Ordinary sonic public space. Sound perception parameters in urban public spaces and sonic representations associated with urban forms

Solène MARRY

Thesis director: **Y. CHALAS**, Professor in urban planning

Urban Planning Institute
Grenoble University
Laboratory Pacte Territoire UMR CNRS 5194

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Subject definition:

• As urban planner my research concerned sonic perception in **urban public spaces**

•I am working both with **urban planners** (in my Laboratory: Pacte UMR 51 94, Urban planning institute of Grenoble)
and with **acousticians** (in my office at CSTB (Construction Technical and Scientist Center), Grenoble Department Acoustics / environmental and urban acoustics team);
my researches try to **understand** how town people **perceived** their **sonic environment**.

•Few research laboratories such as Cresson take an interest in **ordinary sound ambiances**

•Our study is based on a **survey** conducted in order to be acquainted with ordinary sound public space, **perceptive parameters** and to contribute to define **urban ambiances**

- Sound is the subject of a mechanism of selection concerning sonic perception.

- A. Moles paid particular attention to **“intention” concept** [Moles, 1972].

- The question of the **ambiances** is a method in order to approach the **urban environment** by the **daily situations**.

- To work on the questions of **urban ambiances** consists of a consideration of not only physical signals, spatio-temporality, perceptive aspects, but also individual and collective **representations** and social interactions.

<u>Our **hypotheses** are</u>:

-public space **sound perception parameters** are numerous and heterogeneous;

-**spatial, temporal, sensorial, individual parameters** and **spatial practices** impact sound perception;

-**spatial planning** in urban public space is fundamental not only for acoustics but also for **synesthesical perception**.

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- The research is based on a **qualitative survey** conducted among twenty nine people, who were selected along variables such as:

✓ their **place of residence** or

✓ their **mean of transportation**

The survey was conducted along six months from September 2009 to March 2010.

- The first part of the methodology is constituted by 174 **on site questionnaires**, 512 **pictures**, 18 **on site focus groups**

- The second part concerns **acoustic measurements** which are compared to sonic perception survey results.

Some multidisciplinary attempts try to connect physical and perceptive approaches [Raimbault, Lavandier, 2002]

- And the last part is associated with the first collective part. 29 individual **in-depth interviews** are collected with the same participants

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Field of study:

- For this research, the field of study is made up of three **urban public squares**
- A square is a particular public space typology, which is at the base of **public space concept** (Greek agora). Also, a square has a clear **spatial delimitation** and strong **mental representations**

Place Centrale, **campus**, Saint-Martin-d'Hères

Place Mistral-Eaux-Claires, **urba regeneration zone**, Grenoble

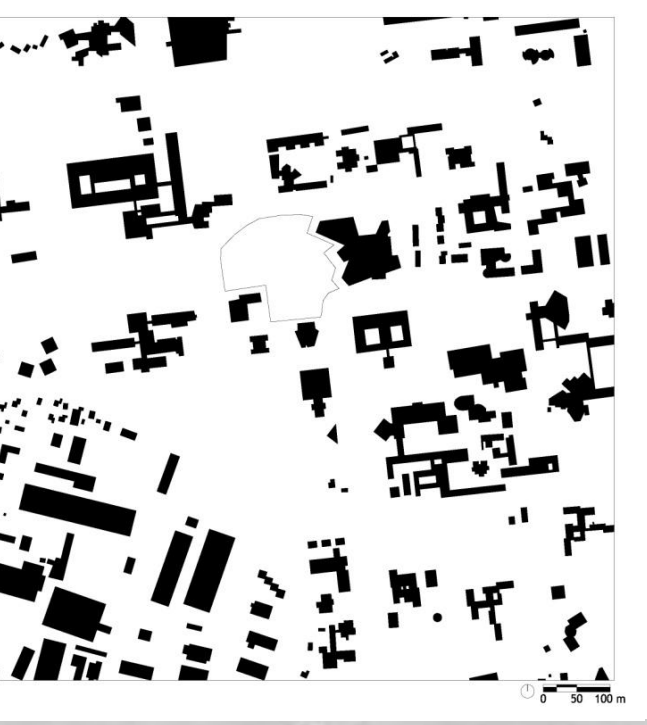
Place des Tilleuls, **historical urban center**, Grenoble

