FORUM ACUSTICUM EURONOISE 2025

INTERVENTIONS AND ACOUSTIC NUANCES IN THE SOUNDWALKS WITH DAUMAL AND ISO 12913 METHODS IN ELCHE, CUENCA AND FARO

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ABSTRACT

When we daily take a Soundwalk with full visual control, there are aspects that go unnoticed. Carrying out a sound itinerary with the Daumal Method means for the participant to acquire a greater sound perception of the city. The participants intervene in teams of three people, made up of the blind person (whose vision is obstructed), the guide (who chooses the specific places within the programmed itinerary), and the notary (who writes down and verifies what the blind person comments. regarding the dynamic route and its stations). By alternating the roles with each other, this method has largely been shown to serve in a participatory way for the auditory education of the participants. If we add to this the Mastered action of a teacher who occasionally intervenes to make the group listen to the specific sound qualities of the spaces, shapes, materials and furniture that make up that itinerary, then the experience is unique. In the soundwalks developed in Elche, Cuenca and Faro, the Master has actively intervened, interfering with the different groups, and showing them other sound peculiarities of these cities. Therefore, the results of the Mastered method, through the surveys carried out, satisfy the participants much more.

Keywords: *soundwalk, Daumal method, ISO method, soundscape*

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1. INTRODUCTION

The Daumal method is initially designed for the group of three participants (blind, guide and notary) to follow the sound path following a previously programmed itinerary.
Normally, it is not necessary to receive any help or external intervention, and the group should be able to discover the adjectives and acoustic characteristics of the spaces as they advance through them. They should recognize the materials, textures and dimensions of the streets and squares. But of course, we are not used to relying exclusively on our ears, and when they take away our vision by placing a blindfold on us, we try to make up for this deficiency by resorting to what we know best: seeing spaces without knowing how to listen to them.
Therefore, it has been observed that many blindfolded participants do not seem to perceive the specific aspects, sonorous or not, of the city, and that it is possible when someone experienced accompanies them and shows it to them. For this reason, we think that it is often necessary the tutored or Mastered action of an expert external to the group, such as the "Master Snorer".
It has been precisely by applying this method, when the participants have been able to perceive, without seeing, many more sonorous aspects of the route that are related to the city and that went unnoticed. The recesses of a street and the auscultation of the railing of the footbridge over the Vinalopó river, all this in Elche, the protection grids of a construction site and the overhead cover on the covered walkway next to the hanging houses in Cuenca, the reinforced polyester street furniture and the fallen street lamp in Faro, are examples of how the participants broaden their knowledge of the acoustics of the city thanks to the intervention of the Maestro. We will discuss these specific cases.

In this way, with the Mastered action, the anecdotes are amplified and the sound experiences that are perceived of these cities are more enriching. This is demonstrated in the surveys conducted by the participants at the end of their tours.
This exhibition aims to break down each and every one of the experiences followed in the three congresses Tecniacústica 2022, 2023 and Acústica 2024 of Elche, Cuenca and Faro, which are intended to enrich the research, always with the aim of expanding the tools for the best sound perception of our environment. This is essential to be able to preserve it from the negative action of noise and preserve it in the case that can be considered Intangible Cultural Heritage Sound.
At the same time, it is expanded by exposing the experiences obtained with the ISO 12913 method in Faro. With the help of Sonia Antunes, it could be developed following the final itinerary that she designed for the city, since the initial approach through protected natural spaces was difficult to access.

2. SOUNDWALKS THROUGH ELCHE

The afternoon is hot. Asking a young participant, he replies that the fountain in the Plaza de la Glorieta, where we are, has seven waterspouts. He is right. We do not know if he had previously been to this square.
But a participant makes a healthy criticism about the route. It is the same that we have done with the group of mornings. "Master Snorer", influenced by what he experienced alone the day before, decides to vary the itinerary, diverting the route from the fountain to the Town Hall. Therefore, we pass through streets that no longer have the recesses that so much liked, in the morning walk, to the councilor, and we arrive at the Town Hall Square, where participants can observe a great overture sonorously speaking. They do not see the beautiful pavement, but discover that there is life of many kinds in the square. We have not been lucky enough to coincide with the chimes of the Town Hall, but there we make them enter that covered passage of the same, where they can hear a very high reverberation, and then access the metal sculptures outside and hit them with their knuckles discovering the characteristic sound of Corten steel.
Then we go down the stairs to reach the Pasarela del Mercat, arranged over the Vinalopó river, where we make the participants listen to the handrails. They discover the vibrations transmitted by this structure, the impacts of the jumps of passers-by, the thousand taps on the railings and crossbeams, and, the full range of sounds and vibrations that make up the life of this walkway.
Obviously, all this was not contemplated in the initial tour. MR feels bad for Dani, from HEAD-acoustics, who has left with his instruments following the same itinerary of the morning walk, but the fact is that "Master Snorer", as we will continue to see, always surprises us by altering the routes at his convenience.
Here we finish with the walk and the participants go on to fill in the survey, the results of which were offered at the Tecniacústica in Cuenca.

