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EM 7 ALPHA: Adaptive Mechanisms for Language Processing

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Key results: ALPHA has been concerned with experimental evidence for adaptive mechanisms in language comprehension as well as the investigation of suitable computational models. In our experiments to date, we have demonstrated effects of both long-term and short-term experience on language processing. The observed effects include constraints imposed by frequency, syntactic priming, discourse information, intonation, and visual context. In the pursuit of computational models, we have evaluated both probabilistic and connectionist approaches, due to their suitability of integrating diverse information sources and learning from experience.

Final phase: ALPHA will seek to more specifically identify and model the nature of the diverse adaptive mechanisms explored to date. In order to identify the nature, limitations, and priorities of adaptation, we plan to investigate language comprehension in the face of varying and even contradictory information sources. In this way we can explore the extent to which specific information types are favoured, dismissed, or weighted with respect to each other. Special emphasis will be placed up on the relative ªweights assigned to linguistic and non-linguistic constraints such as visual context or task specifications. Experimental investigations will place continued emphasis on eye-tracking evidence in visual worlds, as ideal manner for combining linguistic and visual information streams. Crucially, however, evidence from this paradigm suggests that task may have an important influence on how different information sources are exploited. Also, previous studies have focused on the SVO/OVS ambiguity, as a means for enabling comparison across experimental results, we now plan to investigate more diverse structures. Computational modeling will aim to directly model both competence in sentence understanding (arriving at correct semantic representations) as well as the dynamic integration of multiple information sources, probabilistic constraints, and observable behaviours, such as eye-movements in visual scenes, during incremental comprehension.

The outcome of the project will be a much more complete and integrative account of how language comprehension both influences other cognitive processes, such as visual attention, and is influenced by them in turn. While much psycholinguistic research has emphasized that various kinds of knowledge can in principle influence on-line comprehension, our findings will provide insight into the environmental conditions which trigger adaptation. Computational models of such processes will be the first to explain not only the nature of adaptation, but also to model both reading time (complexity) and visual attention behaviour.

Collaboration: Our primary SFB collaboration partners will be the CHORUS and NEGRA projects, which emphasize semantic processing and wide-coverage linguistic performance, respectively. International collaboration partners in the area of eye-tracking are: C. Scheepers (Dundee), G. Altmann (York), Y. Kamide (Manchester). In the area of computational modeling, we will continue collaboration with F. Keller (Edinburgh) and P. Sturt (Glasgow).

Resources: 2 x Wissenschafliche Mitarbeiter(innen) (BAT IIa).
3 x ShK (19 hours): Increased from 2, due to time involved in running experiments and data analysis (speech coding, eye-movements, etc.)_2500 subject fees, per year