- We wondered if **spatial morphology** and urban typology influenced sound perception

- To check on this hypothesis, we chose three different types of squares (size, form, gap…)

- Their **localizations** in the urban area (central position or not) were also a choice criterion as district type, vegetation or water presence

Urban morphology, *Place Centrale*, **campus**, Saint-Martin-d'Hères



Urban morphology, *Place Mistral-Eaux-Claires*, **urban regeneration zone**, Grenoble

Urban morphology, *Place des Tilleuls*, **historical urban center**, Grenoble

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Qualitative survey

- Three groups of ten people were asked to rate these urban squares during **two seasons**.
- In this part of the survey, performed ***in situ,*** interviewees were asked to:

- answer individually a **questionnaire**

- take individually three **photographs** (describing the *ambiance*)

- group together to discuss in a **focus group** their perception of the place

Focus group in September 2009, *Place des Tilleuls*, group B

Acoustic measurements

- **Acoustic measurements** were achieved during the same **seasons** that the survey was conducted and on the same day of the week in order to compare the same **urban temporalities**

- The global aim is to **compare** acoustics levels and types of environmental sounds to **sound perception**

- Measurements were not done at the same time as the qualitative survey in order **not to interfere** with interviewees answers

Individual in-depth interviews

- After the on site survey, we saw all interviewees again **individually**

- They were asked to:

- speak about their **memory** of the squares
- explain why they took these **pictures** to show the place **ambiance**
- do five **cognitive map tests (sonic mind maps)**

- Cognitive map tests concern the **sonic environment** of the three squares, the **ideal sonic ambiance** and the **worse sonic ambiance** of a square in general.

- The analysis of contents of the sonic mind maps was made by means of the **Nvivo software**, the tool of assistant to the **analysis of qualitative data** (textual but also iconographic ones).

Sonic mind maps

- On the basis of **K. Lynch** researches [Lynch, 1960] concerning **urban cognitive mind maps**, few researchers adapted this method to the **sonic environment**.

- P. Amphoux [Amphoux, 2003], one of the main researchers to have tried this method in the field of the **sound**, defines the **sonic mind map** as an effective means to break the inherent difficulty to **represent sound**.

- R. Murray Schafer [Schafer, 1977], from 1977, works out the **urban sound maps**. M. Southworth [Southworth, 1969] uses **sound event maps** in a complementary way in **urban sensory routes**.

- D. Paquette [Paquette, 2004] uses this method on the studied ground by making realize to passers-by, choose randomly in the public place, the **sonic mind maps**.