3. SOUNDWALK THROUGH CUENCA

The rain and the wind prevent a walk with the necessary comfort for hearing in the three scales of the soundscape: far, medium and near. The participants must protect themselves by putting on their hoods to protect themselves, and this cancels the listening of the sounds coming from the sides, as well as the zenithal and posterior hearing. However, we can still hear the sound of water entering the sewer gratings.
And also, when opening the umbrellas, the remaining participants have lost their zenithal hearing to be replaced by the background sound of the rain impacting on it.
In short, under these conditions, the "Master Snorer" decides to actively intervene by knocking on the grille of a repair work on one of the buildings along the route and asks them what it is that sounds. He also makes some metal scaffolding of that work sound, the handrails of the staircase leading to the passage of the hanging houses, emphasizing the differences in height in that passage from how the space returns the voice differently in each case. We also stopped to listen to a fountain, a wooden bench, which sounds like wood, the sign with the methacrylate cover, which sounds like that, methacrylate and not glass, the reflection of the stone wall, the bridge with metal handrail and wooden platform, the change of pavement material when we leave the asphalt and access the park. It all sounds despite raining and sometimes, almost flipping our umbrellas, and that is what participants can hear if conveniently shown to them. Some participants prefer to retrace their steps to hear more architectural elements or furnishings, such as the museum entrance, or a house under construction.

We do not ask them to take the surveys immediately, and we collect them, dry, afterwards, and present them at the Faro Acoustics congress.

4. SOUNDWALK THROUGH FARO

We begin the tour next to the AP Eva Senses Hotel. We've already formed the 10 participants into groups and briefed them on what to do. We noticed some were somewhat disoriented, so we're going to apply the Master method again.

The fiberglass-reinforced polyester sign is hollow, and when struck, it sounds obviously hollow, but with a low reverberation, indicating that it's not very large. The blind participants have difficulty recognizing the material. Advertising is already impossible. But they rule out metal, glass, or wood, and deduce that it's plastic. We're interested in helping them discover the different materials that appear in the city. We'll continue this at the start of the tour, listening to the port and the vehicles, which appear simultaneously, but in each ear. (Fig. 1)

Figure 1. Several participating teams begin the tour. Photography Acustica 24

A plane flies over us. Due to its low altitude, they discover its direction and whether it's approaching or receding. We inform them that it's heading toward the airport and is therefore about to land. They also discover the sounds of seagulls. Of course, we're in the port, and the splashing of water from a boat is clearly visible. They already know it's a very open space, because they saw it before starting the tour, but we guide them toward the old city. They're surprised by the cobblestones beneath their feet and the sound of a water fountain.

In Faro, we weren't able to conduct a preliminary inspection to compare the final itinerary that Sonia Antunes had so excellently prepared for us. For this reason, MR got up early and went along the marked path, entering the historic center to hear it with his own ears.

MR realized that there was too much walking through open spaces and decided to change it by entering the old town. The Arco da Vila is an ideal place to perceive the difference between exterior and interior, with the resulting presence and warmth of the reverberation and the focus of the upper vault. It also allows the blind person to experience the effect of false lateralization. The participants stand inside, listening to the space, trying to define its dimensions and materials. We stand outside on the other side of the small tunnel, hidden on one side from which we pronounce a few words, and the blind person perceives us as being on the other side, since the wall on that side acts as an acoustic mirror. (Fig. 2)

Figure 2. A group of participants passing under the Arco da Vida (Arch of Life). Photograph Acustica 24

We walk down the narrow, cobbled street of Do Municipio until we reach the Cathedral, where we listen to the resonances of its vestibule. In Fig. 3, we show a moment during the measurement performed by HEAD acoustics.

Figure 3. SQobold measurement and recording. Photography be HEAD acoustics at Acustica 24

There the groups change, and we head back outside through Porta Nova. We let them discover the changing reverberations, the nuances in the cobblestones, the sound of the train's arrival announcement (Fig. 4), the train itself, the voices of the people arriving by ferry, and the voice amplified by the PA system at a meeting on the wall.

Figure 4. Train crossing to the ferry terminal. Photograph by Daumal, F. at Acustica 24

It seems they're beginning to understand what the blind soundwalk is all about. When they reach the wooden huts, some guides guide the blind through them and step onto the wooden floorboards. They easily recognize the sound of wood, but they have no idea how precarious these structures are.

