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LINGUISTIC REPRESENTATIONS OF SOUNDSCAPES: PERCEPTIONS AND DESCRIPTIONS IN URBAN AND MOUNTAIN CONTEXTS IN TRENTINO-SOUTH TYROL

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ABSTRACT

Linguistic studies on soundscapes—the mix of natural and human-made sounds as perceived by people in context—have rarely focused on evaluations in mountainous as opposed to non-urban areas. This research investigates how residents of Trentino, a sparsely populated mountainous region in Northern Italy, perceive and describe both their current and ideal soundscapes. Drawing on an open-ended questionnaire inspired by Guastavino (2006)—which explored perceptions of urban sound quality through interviews in three French cities—this study collected responses from 68 participants: 31 from mountain areas and 37 from urban areas. The findings reveal qualitative differences in how soundscapes are described, with particular emphasis placed here on the ideal soundscape. The two groups diverge in how they characterize specific categories of sounds, especially those produced by other people. Such sounds are evaluated more positively by urban residents than by their mountain counterpart. Notable differences also emerge in the way natural sounds are described: urban participants more frequently reference 'leaves', while those from mountain areas tend to emphasize the 'wind' element. Compared to the French sample, respondents from Trentino appear to idealize natural soundscapes more strongly and make fewer negative comments about their acoustic environment. Interestingly, both groups exhibit signs of urbanophobia—a tendency to reject urban life and view urban behaviors as more disruptive.

Keywords: *Soundscape, Cognitive Linguistics, Alps*

1. INTRODUCTION

The aim of this work is to understand the qualitative and quantitative similarities and differences in how people from mountain and urban contexts describe the ideal soundscape. This paper focuses on the concept of soundscape, which has prompted the use of a Cognitive Linguistics approach for several reasons: studies on this subject in the linguistic field are predominantly cognitive, starting with the reference paper by Guastavino [1]; the description of the soundscape inherently involves an analysis of perception, highlighting how individuals interpret and give meaning to auditory experiences; there is a lack of specific studies in Italian on both this topic and on the region Trentino-South Tyrol under investigation; the method of linguistic data collection and analysis adopted in this study facilitates a linguistic, cultural, and experiential explanation of the use of a given concept or idiomatic phrase, beginning with qualitative data and followed by statistical data, without

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the need for the creation of a mathematical model to substantiate its existence. The chosen research method is based on the open-ended questionnaire formulated by Guastavino [1], with slight modifications. In contrast to questionnaires adhering to ISO 12913 standards, the spontaneous responses from participants allow for the collection of richer qualitative, linguistic, and thematic data. Qualitative analysis plays a central role in this research, as it facilitates a deeper understanding of individual perceptions and experiences related to the soundscape. Indeed, the qualitative approach captures nuances that quantitative data may overlook, especially in a complex context like Trentino, where there is a strong sense of belonging and influence from the dialectal linguistic component, as well as from the three minority languages protected at the provincial level (Ladin, Mòcheno, and Cimbrian), whose characteristics we are not able to explore in greater detail here. The following paragraphs will present the questionnaire, the methods, and the results, organized by thematic areas or environments that emerged from the interviews.

2. METHODS

The study is based on the free and spontaneous responses to the questionnaire derived from Guastavino [1], translated in italian and given by 68 participants—31 from the mountain group and 37 from the urban group. The mountain context refers to areas located above 700 meters above sea level and with a population below 3,000 inhabitants. The slight modifications made to the administered questionnaire shift the focus from the urban soundscape to the one experienced by the interviewees, creating a context that differs significantly from that of French cities.

2.1 Questionnaire

The proposed questionnaire was entirely derived from Guastavino's study [1] on the analysis of the soundscape in three French cities. As a result, the adjective ‘urban’ was removed from questions 1, 2, 3, and 4, while the phrase ‘non-urban’ was added to question 5. In question 4, the singular form ‘environment’ was retained in Italian, as using plural the plural would have required additional clarification (e.g., ‘Which environments?’).
The following are the questionnaire questions in English:

1. According to you, what would be the ideal soundscape?
2. In your sonic environment, what do you find pleasant/unpleasant?
3. In your sonic environment, are there high-pitched/low-pitched sounds? If so, describe them.
4. Do you perceive background noise in environments? If so, under which circumstances? How would you describe it?
5. In non-urban and urban areas, are you sensitive to transportation noise? Describe its characteristics.

