varying adaptability of individuals to sudden changes in their surroundings. This polarization underscores the complexity of human responses to environmental shifts and the importance of considering demographic factors in urban planning.

These detailed descriptive statistics lay the foundation for a nuanced exploration of participant demographics and key variables, offering valuable insights into the characteristics of the sample and setting the stage for subsequent inferential analyses.

6. Conclusions.

In conclusion, this study provides valuable insights into the impact of the COVID-19 lockdown on urban acoustic ambiance and residents' perceptions. The descriptive statistics highlight the diverse experiences of participants, influenced by their demographic backgrounds and pre-existing environmental conditions. While the lockdown brought about significant changes in the acoustic environment, including the absence of familiar sound-marks, leading to increased satisfaction for some, it also exposed the complexities of urban living and the varied responses of individuals to environmental changes.

However, it is crucial to interpret these findings within the context of the study's acknowledged limitations. A notable challenge in this study is the lack of comparable references employing similar methodologies. The unique circumstances of the COVID-19 lockdown and the specific focus on urban acoustic ambiance create a context that is not widely studied in existing literature. This scarcity of comparable studies limits the ability to contextualize our findings within a broader research framework, making it difficult to draw parallels or contrasts with previous work.

Several other limitations were identified in the study. The time-intensive nature of questionnaire administration could have affected participant responses due to changes in their perceptions over the four-month period. Variations in engagement levels and the restriction of measurement tools during the lockdown also posed challenges, potentially impacting the comprehensiveness of the data. Additionally, the reliance on self-reported data introduces inherent biases, and the context-specific nature of the findings limits the generalizability to broader populations.

Despite these limitations, the study offers a comprehensive overview of how significant reductions in urban noise pollution and the absence of usual sound-markscan alter residents' experiences and perceptions. These insights are crucial for urban planners and policymakers aiming to create more livable urban

environments that accommodate the diverse preferences and needs of their populations. The findings emphasize the importance of considering the dual impact of the altered acoustic environment on well-being, identity, and perception of urban spaces, as demonstrated by the experiences of Didouche street's residents during the pandemic. Balancing the positive and negative consequences of such changes is essential for sustainable urban living. This study's objective—to examine how the absence of the customary sound-mark in Didouche Mourad Street influenced residents' capacity to recognize and relate to their urban space—underscores the critical role of sound-mark in shaping urban identity and connection.

Funding: This research received no external funding.

Informed Consent Statement: Verbal consent was obtained rather than written due to the sociocultural diversity of the participants, many of whom did not fully understand the questionnaire, which was prepared in a foreign language. To ensure comprehension, we provided oral explanations of the consent statement and the questionnaire's contents, allowing participants to ask questions and clarify before giving their consent to participate.

Institutional Review Board Statement: This study involves non-interventional research and does not require ethical approval under the regulations of Algeria. Participants in this research were fully informed about the study's purpose, assured of their anonymity, and were made aware of how their data would be used. There were no foreseeable risks involved for participants. However, the research was conducted in alignment with the general ethical principles of informed consent, data privacy, and respect for participants.

Acknowledgments: We extend our sincere gratitude to the editors and reviewers for their invaluable feedback and guidance. Special thanks to all participants for completing the questionnaire, sharing their experiences, and making this research possible.

Conflicts of Interest: The authors declare no conflicts of interest.