What's more difficult is knowing what a streetlight sounds like when it falls onto the pavement outside the entrance to the old city. We show it to them. The metal doesn't lie, and it's hollow. Of course, the section decreases in size as we walk along it, and this disorients the participants who can't see it.

Finally, along Castelo Street, we come to a sign made of stretched, laminated canvas, hanging on a facade. The canvas may not make much noise since it barely collects any wind that would force it to flap like a sail, but the sounds of the tensioners, when we pluck them like the strings of a guitar, are characteristic of the stress they're under.

We reached the end, Castelo Square. The blind people were completely disoriented. They removed their bandages. We took the surveys and took the final photograph. (Fig. 5). At the conference, Sonia and Francesc presented the routes they followed, and the results obtained, which are shown in Figure 6.

Figure 5. Participants in the Mastered Soundwalk. Photography at Acustica 24.

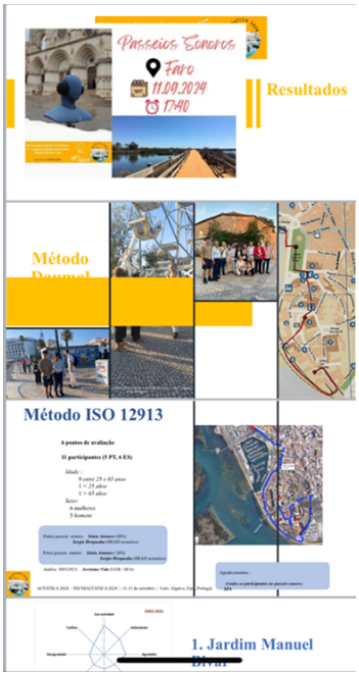

Figure 6. Antunes S. Presentation at the conference conclusions. Source: Antunes, S.

5. RESULTS OF THE FARO SURVEYS

Except for a few sections of the route, the itinerary can be described as fairly peaceful, with sound levels not too high, ranging between 44.12 and 57.74 dBA (SPL) for the L95(A).

Regarding the survey's scores, in order of highest rating, it corresponds to:

10 "The experience of being a blind person allows me to hear the city and its buildings better."

9.75 "The Daumal method has helped me with my auditory education." "I would recommend these soundwalks to my friends and family." "I am now more aware of the importance of the city's sounds." "After completing the soundwalk, I believe the sense of hearing is undervalued." "I would repeat this itinerary again blindfolded." It was noted that one participant repeated the experience in both Elche and Cuenca, as well as in Faro, and another participant repeated the experience in Elche and Faro.

8.75 "For training, an acoustic engineer should take a blind tour using this method."

8.5 "I think the City Council should create similar tours for each neighborhood in Faro."

8 "Blindfolded, you can better describe the acoustics of the spaces."

And the worst scores are 2.75 "I was very scared," so in general, it can be deduced that, with a few exceptions, the walk can be quite peaceful. At least that's what the participants' smiles convey when they're blindfolded. They also fail the question "Would you define the soundscape you heard as a musical symphony," contrary to the considerations of Hildegar Westerkamp and Murray Schafer about it.

As a final conclusion to the Daumal Mastered method, the participants, in their roles as blind person, guide, and auditor, being questioned at all times by the Master, are more active, better integrating with the acoustics of the architecture through which they are taking the tour, thus better recognizing the shapes, textures, and materials that comprise it.

6. ISO METHOD

The analysis of soundwalks according to the ISO methodology allows for the characterization of the perception of the acoustic climate in context at each evaluation point by calculating the Pleasantness and Eventfulness coordinates [P, E] in the ISO 12913 space. These coordinates are estimated from the eight dimensions of the perception model included in the ISO 12913-2 standard, incorporated as question Q2 in the opinion

questionnaire that each participant answered at points along the walk route.
The soundwalk through the city of FARO was carried out along a route with six evaluation points and six stops, as shown in Figure 7. The six points evaluated were the following:

P1. Jardim Manuel Bivar
P2. Faro
P3. Mirador Ría Formosa
P4. Largo de São Francisco Defensive Wall
P5. Arco de Repouso
P6. Catedral de Faro / Igreja de Santa María

Figure 7. Layout of the ISO soundwalk carried out in the city of FARO on 11.09.2024. Source: Antunes, S.

Since 11 people participated in the ISO soundwalk, a total of 66 responses were collected, 11 at each of the six stops along the route. The [P, E] coordinates of each response can be seen in the KDE diagram in the next figures, along with the 50th percentile isoline of the distribution and the representative coordinates of each point estimated from the median of the responses, as indicated by ISO 12913-3. The volunteers' different perceptions at each of the points along the route can be observed in Figures 8 and 9. The latter shows the same information as in the previous figure but highlights the responses at each of the points evaluated in different colors and shapes.