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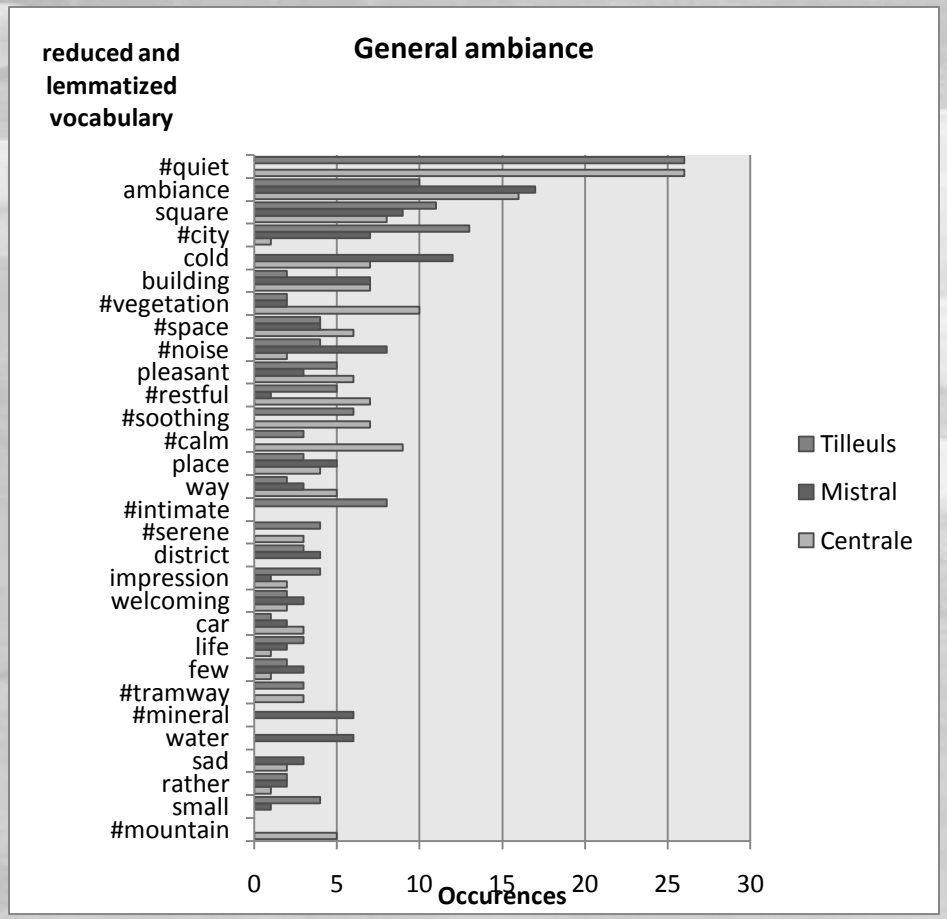
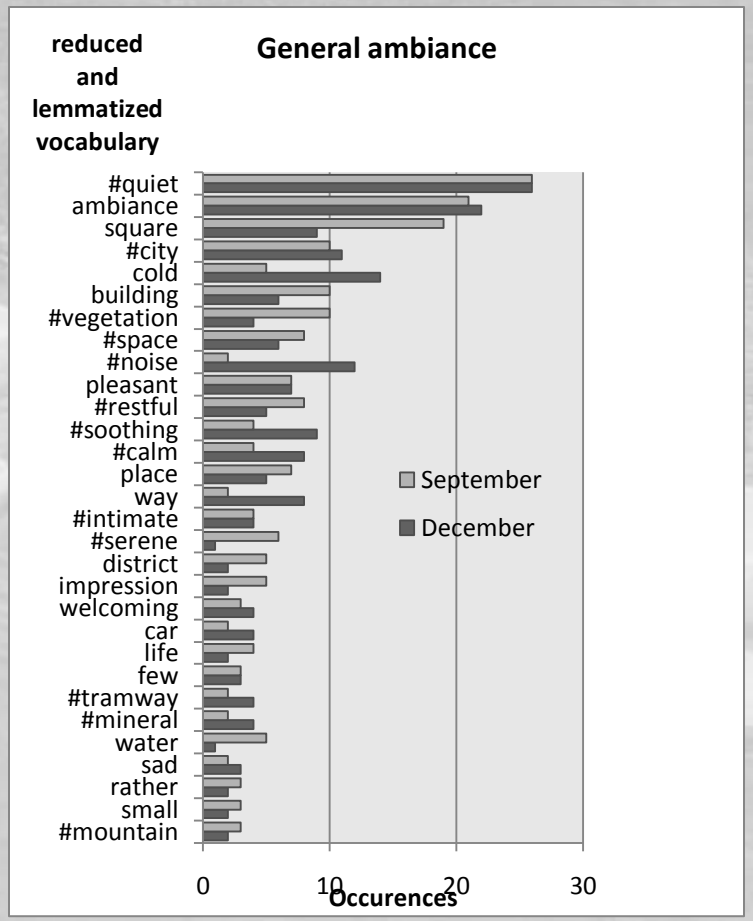
Qualitative on site survey results

- In the on site **questionnaire** interviewees were asked to qualify the **global ambiance** of the area.
- The results concern **words** used by all interviewees to describe the general *ambiance* of the three squares





Occurences of lemmatizes vocabulary (with Sphinx Lexica software) used by interviewees to answer the question "How would you describe the ambiance of this square?"

