

Meeting summary – 23 July 2006  
Brainstorming on psychoacoustic testing by Atsuko and Hiroko

The discussion happened over voice-chat, in order to brainstorm on the main psychoacoustic experiment. The main experiment could consist of a few sessions, and the below is the list of potential experiment procedures.

**Part 1. Threshold measurements (physical/perceptual properties of masking effect)**

In this part, we aim to measure how much loudness level of transmitted noise would be masked by the synthesized masking noise.

***Test 1: Just audible level of the transmitted noise***

Present masking noise with 35 dBA (fixed), and vary the transmitted noise level. Measure the just audible level of the transmitted noise,  $x_1$  dBA (the level, at which, subjects can tell the presence of the transmitted noise.)

***Test 2: Just intelligible level of the transmitted noise***

Present masking noise with 35 dBA (fixed), and vary the transmitted noise level. Measure the just intelligible level of the transmitted noise,  $x_2$  dBA (the level, at which, subjects claim that they understand any part, contents, and words of the transmitted noise.)

Standard approaches for absolute threshold measurement could be modified and applied for this measurement (either varying backward/forward level or random presentation of different levels.) Number of subjects is desirably 2-5. We may have to consider language proficiency for the just intelligible level measurement.

**Part 2. Quality assessment (effectiveness/annoyance properties of masking noise)**

The purpose of this part is to measure the quality of masking noise in terms of annoyance and productivity: First, if it is a distractive sound for the people inside the conference room. Second, if it causes any influence on the productivity of a meeting.

***Stimuli:***

- (1) Different types of masking noise
- (2) With varied loudness levels of masking noise (e.g. three levels - loud, medium, quiet)

***Test 1: Annoyance assessment***

With masking sound presented, a subject and an interviewer have a dialogue for a minute (contents of the dialogue – TBD.) After the dialogue, with music or white noise presented (in order not to make an absolute silence), interviewer ask questions as follows:

1. Was any sound present other than the conversation?
2. If it was present,

- a. How disturbing was that sound? Rate it with 0 (not disturbing at all) or 1-10 (less to much disturbing.)
- b. Describe and comment on that sound.

Repeat this procedure for the given variety of the stimuli.

Experiment design concerns on Test 1: We may have better performance on the first run of the experiment, but by repeating the procedure, there may be a learning effect (which actually may happen in the real conference room situation) and people focus more on the noise behind the conversation. Still looking for a good way to trick the subjects by wisely asking the questions.

### ***Test 2: Effectiveness Assessment***

The goal of this test is to measure the productivity using a task, which could be numerically graded. Use the grades in order to state the productivity in the conference room.

#### *Idea 1: Without dialogue by subject*

The task would be a dictation of a long dialogue/conversation. A conversation of a few minutes long would be presented, and after the listening, the subjects are asked questions about the details of conversation (numbers, directions, schedules, instructions etc.) A simple numerical grade on the exam will be used for quality assessment.

#### *Idea 2: With dialogue by subject*

Carry on a conversation and ask questions on the discourse. Measure the words per minutes or prosody/tone of the conversation and use them for quality assessment – but we're not sure if they could be meaningful judgments.

### **Concerns in general**

We have to design the test so that subjects are not paying too much attention to the masking noise. By not turning the listening room to an absolute silence, or maybe by presenting some noisier/louder sounds between sections, subjects may show more realistic perceptions. It would be important that we do not tell that we're testing about the background noise, but we don't know how to do it yet.