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Design process: a role of soundscape perception in spatial ambience evaluation

1 INTRODUCTION

Why should we be as thoughtful about designing soundscape as designing visual elements of environment?

Design for All approach assumes that built environment should be accessible for everyone. Not only at the basic level of safe mobility, but also in term of creating legible instructions and representations of spatial rules of behavior and structure. That lets every person understand and know surrounding environment as an integral whole in which they can function under the same conditions (ex. Preiser, Smith, 2011; Kuryłowicz, 2005; Devlieger, Rusch, Pfeiffer, 2003).

Our perception of place's ambience is moderated by each of perceptual systems in Gibson (1968) terminology. Taking into account mostly visual aspects and leaving other factors to chance during design evaluation leads to decreased accuracy of predictions about social and behavioral aspect of spatial functionality.

The goals of presented research:

- to identify a role and significance of sound information in perception of ambience (To what extent soundscape influences the ambience?);
- to investigate if it is possible to verify an influence of soundscape (Schafer, 1977) on functionality and ambience's perception at the design stage.

3 RESULTS

affordances' quality?

Which place is good for mental activities?

People soundscape makes places unsuitable for mental activities.

Which place is good for meetings?

Although car soundscape is not disturbing while mental activities, car place with car sounds is the worst surrounding for meetings.

place ambience's features?

Soundscape with people sounds prevailing makes both places more friendly.

More diverse and interesting soundscape (people soundscape; see diagram in experiment design section) makes both places scoring more on flexible and variable dimensions.

The biggest differences were noted between places without soundscapes. Addition of sounds makes places' scores more equal for every dimension.

environment's affective qualities?

Rates of both places with people soundscape were the highest on arousal pleasure (ex. exciting) dimension and the least on sleepiness displeasure (ex. boring).

Without sound car place and people place were rated extremely different on sleepiness pleasure (ex. relaxing) and arousal displeasure (ex. tense) dimensions. With addition of sound places' rates equalize.

4 DISCUSSION

conclusions

Soundscape contribute significantly to changes in perception of type and level of stimulation in surroundings. That may explain why places' adequacy for various activities changes under different sound's conditions.

People associations concerning social functionality and ambience of public spaces change when sound information is added. Therefore taking into consideration the acoustic dimension of designed or evaluated space contribute significantly to the accuracy of predictions about final effect of the design process.

References

Devlieger, P., Rusch, F., Pfeiffer, D. (2003). *Rethinking Disability: The emergence of New definitions, concepts and communities*. Antwerp: Garant.
Gibson, J. J., (1968). *The Senses Considered as Perceptual Systems*. Londyn: George Allen & Unwin.
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Preiser, W. F. E., Smith, K. H. (2011). *Universal Design Handbook*. Mc-Graw-Hill.
Russell, J.A., Ward, L.M., Pratt, G. (1981). The affective quality attributed to environments: A factor analytic study. *Environment and Behavior*, 13, 259-288.
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Acknowledgements

Detailed information about research materials and the results is presented on the webpage: www.usersense.pl
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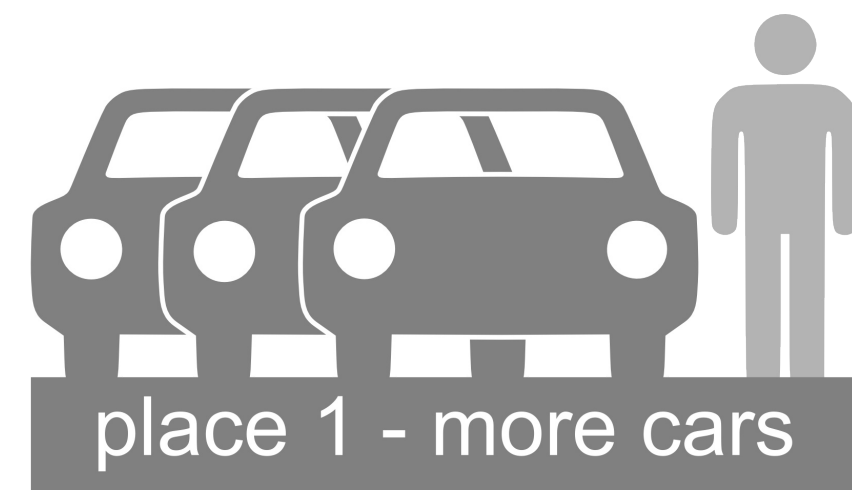
A tree icon made by: <http://www.visualpharm.com> was used on this poster.