Analysis : Words used to define three squares ambiances 1/2

- We can emphasize that **sonic ambiance** is used to describe the overall **ambiance** in an urban public space

- Another observation concerns **temporality**; interviewees describe ambiance by using more sound-related words during the second on site questionnaire

- We can venture the hypothesis that during this second round, in December, participants had a better knowledge of the three squares and it is for this reason that their attention was more focused on sounds.

Analysis : Words used to define three squares ambiances 2/2

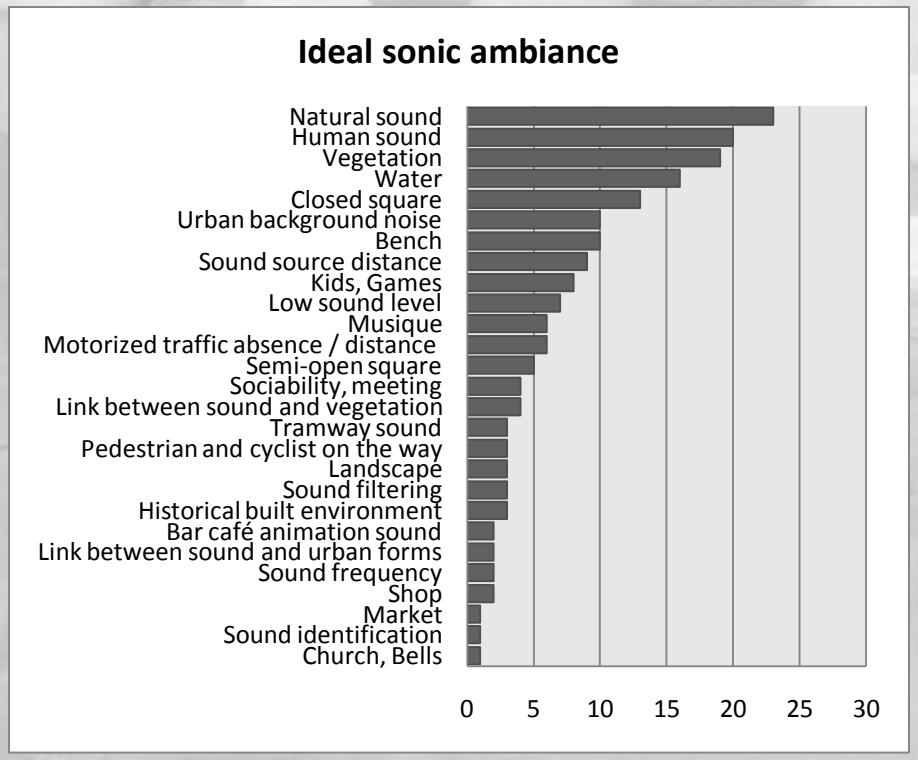
- Space **knowledge** seems to interfere in global perception and particularly in sonic perception