No additional data were collected regarding gender, age, or place of residence or domicile. All this information was requested informally to assess the candidate's eligibility. This article will examine only the responses to the first question, which concerns the ideal soundscape.

2.2 Partecipants

A total of 68 individuals were interviewed, divided into 31 from mountain areas and 37 from urban areas. The mountain context refers to areas located above 700 meters above sea level and with a population below 3,000 inhabitants. Their ages ranged from 18 to 66 years. Among them, 12 were students and professors from the University of Trento, while affiliations with other universities were not recorded. All interviews were conducted within the Autonomous Province of Trento, in the municipalities of Trento, Altopiano della Vigolana, Levico Terme, Caldonazzo, Pergine Valsugana, Fierozzo, and Palú del Fèrsina.

2.3 Analysis

During the analysis, all variations of the same word, as well as synonyms and etymologically related words, were recorded separately but grouped into the same category in the graphs [Figure 1-3]. These graphs also include individual semantically relevant occurrences. The two groups were analyzed separately to determine whether there were differences in perception and description. The analysis conducted is psycholinguistic, starting with qualitative data, derived from the participants' mental and cognitive representations of the soundscape. After listening to the recordings twice and reviewing the transcripts, following Guastavino [1], occurrences were manually counted and categorized, with some categories added or removed compared to the original study. A thematic analysis was then conducted following Braun & Clarke [3], a method for identifying and interpreting patterns of meaning across data. This approach helped explore shared experiences related to the research questions. Both inductive (data-driven) and deductive (theory-driven) strategies were used to develop themes. This method involves re-reading interviews to identify emerging themes, providing insights

beyond individual term frequencies. Fisher's exact test was performed to assess differences between proportions of the categories (i.e., positive vs negative judgments) in two group variables (mountain vs urban samples). Analyses were performed in SPSS (version 30.0). The significance threshold was set at 0.05.

3. RESULTS

The following chapters will examine the individual thematic areas that emerged in the responses concerning the ideal soundscape (question 1).

3.1 The ideal soundscape

The description of the ideal soundscape was framed either negatively, by outlining the elements one wishes to avoid, or positively, by specifying which elements may or may not be present in one's sonic environment. The lack of specification for an "urban" soundscape allows for a greater variety of environments and expands the range of possible sound sources. When given the freedom to describe an ideal soundscape, 93.5% of respondents from the mountain group chose an environment featuring one or more natural sound sources, compared to 91.9% of the urban group. However, a similarity between Guastavino's study (2006) and the present study emerges in the percentage of responses describing a sound object versus those describing a soundscape: 74% of responses describe a sound object, while 26% describe the ideal soundscape in the mountain group. 76% describe a sound object, while 24% describe the ideal soundscape in the urban group. The total percentage across both groups is thus 75% for sound objects and 25% for soundscape descriptions. Question 1 shifts the focus towards the natural environment. As seen in Figure 1, there is a strong preference for the "Nature" category: 58% (n = 18) of the mountain group express a general preference for a natural soundscape, as does 35.1% (n = 13) of the urban group. Among them, only one respondent from the mountain group (3.2%) explicitly prefers the natural landscape in general, while all others mention both the general environment and specific natural elements. 35.5% (n = 11) of the mountain group refer exclusively to natural elements, compared to 56.8% (n = 21) of the urban group. 6.5% (n = 2) of the mountain group and 8.1% (n = 3) of the urban group do not mention nature at all. However, differences between the two groups in mentioning general nature, specific natural elements, both, or not mentioning nature at all, were not substantiated by statistical significance ($p = 0.187$).