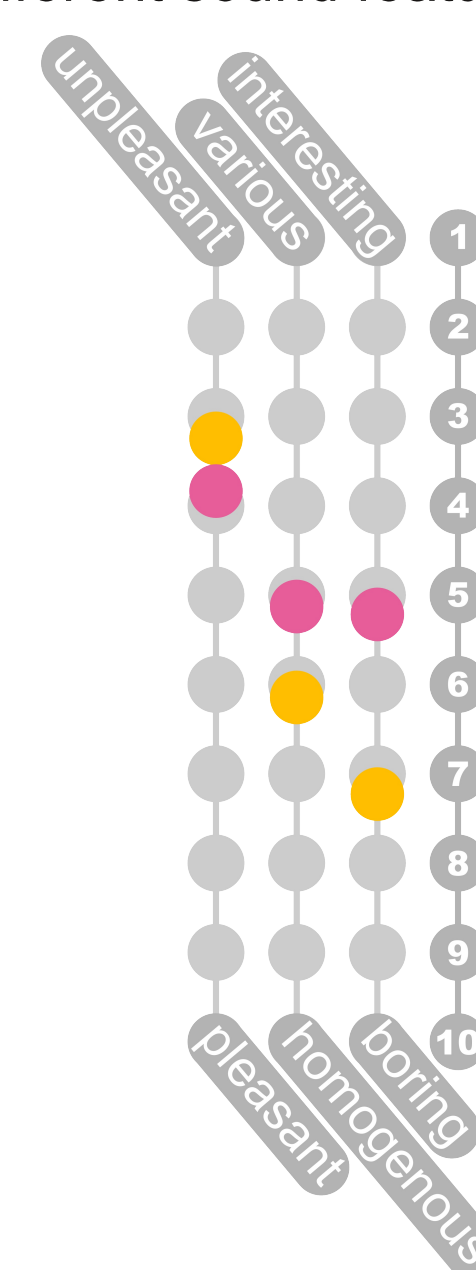
2 METHOD

Experiment design: 2-way ANOVA

two schematics of public spaces
different ratio of cars' to pedestrians' infrastructure



three soundscapes
different levels of people, traffic and nature sounds, different sound features:



Research material

Soundscape's records and places' schematics are available on the webpage: www.usersense.pl

Procedure

- computer-assisted web interview
- research material was presented as a film with static plan presentation and with or without soundtrack of soundscape
- each film was 70 seconds long; material was presented randomly to the participants
- after public space presentation participants answered the questions about soundscape characteristics and then about place features

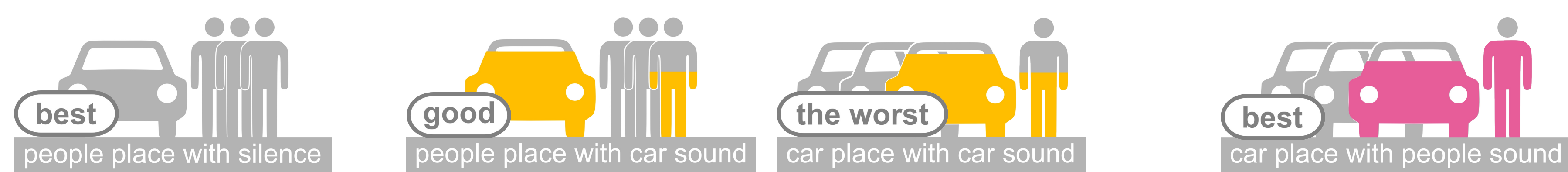
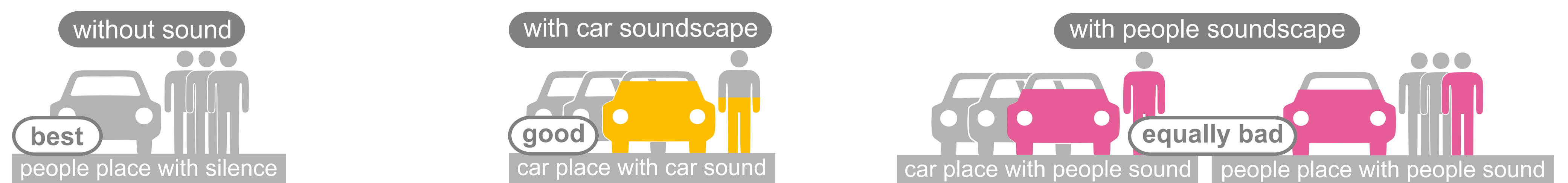
Participants

- 274 participants
- 179 (65%) females and 95 (35%) males
- between 18 - 63 years old
- 65% live in big cities (over 500k population), 31% in smaller cities (from 20 to 500k population), 4% lives in the villages
- 68% have an university degree level