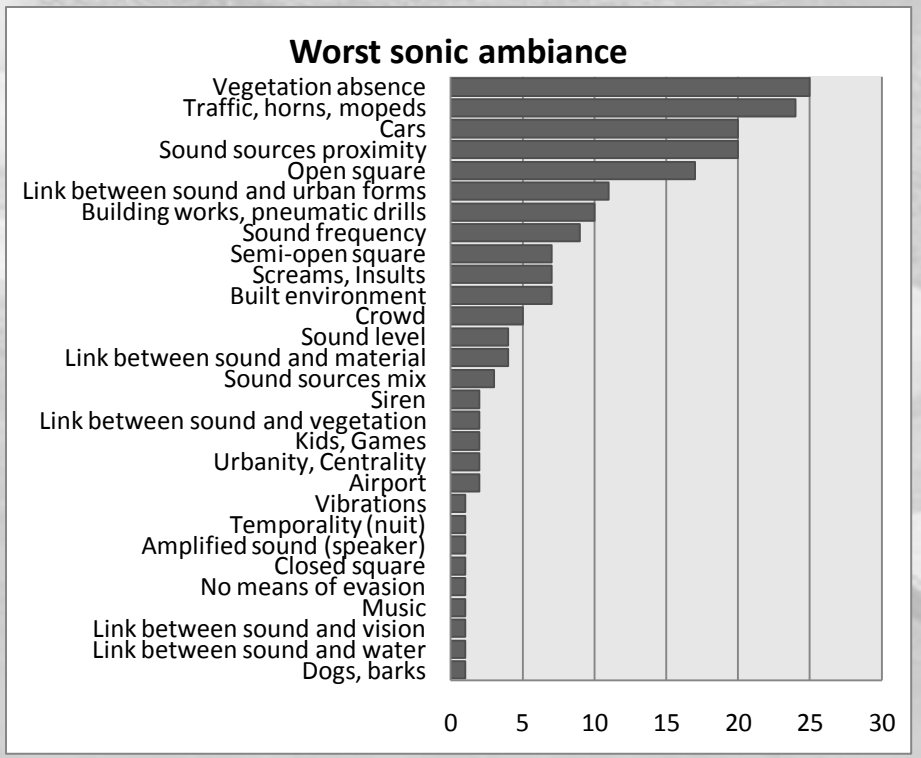
- That is why we chose interviewees who did not previously know the squares. We wondered if their **sonic space judgment** would change between the two experiments

- The previous figures illustrate the **perceptive change** between the **two periods**