3.2 Nature

The term "Nature" appears 18 times in the mountain group and 13 times in the urban group, used either: as a place ("surrounded by nature", "in nature"), as an object of a statement ("I love nature," "anything related to nature"), or most commonly, as a specifier ("background," "sounds," "noises" of nature). Other related terms include: 'Natural' (10 mountain, 7 urban), 'Naturalistic' (2 urban). This variety suggests that respondents attribute a complex and multifaceted meaning to nature, beyond merely referring to a physical space. The concept of "nature" is deeply rooted in personal perception and aspirations, likely associated with tranquility, balance, and connection with the environment (see Figure 1). The use of these terms may indicate that respondents value not only the physical aspect of nature but also its authentic and unspoiled characteristics, suggesting a preference for genuine experiences free from artificial elements. This is further emphasized by negative statements related to the concept of "anthropogenic" influence, implying human impact on the environment: "Free from noise caused by human activities… less human interference," "not too urbanized", "fewer anthropogenic sounds". Similarly, the term "pollution" carries a negative connotation: "Less polluted", "I would avoid… sound pollution". Notably, all these responses come from participants in an urban context.

3.3 Forest, woods and trees

The second most common environmental reference is: "woods"-"forests"-"wooded" (29% mountain, 30% urban), "forest" (0% mountain, 8% urban). Although "woods" and "forest" are often used as synonyms (1 case in the urban group), they differ in scale and human intervention: a "wood" is smaller and managed by humans; a "forest" is larger and less disturbed by human activity. Interestingly, "forest" is absent from mountain-group responses, despite the greater presence of wooded areas in those regions. Conversely, urban respondents idealize forests more often, possibly due to a more

abstract, romanticized view of natural spaces. Through metonymy,[1] respondents also refer to:

"trees" (16% mountain, 11% urban), "leaf"-"leaves" (6% mountain, 27% urban). This metonymic shift—from a whole ecosystem (forest) to its parts (trees, leaves)—illustrates how concepts expand semantically, reflecting how people perceive and structure their experiences. The use of "trees" and "leaves" to refer to "woods" or "forests" suggests a holistic view of the natural environment. Several factors may explain the higher reference to "leaves" in the urban group: (i) Deciduous trees are more common in urban areas, while mountain forests at higher altitudes have a lower proportion of them (see forest types in Trentino [4]); (ii) Differences in ground moisture retention: In forests, moisture is retained by the soil, whereas in urban settings, leaves on paved surfaces dry out and become noisier when stepped on; (iii) Perceived rarity of the sound in urban settings: due to frequent street cleaning in cities, the sound of dry leaves is less common, making it more desirable compared to a regular hiker who often experiences this sound on mountain trails. In summary, the sound produced by stepping on leaves is more noticeable in urban contexts, where asphalt or rigid pavement amplifies the noise. Although leaves are less common in cities, they are still perceived as pleasant and are thus conceptually shifted from the experienced place to the ideal place. This association aligns with the concept of embodiment [5], a central idea in Cognitive Linguistics, which posits that language is rooted in bodily and sensory experience. The heightened perception of rustling leaves in urban environments—where this sound is less frequent and therefore more appreciated—demonstrates how sensory experiences influence the categorization and preference for certain soundscapes. One could also conclude that this phenomenon reflects the human tendency to idealize pleasant sensory stimuli and conceptually transfer them between different contexts.

3.4 Mountain

The third environment is the "mountain, mentioned by 27% of the mountain group and 35% of the urban group. However, 8% of the urban group refers to it in relation to other elements rather than as a preference, balancing the percentage between the two groups. Notably, only in the urban context (8%) is the mountain explicitly linked to the verb "to walk". This suggests that high-altitude hiking is idealized by those who do not experience it daily but seek it out, even for its soundscape.

3.5 Sea

The fourth and final environment is the "sea" – "marine landscape", described by 13% of the mountain group and 5% of the urban group. More than half of the respondents simultaneously mention the "sound of the waves" (notably, they never use the word "sound" for the sea, only "noise"), indicating a strong relationship between context (frame) and sound object (domain). This is demonstrated by the fact that descriptions consistently follow the sequence "sea" → "waves". This pattern suggests that respondents have a well-defined mental representation of the marine landscape, where the sound of the waves is an essential feature spontaneously associated with the sea. Additionally, in the urban group, the word "seagulls" is included in this sequence ("The sea, I like the noise of the waves… and the seagulls…"; "the noise of the sea… the seagulls"), whereas this element is absent in the mountain group. Only in one case from the mountain group is the "lake" mentioned alongside the sea, marking the only occurrence of this reference across all responses—despite Trentino having several alpine and non-alpine lakes.