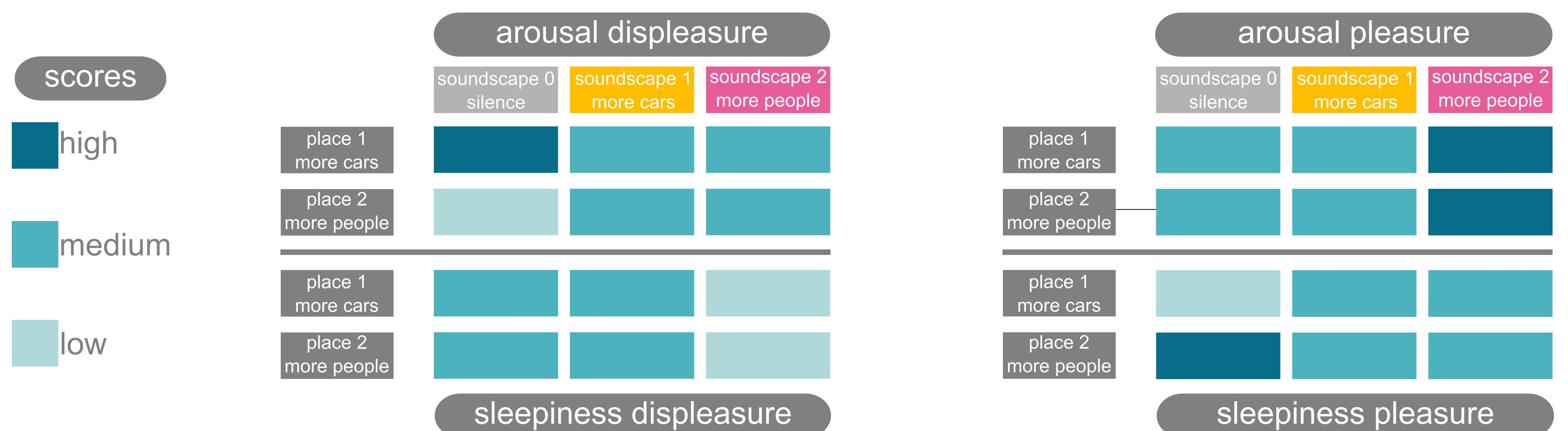
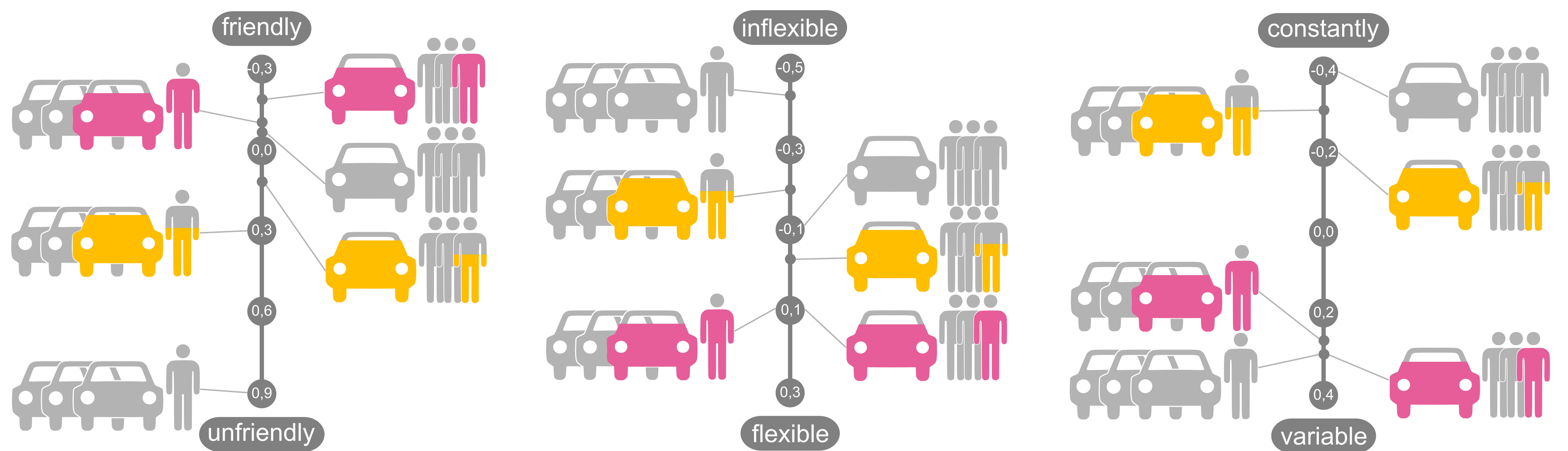
Dependent variables - public place evaluation scales:

- perceived affordances and its quality
- place characteristics concerning the places' ambience
- perceived affective quality of environment: four factors on two bipolar dimensions: level of stimulation (arousal-sleepiness) and its sign (pleasant - displeasing); based on Russell's et al (1981) circumplex model of affect

How does soundscape types influence perception of:



Note: only the results with statistically significant differences (p=0,05 at least) were shown on this poster. Wider and detailed scores are presented at: www.usersense.pl



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practical implications

- it is useful to plan acoustic features (not only noise level) in parallel to visual attributes during public space design process;
- design and plan type and level of stimulation you want to obtain first, then translate it into physical and acoustical project

future research

- comparison with data collected *in situ*;
- comparison of soundscapes of the same type (ex. both "people sounds") but with subtle differences in ex. reverberation, intensity;
- experiments with artificially created soundscapes (design public space in parallel with soundscape's design).