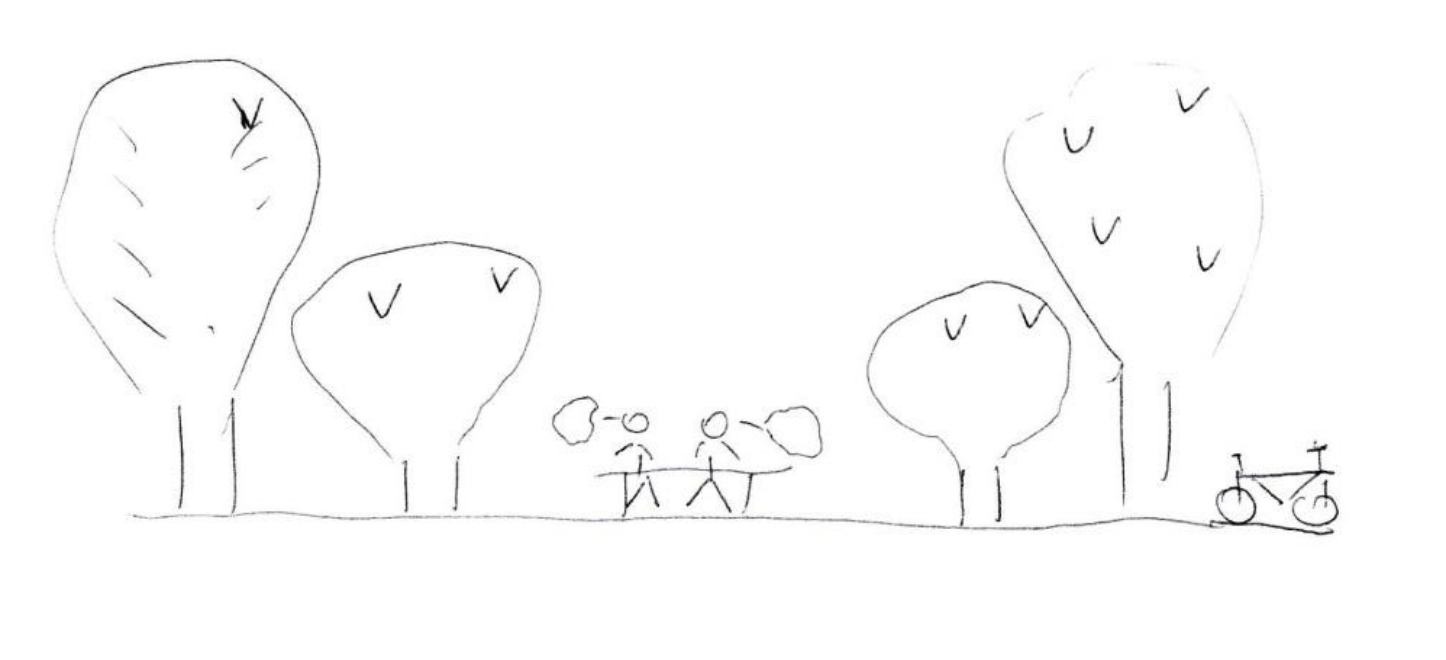
Sonic mind maps analysis

- These figures present the occurrences of the NVivo codes relative to the sonic mind maps of the ideal sonic ambiance of a square and those stemming from the coding of the sonic mind maps of the worst sonic ambiance of a square.





- The **natural sounds** are the most present elements in the sonic mind maps of the **ideal sonic ambiance** of a square and in a correlative way; the **absence of vegetation** is the most recurring in the sonic mind maps of the **worst sonic ambiance** of a square
- This figure presents the sonic mind map of the ideal sonic ambiance of a square according to one interviewee; the **vegetation is very omnipresent** and creative of a **specific positive sonic ambiance**



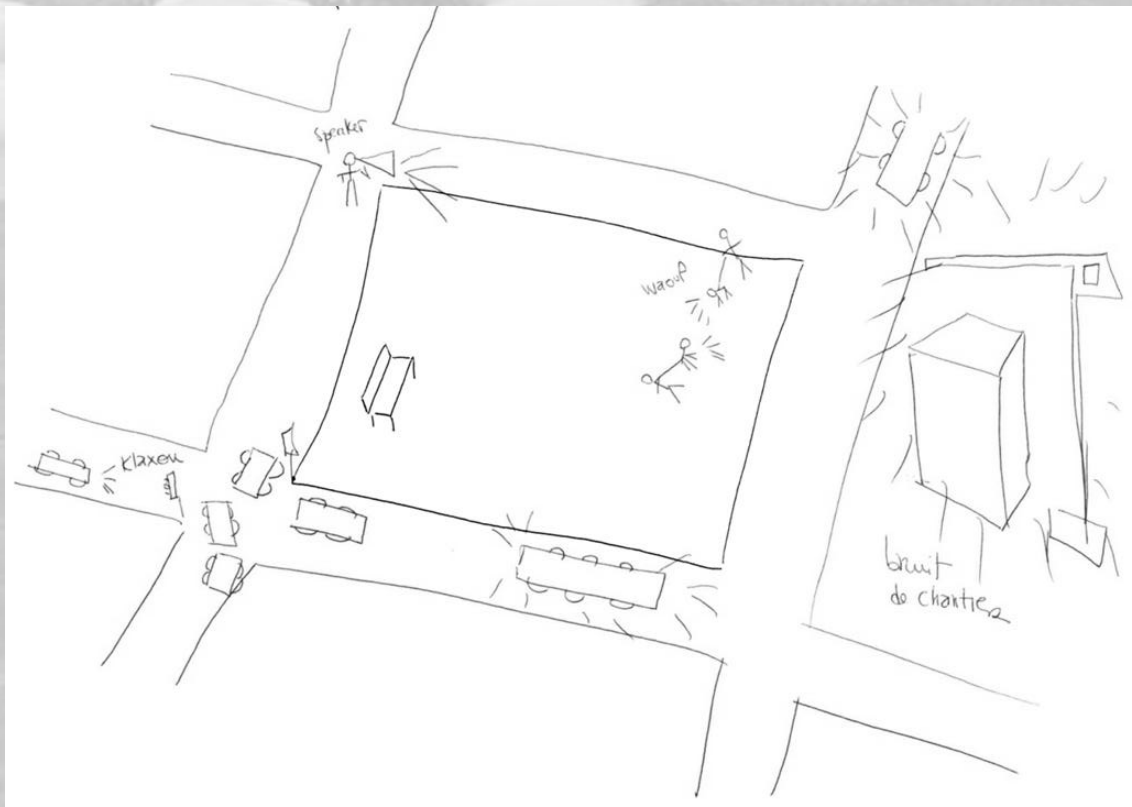
Sonic mind map of the ideal sonic ambiance of a square, interviewee n°14

- 13 interviewees (on 29 referees) associate an ideal sonic ambiance with the **volumetric of a closed square**. A spatial volumetric directed to the **closure** of the square thus seems necessary and it with the aim of putting at a distance the motorized circulation (for 6 investigated).