3.6 Leaves, wind, rustling and other vehicles

The majority of respondents do not distinguish between "sound" and "noise", with the latter being used interchangeably in three cases by three different participants ("the noises of nature… the sound of birds"; "the noise of birds… the sounds of nature… the noise of the sea"; "the sound of nature… the noise of water or birds"). Italian also lacks a rich auditory lexicon compared to its vocabulary for visual perception. One of the few purely auditory nouns is "rustling", which appears in 6% of the mountain group and 11% of the urban group. This term was incorporated into the "Wind" category, which itself is much more frequently mentioned (35% mountain, 16% urban). In Figure 3, "rustling" was merged into the "Wind" category and counted as a single occurrence when

[1] Metonymy is a figure of speech in which one word or phrase is substituted for another with which it is closely associated, often based on a part-whole or cause-effect relationship.

both terms appeared in the same description. There are also statistically significant results on the quantitative side. Positive judgments regarding the "Leaves," "Wind," and "Rustling" categories do not follow the same multinomial probability distribution within the population ($p = 0.046$). The observed frequencies and percentages of sounds judged positively in both groups are presented in Table 1. For the "Other Vehicles" category (Figure 1), the only other category with enough data for Fisher's exact test, the two multinomial probability distributions are identical ($p = 1.000$). The mountain group rated "Other Vehicles" positively (n = 1, 50.0%, vs. n = 2, 25.0%), whereas the urban group was more critical (n = 3, 75.0%, vs. n = 1, 50.0%).

3.7 Other people

The relationship with "Other People" also reflects this trend: in the mountain context, there is only one negative occurrence, compared to three-quarters negative in the urban group. This highlights another aspect studied by Félonneau: the salience of incivility, which, in our case of urbanophobia, tends to overestimate uncivil behaviors in the city [2], as seen in references to "shouting," "human noises," and "market". This qualitative data is supported by the quantitative data (Figure 2). Eight participants from the mountain group perceive the sounds produced by "Other People" more positively (n = 7, 87.5% vs. n = 2, 25.0%) compared to the urban group, which instead perceives them more negatively (n = 6, 75.0% vs. n = 1, 12.5%). The two multinomial probability distributions were not equal between the two groups ($p = .041$).

3.8 Verbal descriptions

As already stated in Guastavino [1], this chapter analyzes the verbal descriptions (39 in total—16 from the mountain group and 23 from the urban group) that refer to the soundscape as a whole. Most of the descriptions (77% of the total) are based on complex phrasings rather than single adjectives (23%). The categories emerged from the thematic analysis of the interview responses to Question 1. Compared to Guastavino [1], the categories "Animation" and "Non-aggressiveness" are absent, while "Balance" and "Non-Intrusive" are instead present. The category of "Tranquillity" emerges as the most prevalent and is distinguished by its comprehensive lexical range, encompassing adjectives ("calm", "quiet", "relaxing"), nouns ("relaxation", "tranquillity", "calm", "peace"), and verbs ("to relax", "to soothe"). The "Non-Intrusive" category is described as one where sounds do not provoke stress, irritation, or distraction.—e.g., "without too many loud noises", "the concentration of a loud and annoying noise", "it doesn't have strong noises", "it doesn't jar your sensitivity and doesn't make you nervous". The "Balance" category includes detailed descriptions that weigh natural, anthropic, and mechanical elements, such as "a house in an environment that is not too anthropized, perhaps outside a small town surrounded by woods". The "Variability" category includes all descriptions that distinguish soundscapes based on mood or explicitly state it: "changeable and variable", "If I need to be energetic, I'd say rhythmic music, or if my goal is to relax or stay calm", "An ideal soundscape, I think, also depends a little on a person's momentary disposition". There were no statistically significant differences between the two groups. The two multinomial probability distributions were equal in the population ($p = 0.614$). The mountain group preferred a "quiet" soundscape (n = 9, 56.3% vs. n = 9, 39.1%), just like the urban group, which equally favored "non-intrusive" (n = 5, 21.7% vs. n = 4, 25.0%) and the "balance" between natural and anthropic sounds (n = 5, 21.7% vs. n = 2, 12.5%). Meanwhile, variability, which was the most preferred category in Guastavino [1], ranked last (n = 4, 17.4% vs. n = 1, 6.3%).