REFERENCES

1. Aletta, F., Kang, J., & Axelsson, Ö. (2016). Soundscape descriptors and a conceptual framework for developing predictive soundscape models. *Landscape and Urban Planning, 149*, 65-74.
2. Aletta, F., & Osborn, D. (2020). The COVID-19 global challenge and its implications for the environment–what we are learning. *UCL Open Environment, 2*.
3. Axelsson, Ö. (2015). How to measure soundscape quality. In *Proceedings of the Euronoise 2015 Conference* (pp. 1477-1481).
4. Badjadja, A. (2008). *Etudes archivistiques et historiques sur Constantine.* Paris: Editions de la Société des Ecrivains.
5. Balaÿ, O. (2003). Les chorographies de l'urbanité sonore. *Géocarrefour*, *78*(2), 159-165.
6. Bazant, J. (1998). *Manuel d'aménagement urbain.* Seuils.
7. Bazant, J. (2009). *Espacios urbanosos: historia, teoría y diseño.* Editorial Limusa.
8. Ben Hadj Salem, M., & Chtara, C. (2018). Le paysage sonore comme révélateur de l'esprit du lieu: une sécrétion latente. *VertigO - la revue électronique en sciences de l'environnement, 18*.
9. Berglund, B., & Nilsson, M. E. (2006). On a tool for measuring soundscape quality in urban residential areas. *Acta Acustica United with Acustica, 92*, 938-944.
10. Bonesio, L. (2001). *Paysage et sens du lieu. Éléments, le localisme, une réponse à la mondialisation.*
11. Borja, J. (2003). *La ciudad conquistada.* Alianza Editorial Sa.
12. Botteldooren, D., De Coensel, B., & De Muer, T. (2006). The temporal structure of urban soundscapes. *Journal of Sound and Vibration, 292*(1), 105-123.
13. Brambilla, G., & Fiebig, A. (2023). Measurements and techniques in soundscape research. In *Soundscapes: Humans and Their Acoustic Environment.* Springer.
14. Erfanian, M., Mitchell, A., Aletta, F., & Kang, J. (2020). Psychological well-being, age and gender can mediate soundscapes pleasantness and eventfulness: A large sample study. *bioRxiv*, 2020.10.16.341834.
15. Farina, A. (2014). *Soundscape ecology.* Dordrecht, NL: Springer.
16. Farina, A., James, P., Bobryk, C., Pieretti, N., Lattanzi, E., & McWilliam, J. (2014). Low cost (audio) recording (LCR) for advancing soundscape ecology towards the conservation of sonic complexity and biodiversity in natural and urban landscapes. *Urban Ecosystems, 17*(4), 923-944.
17. Fezzai, S. (2018). La configuration urbaine comme outil d'orientation des comportements: Cas d'étude des transformations urbaines dans la vieille ville de Constantine (Master's thesis, Université Mohamed Khider Biskra, Algeria).
18. Hamidouche, M. (2020). COVID-19 epidemic in Algeria: Assessment of the implemented preventive strategy. *medRxiv*, 2020-04.
19. Khenoucha, T. (2010). De la permanence et du changement dans la genèse de l'espace public de la vieille ville de Constantine. *Sciences & Technologie D. Sciences de la Terre*, 15-24.

20. Lercher, P., & Dzhambov, A. M. (2023). Soundscape and health. In *Soundscapes: Humans and their Acoustic Environment.* Springer.
21. Li, C., Liu, Y., & Haklay, M. (2018). Participatory soundscape sensing. *Landscape and Urban Planning, 173*, 64-69.
22. Mariétan, P. (2005). *L'environnement sonore: approche sensible, concepts, modes de représentation.* Champ Social Editions.
23. Porteous, J. D., & Mastin, J. F. (1985). Soundscape. *Journal of Architectural and Planning Research*, 169-186.
24. Schäfer, R. M. (1993). *The soundscape: Our sonic environment and the tuning of the world.* Simon and Schuster.
25. Semidor, C. (2004). How to validate the urban soundscape. In *Proc. DAGA-CFA.*
26. Semidor, C. (2006). Le paysage sonore de la rue comme élément d'identité urbaine. *Flux, 4*, 120-126.
27. Stockwell, S., Trott, M., Tully, M., Shin, J., Barnett, Y., Butler, L., McDermott, D., Schuch, F., & Smith, L. (2021). Changes in physical activity and sedentary behaviours from before to during the COVID-19 pandemic lockdown: a systematic review. *BMJ Open Sport & Exercise Medicine*, *7*(1), e000960.
28. Vogel, C. (1999). Etude sémiotique et acoustique de l'identification des signaux sonores d'avertissement en contexte urbain (Doctoral dissertation, Université Paris VI).
29. Zanke, A. A., Thenge, R. R., & Adhao, V. S. (2020). COVID-19: A pandemic declared by the World Health Organization. *IP International Journal of Comprehensive and Advanced Pharmacology*, *5*(2), 49-57.