- On the other hand this will of **closure** of the space is associated in 9 sonic mind maps with the **distance of the sound source**, allowing distance not only **visual** but also **sonic**.

- **Urban form** and **sonic ambiance** thus seem intrinsically connected in the **sonic imagination** of the interviewees; two of them clarify clearly the link which they establish between the urban form and the sound.

- 11 sonic mind maps represent the **negative impact of spatiality** on the **sonic ambiance**. For 17 participants, an **opened square** is associated with a negative sonic ambiance.
- The opening of the space appears as being associated with the **nearness** of the (unwanted) **sound source**.
- One of the interviewees indicates unambiguously "*the sound is sent back by the building*".
- As for the sonic mind map presented here, the opening of the square on the sound sources is clearly represented.



Sonic mind map of the worst sonic ambiance of a square, interviewee n°18

Individual in-depth interviews results

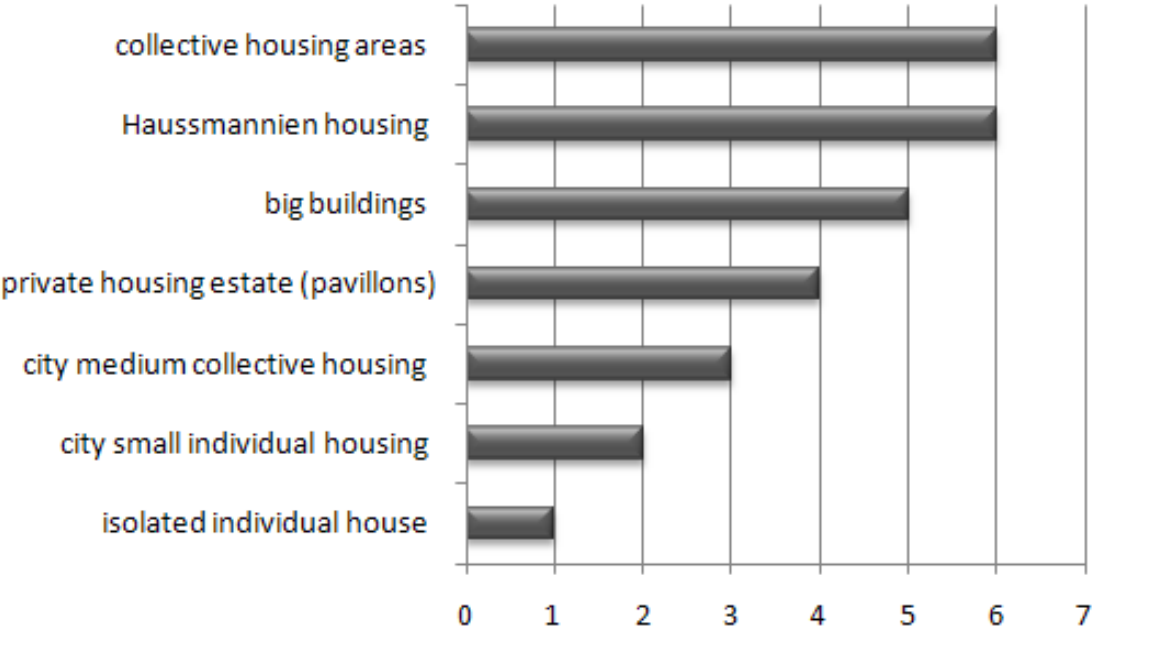
- We wondered if **place of residence** (when it is a choice) influences **sonic environment representations** associated to **urban typologies**

  *A survey, conducted in 2007 asked over 1000 French participants to associate housing types to different words. The word "**calm**" is associated to an **isolated individual house** by 80% of participants [Sofres, 2007]*

