Serious games:
A new approach to phonetic/linguistic experimentation in and beyond the laboratory

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Increasing efforts are put into gamification of experimentation software in psychology and educational applications and the development of so called serious games. Computer-based experiments with game-like features have been developed previously for research on cognitive skills, cognitive processing speed, working memory, attention, learning, problem solving, group behaviour and other phenomena. It has been argued that computer game experiments are superior to traditional computerized experimentation methods in laboratory tasks in that they represent holistic, meaningful, and natural human activity.

Recently, this methodology is being adopted for experimentation on speech perception and production. We argue, along others, that games are in some respects superior to classic test designs. Classic tests may be perceived as being boring due to their repetitive nature and the very abstract, unnatural laboratory situation that subjects are exposed to. Games may increase subjects' motivation to participate and perform well on the given task and the validity of the gathered data due a more natural situation - i. e. a situation that people are either already familiar with or where people can easily immerse themselves. Categorization tests (or other linguistic tasks like discrimination or similarity judgements) can be implemented within computer games such that no explicit decisions are required from the subjects. Focusing on the goals of the game, subjects are not explicitly told to pay attention to phonetic details of the stimuli they hear. Classic tests, on the other hand, in most cases include explicit instructions and require conscious decisions from the subjects. Computer game frameworks thus provide a compromise solution between spontaneous natural data on the one hand and full experimental control on the other.

In this talk, I present a novel computer-game based framework for perception studies and its application in a study focusing on attention to fine phonetic detail in natural speech perception. This novel framework implements a traditional psycholinguistic categorization test paradigm within a computer game. Using the state-of-the-art Unity game engine, we developed a first person action game. This genre is ideally suited to implement a test scenario which requires the subjects to respond as fast as possible. The player moves around within a virtual 3D environment and reacts to stimuli presented by virtual agents which belong to two different categories, each of which is associated with one response key. The two categories are initially distinguished by visual and acoustic cues (e. g. different colours, and different sounds). Gradually, visual cues are removed. Thus, the subject has to attend to the acoustic cues and react accordingly. I discuss practical and theoretical challenges encountered with the implementation of a psychological test within a computer game.