Common Sound Scenarios –
A context-driven categorization of everyday sound environments for application in hearing-device research

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Intention	Speech communication						Focused listening				Non-specific			
Task	2 people		More than 2 people		Through device		Live sounds		Through media device		Monitoring surroundings		Passive listening	
	Two people having a conversation		Several people having a shared conversation		Two or more people having a shared conversation through a communication device		Focused listening to sound without being able to control the sound source		Focused listening to sound while being able to control the sound source		Conscious or unconscious screening of sound of relevance to current activity		Unconscious perception of environmental sounds, without relevance to current activity	
Scenario	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	#14
Occurrence														
Importance														
Difficulty														
Scenario	Conversation at home	Conversation on metro	Meeting in an office	Car ride with family	Phone call at home	Mobile call in the street	Lecture	At a concert	Watching TV	Listening to car radio	Vacuum cleaning	City walk	Relaxing with a book	Relaxing on train

ABSTRACT

In order to design laboratory tests (for evaluation of signal-processing features) that have the potential of indicating real-life benefit, there is a need for more information about the listening situations people encounter and the demands people face in these situations.

The purpose of the current study was to investigate the acoustic environments and listening demands people encounter and to provide a structured framework of common sound scenarios that can be used for instance when designing realistic laboratory tests.

METHOD

A literature search was performed September – November 2013.

1. *General literature search:* focus on central research areas
2. *Specific literature search:* focus on data extraction
3. *Data extraction* and *categorization* in a systematic way
4. *Selection of common sound scenarios*

General literature search

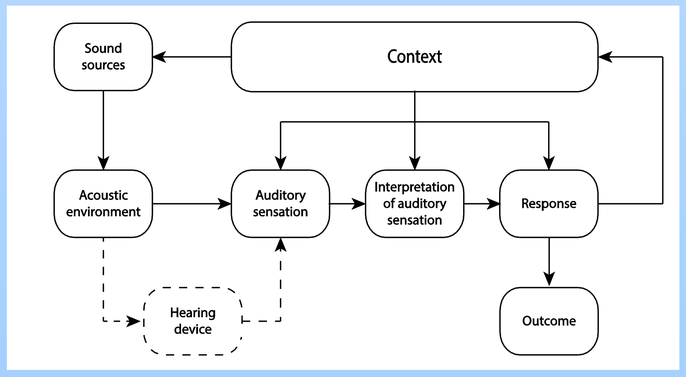
Using PubMed and Google Scholar, 733 publications were found.

Exclusion criteria:

1. Studies on non-human test subjects
2. Studies with irrelevant research questions
3. Studies with informants that would have made it difficult to generalize to "common" sound scenarios

After exclusion, 41 studies remained.

Relevant area identified: *Soundscape ecology*. ISO-12913-1, 2014.



A strong focus on context guided the current categorization strategy.

Specific literature search

References were kept if they provided data on real-life acoustic environments or listening situations reported by informants.

Article	Study goal(s)	Informants (number)	Data collection method
Eckardt (2013)	1. Auditory ecology 2. Listening effort	NH (10), HI noHA (10)	Questionnaire, EMA
Galvez et al (2012)	1. EMA 2. Auditory ecology	HI HA (24)	EMA
Gatehouse & Noble (2004)	1. Disabling effects 2. SSQ evaluation	HI noHA (153)	Questionnaire (SSQ)
Jensen & Nielsen (2005)	1. Auditory ecology 2. HA performance	HI HA (18)	Audio recordings, EMA
Kochkin (2010)	1. HA satisfaction	HI HA (3174)	Questionnaire (MarkeTrak)
ORCA Europe (2013)	1. Auditory ecology	HI HA (7)	Questionnaire
Schulte & Meis (2013)	1. Listn effort methods 2. Aud ecology	HI noHA (7), HI HA (13)	Focus groups
Wagener et al (2008)	1. Auditory ecology, 2. HA performance	HI HA (20)	Audio recordings, Lab evaluation
Walden et al (2004)	1. Everyday listn sits 2. Mic preference	HI HA (17)	EMA
Wu & Bentler (2012)	1. Aud ecology young and older HI adults	HI HA (25), HI noHA (2)	Dosimeter, EMA

Data extraction and categorization

187 listening situations were extracted and printed on separate pieces of paper, adding all available information (including number of informants, reported frequency of occurrence, difficulty and importance). When context was not explicitly stated, the authors made interpretations based on the available information.

Based on the soundscape concept, the categorization was then performed using a qualitative and context-driven approach. A new intention category was created when a situation did not fit into the already defined categories. This was done until all situations were placed in an intention category.

Then, the same approach was used for the task categories.

Selection of common sound scenarios

Last, two sound scenarios (selected based on reported frequency of occurrence, importance to hear, and listening difficulty) were added to each task category.

The now suggested common sound scenarios should be viewed as two data-driven examples of each of the seven task categories. These scenarios might be exchanged or supplemented by other scenarios that are equivalent in terms of intention and task.

CONCLUSIONS

A framework of Common Sound Scenarios (CoSS) was developed. Potential use:

- Development of ecologically beneficial signal-processing features.
- Design of realistic laboratory tests and other outcome measures.
- Demonstration of the functionality of signal-processing features.

Next steps:

- Detailed technical description of the common sound scenarios
- Validation of the framework

Future research: More studies investigating acoustic environments and listening demands, in particular

- Studies with normal-hearing informants
- Studies performed outside North America and Western Europe.

Reference: Wolters F, Smeds K, Schmidt E, Christensen EK, Norup C. (2016) *J Am Acad Audiol* 27: 527-40.