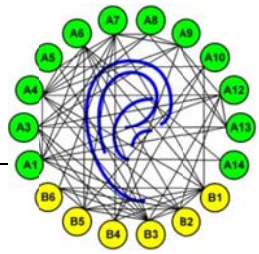
Sonderforschungsbereich/Transregio 31
"Das aktive Gehör"



E I N L A D U N G

zum Vortrag im Rahmen des Seminars des SFB/TRR 31

Freitag, 7. Dezember 2012, 14:00 Uhr

im Raum W2 1-143 der Universität Oldenburg
und Raum H28 / R 2.31 des Med. Campus Magdeburg
(per Videoübertragung)

"Judgments of Temporal Order: Lessons from the response format and data analysis approach"

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Judgments of the temporal order (or simultaneity) of two stimuli are collected in studies of prior entry, temporal recalibration, multisensory integration, causality perception and, more generally, in research on perception of temporal order. Two classic experimental tasks are used in the field, temporal order judgment (TOJ) and simultaneity judgment (SJ). In both tasks two stimuli (S_1 and S_2) are presented with some temporal delay and observers are asked to report (i) which stimulus was presented first (in the TOJ task) or (ii) whether the two stimuli were presented simultaneously or successively (in the SJ task). There is also a variant of the SJ task (SJ3) that allows for three response categories: "S_1 first", "S_2 first", or "simultaneous". Data from these tasks are usually analyzed by fitting piecewise arbitrary functions of suitable shape that render two measures of performance: the point of subjective simultaneity (PSS) and a measure of sensitivity. This practice of fitting arbitrary psychometric functions with uninterpretable parameters has been reinforced by some characteristics of empirical data from the SJ3 task, which have been used to rule out independent-channels models of timing judgments. In principle, measures of performance should agree (within sampling error) across tasks, but agreement has been shown to be generally quite poor in empirical studies, prompting the idea that TOJ and SJ tasks involve different processes.

In this talk, I will argue that the response format and the way in which data are analyzed has played a crucial role in the conclusions of these studies. I will also show how an extension of independent-channels models provides more powerful tools to analyze data, with model parameters that are interpretable in terms of the processes underlying timing judgments and responses. The core of the model is a unified representation of the decision space and the various experimental tasks differ as to how they require the observer to use this representation to produce a response. The perceived time of occurrence of any given event is modelled as an exponentially distributed random variable. Then, when two stimuli, S1 and S2, are presented the decision variable is defined as the difference between their perceived times of occurrence. The model includes three additional components: a resolution parameter that accounts for the lack of perfect temporal resolution of real observers, a response bias parameter that comes into play when "simultaneous" responses are not allowed, and response-error parameters. Depending on the constrains imposed by the response format, this framework yields different psychometric functions, thus leading to discrepant estimates of the PSS and sensitivity. Implications for performance in the three tasks will be derived and tested against empirical data from published studies. It will be shown that the model fit is satisfactory, explaining inconsistencies across tasks, reinstating independent-channels models, and opening a new way to analyze synchrony-judgment data.

Finally, I will present an R package developed in our lab to help researchers analyze their data by fitting model-based functions. The package includes additional routines that provide bootstrap p-values and confidence intervals for estimated parameters along with conventional performance measures (PSS and sensitivity) from the fitted functions.