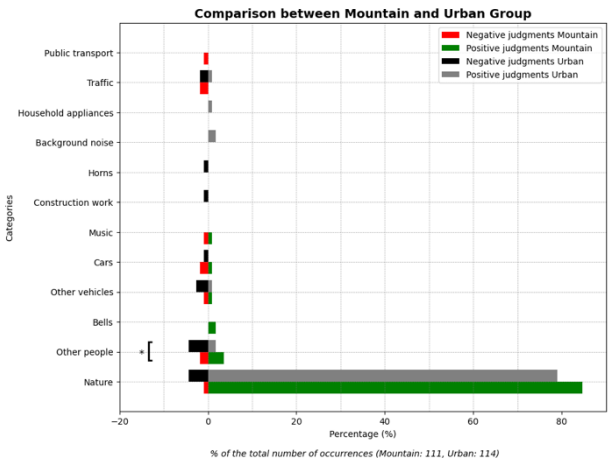

Figure 1. Categories of sound sources emerging from participants' spontaneous responses on the ideal soundscape (Question 1). *$p \leq 0.05$.

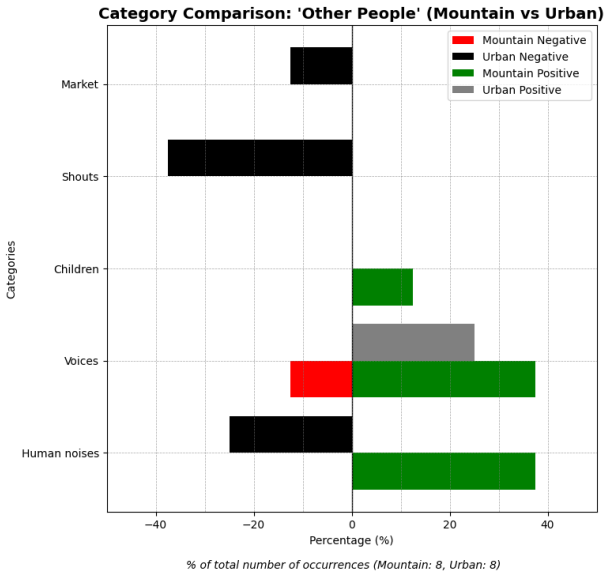

Figure 2. Subcategory of the main category “Other people” Figure 1 (Question 1).

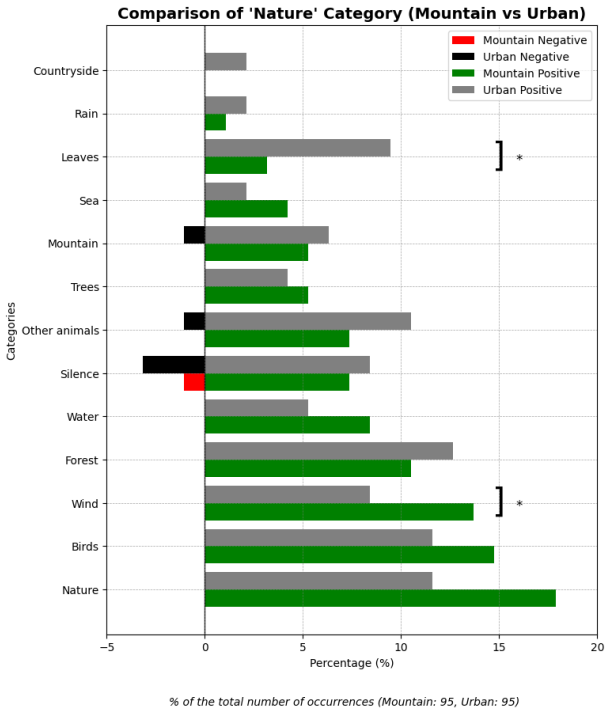

Figure 3. Subcategories of sound sources within the "Nature" category in Figure 1 (Question 1). *p ≤ 0.05.