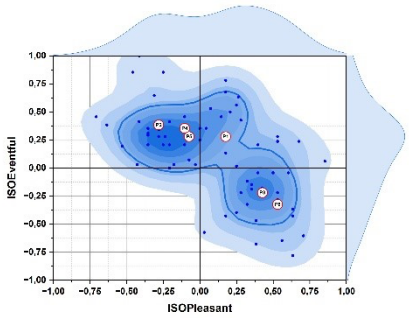

Figure 8. KDE distribution of responses across the six points assessed, indicating the [E, P] coordinates representing each point according to the ISO 12913 methodology. Source: Vida, J.

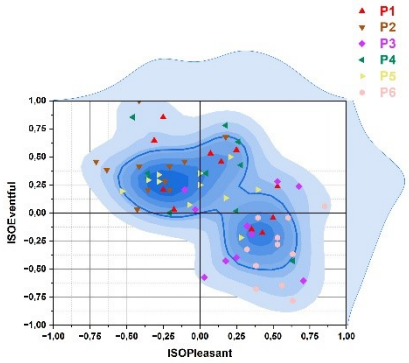

Figure 9. As in the previous figure, differentiating the responses at each point. Source: Vida, J.

Analyzing these figures it is possible to observe how the degree of agreement at each point is different, with much more variation at points P1 and P4 where the deviation of the responses was greater, as shown in table 1 and in the centroids with the 95% confidence interval in Figure 10.

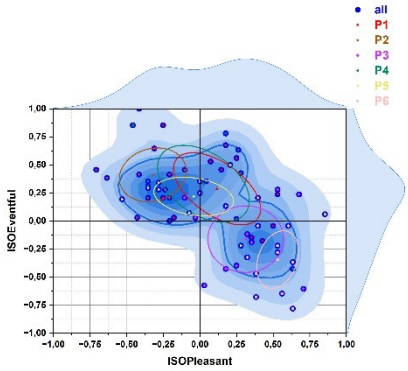

Figure 10. As in the previous figure showing the centroid of the 95% confidence interval at each point. Source: Vida. J.

Table 1. Degree of agreement between perception responses at each evaluation point

SDEV	P	E	SEM	P	E	RANGE	P	E
P1	0,31	0,33		0,09	0,10		0,84	1,03
P2	0,23	0,25		0,07	0,07		0,88	0,97
P3	0,27	0,31		0,08	0,09		0,81	0,88
P4	0,32	0,35		0,10	0,11		1,09	1,28
P5	0,28	0,18		0,08	0,05		0,93	0,72
P6	0,15	0,27		0,04	0,08		0,53	0,84

The individual analysis of the eight dimensions of the model at these points, P1 and P4, and at points with very different acoustic climates such as P2 and P6, adds information to interpret the result of the evaluation, as shown in Figures 11 and 12, where the eight dimensions have been calculated from the median of all the responses obtained at each point, as indicated by the ISO12913 standard.

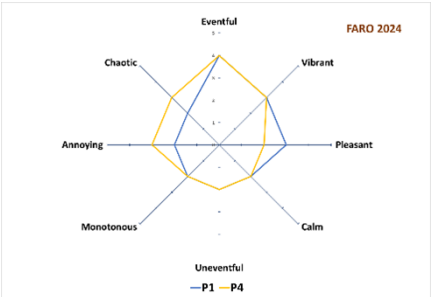

Figure 11. Representation of the eight dimensions of the ISO 12913 emotional model at the Faro points 1 and 4. Source: Vida, J.

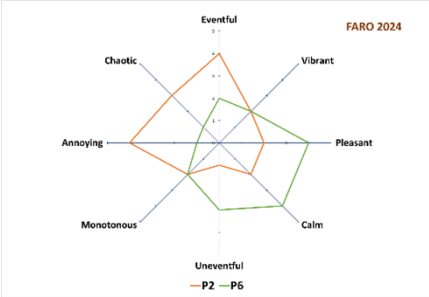

Figure 12. Representation of the eight dimensions of the ISO 12913 emotional model at the Faro points 2 and 6. Source: Vida, J.

As can be seen, the ISO 12913 standard allows for the objective assessment of subjective perception in context. This, combined with information on ambient noise levels at the time of the assessment, provides useful information for urban planning and the development of action measures, where appropriate. With the development of these studies, the intervention of urban planners, managers, or technicians on elements of the environment and urban landscape would not be carried out exclusively from the perspective of noise, as a form of pollution, but rather would include the perspective of sound as a resource that contributes to improving citizens' quality of life. This is due to the simple, yet complex, fact of having asked for their opinions, which is why this type of research is encompassed within what is currently broadly referred to as "citizen science."

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