- In order to gain understanding of **urban environmental sound representations**, seven **urban typologies** were shown to interviewees who had to rank them in accordance with **quality environmental sounds**

Urban typologies appraisal

- Participants were asked to **rank** seven **urban typologies** from 1 to 7, 1 corresponding to the most pleasant **sonic environment** and 7 to the most unpleasant one



Sonic environment associated to urban typologies
(1: More pleasant, 7: more unpleasant)

- Isolated individual house is associated to a pleasant sonic environment

- Collective housing areas and Haussmannien housing are most often associated to the worst sonic environment

Urban typologies appraisal

- We can highlight an unexpected result:

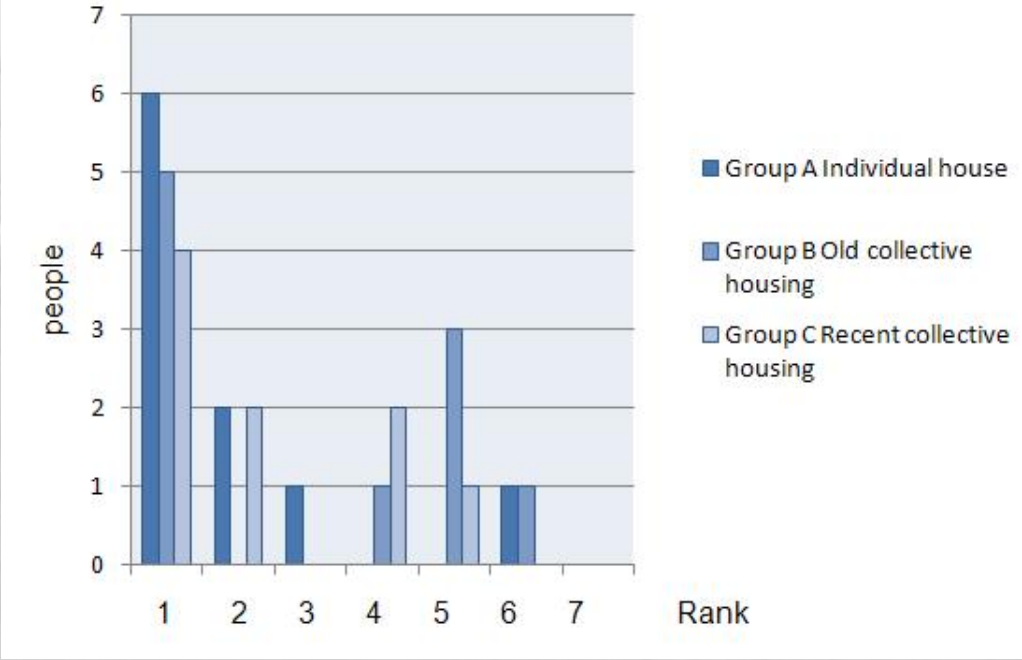
- A **collective urban typology** (in this case **city medium collective housing**), is ranked as a **more pleasant sonic area** than an **individual** typology (**private housing estate**)

- This may draw a parallel between **urban typology** (pavillons) which have a bad reputation and **sonic appraisal** associated with them.

Influence of type of residence

- We wondered if the **type of residence** influences **sonic representation** concerning various **urban typologies**

- Most of the participants living in individual houses rank this typology in the three more pleasant sonic environments



Sonic environment associated to isolated individual house
(Left: most pleasant, right: most unpleasant)

Influence of type of residence

- When we showed to participants an **isolated individual house**, participants living in an individual house associated this **typology** to a **pleasant sonic environment**, more than other participants

- This experiment shows that a **link** can be assumed between **housing type**, **urban typology representations** and **sonic environment representations**

- There are differences between **residential parameters** concerning **sonic representations**

Contents

Conclusions

- To conclude, our study, based on a **qualitative survey**, tries to understand **everyday sound perception** in urban public spaces

- We wondered which parameters influenced **sound perception**

- **Sound perception** should be considered as a significant aspect in urban **public space appraisal** and may alter **city planning** and **urban furniture design**

Thank you for your attention

solene.marry@cstb.fr