4. DISCUSSION

This study investigates the ideal soundscape as perceived by residents of both urban and mountain areas within the Trentino region of Northern Italy. Compared to Guastavino’s work, notable differences emerge in both the positive and negative values associated with specific sound sources, as well as in the number and types of sources mentioned. In this study, natural elements are the most frequently cited, followed by sounds produced by other people. Music is mentioned explicitly, not through metonymy or as a byproduct of human activity. Silence is also directly referenced as a component of the soundscape, and tranquility emerges as the most valued feature among both urban and mountain residents. This stands in contrast to Guastavino’s findings, where silence was not "spontaneously evoked," and "variety" was the preferred criterion for assessing sound quality. The ideal soundscape described by interviewees from Trentino evokes predominantly natural environments—whether forested, mountainous, or marine—with mechanical sounds largely absent. Compared to Figure 3 in Guastavino [1], in Figure 3 the categories "Parks" and "Natural Elements" are absent. Instead, the categories "Leaves" and "Trees" have been added, which can be attributed to the "Natural Elements" category. Additionally, the categories "Sea," "Mountain," "Silence," "Forest," and "Nature" have been included, the latter indicating a general preference. In addition, in Figure 2 due to the limited data compared to Figure 2 in Guastavino (2006), the categories “Angry people” (≈ “Shouting”), “Cell phones,” “Footsteps,” “Neighbors,” and “Pedestrians” are missing. Interestingly, public transport is not evaluated positively, even in connection with issues such as air pollution. These results diverge from those of the reference study [1], likely due to the region’s low level of anthropization and the abundance of green spaces and nature-based recreational activities. However, the similarities between the two studies reinforce the idea that natural sounds are generally rated more positively than mechanical ones, and that participants tend to describe their ideal soundscape through the specific sources of sounds rather than offering a global or abstract description. If we look at Figure 1 compared to the chart in Figure 1 of Guastavino [1], the categories “Electric vehicles” and “Birds” (which falls under the broader “Nature” category) are missing, while the categories “Other vehicles” (heavy vehicles, tractors, etc., ≠ public transport) and “Household appliances” have been added. With regard to differences between urban and non-urban settings, some prior studies have used quantitative methods. For example, Zhang et al.

[6] found that rural inhabitants preferred listening to music, while urban residents favored the sound of birds. This pattern does not emerge in the present study: music is mentioned only by the mountain group—and both positively and negatively—while bird sounds are more frequently appreciated by mountain residents than by those in urban areas. Altitude does not appear to influence perception; rather, the degree of urbanization seems to play a more significant role, as noted in [7]. It is important to acknowledge certain limitations of this study: the time period in which data was collected (between November 2024 and January 2025); the relatively small sample size; the lack of demographic data such as gender, age, and education level; and the geographically narrow focus. Additionally, the interviews were not always conducted in controlled, neutral environments (such as a listening room); in 5.9% of cases, they took place outdoors or in participants' homes, residences, or study spaces—sometimes with other people present. Therefore, future studies conducted in more controlled settings and involving both subsamples may help to further validate and better interpret the findings presented here.

5. CONCLUSION

This study analyzed descriptions of the ideal soundscape provided by two non-homogeneous groups living in different environments—urban and mountain settings. The study was conducted in a mountainous region that is sparsely populated and urbanized, where demographic factors influence the perception of the soundscape. From a qualitative perspective, the mountain context is characterized by a conceptually well-established relationship between nature and humans, even in the description of sounds, as the ideal soundscape almost always coincides with the experienced one, whereas in the urban context, there is a stronger tendency to describe undesired sounds. According to participants opinion, the soundscape should provide an escape from mechanical noise, perceived more negatively, while still allowing for social interaction, though at a lower intensity. In summary, the two groups differ qualitatively in their descriptions of the soundscape, highlighting aspects related to personal experience and cultural background, whereas statistical differences are. Further studies should be conducted in other mountainous areas to understand whether the overall low population density affects the entire Alpine region both in the description and conceptualization of the soundscape, and what the impact of tourism is on the perception of the soundscape in rural areas with higher vs. lower visitation rates throughout the year. From a cognitive perspective, it would be valuable for future research to explore how moving between rural and urban environments affects soundscape perception—specifically, whether such a change influences perception, how quickly this occurs, and how long the effects last.

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