

STSM Scientific Report

COST Action IS0703: The European Research Network on Learning to Write Effectively (ERN-LWE)

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Period: from 08/03/2009 to 15/03/2009

Place: Nottingham (UK)

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Purpose of the visit

During the STSM Mark Torrance and I wanted to prepare and run a pilot experiment on grammatical planning, execution and control in written sentence production using eye movement and keyboard input data.

The central question of our pilot study concerns how elements in the conceptual formulation of a message are transformed into an utterance that is structured according to the grammatical conventions of the writer's language. Part of this question relates to the scope of grammatical planning: Is it the clause, the full phrase, the initial verb argument phrase or is the scope smaller than a phrase? Identification of the scope or the conditions determining the size of the scope used in grammatical planning allows constraints to be placed on theorising about the processes involved in this transformation.

Description of the work carried out during the visit

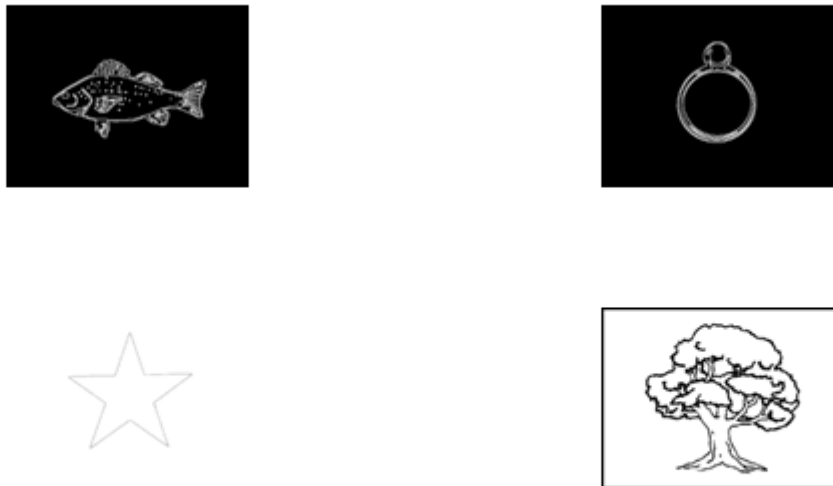
Most of the planning for the pilot experiment was done before the visit. Therefore, the first two days were dedicated to fine tuning of the experimental setup (e.g. counterbalancing) and programming the experiment in "Experiment Builder". As I haven't worked with this software before, this was an interesting learning experience. The rest of the week was filled with the execution of the experiment. We managed to collect the data of 20 participants (12 for the original experiment plus 8 for an alternative version, see below) and had a brief look at the data on the last day.

Another topic was the discussion of a new grant application. Different possibilities (institutions, frameworks) were discussed and a plan for an application in June was scheduled (ESRC/DFG).

Description of the main results obtained

The experiment was a picture description task (naming of two to four objects) and resulted in simple vs. complex noun phrases:

- simple/simple: *The tree is above the star.*
- simple/complex: *The fish is below the tree and the star.*
- complex/simple: *The ring and the tree are above the fish.*
- complex/complex: *The tree and the star are below the fish and the ring.*



The fish and the ring are above the tree.

Figure 1.: Example for stimulus pictures in both experiments. The white-on-black pictures were to be described in the first part of the sentence.

In experiment 1 the stimulus pictures disappeared as soon as the participants started to type. In experiment 2 the pictures remained on the screen during typing.

Concerning error the following types of errors were analysed: 1. typing errors, 2. confusion of above/below, 3. confusion of object order (in complex condition), 4. replacement of one or more objects, 5. omission of one or more objects, 6. addition of one or more objects. The number of erroneous vs. correct responses are depicted in figure 2.

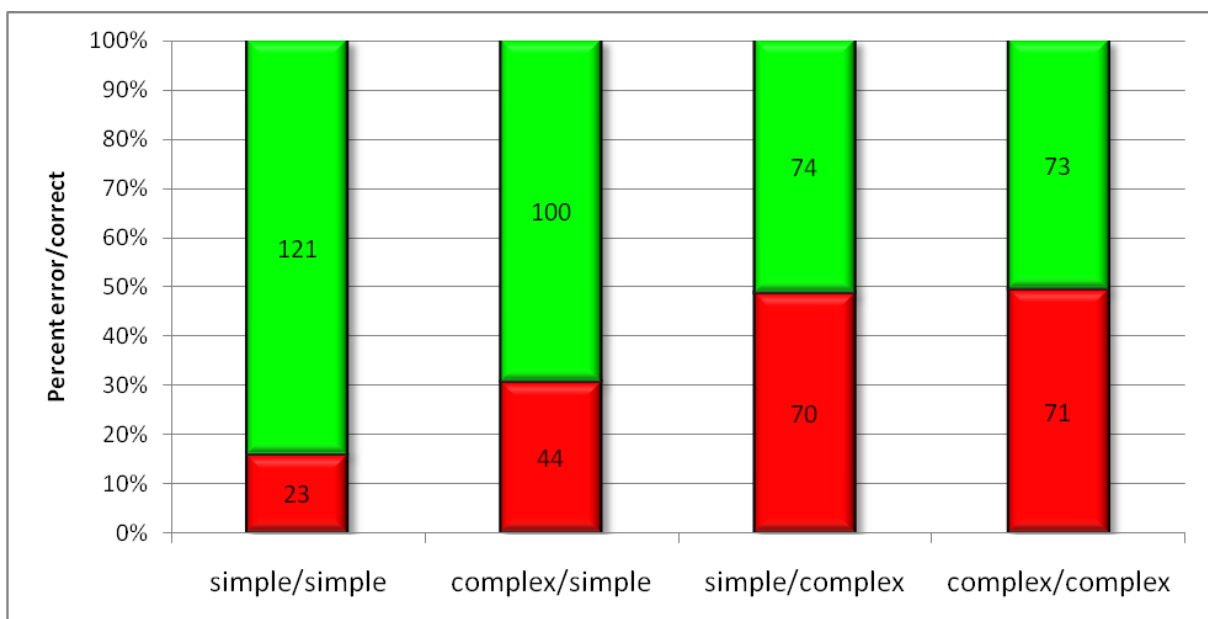


Figure 2.: Number of errors vs. correct responses in the various conditions of experiment 1.

As can be observed from figure 2 the two conditions with a complex structure in the verb phrase led to the largest amount of errors. Least errors were committed in the simple/simple structure as

expected. The most interesting result is the difference between the two conditions complex/simple and simple/complex as in both conditions three objects were present.

In experiment 2 the number of errors was largely reduced as the pictures remained on the screen during typing (figure 3). The allocation of error to the different conditions was similar, though.

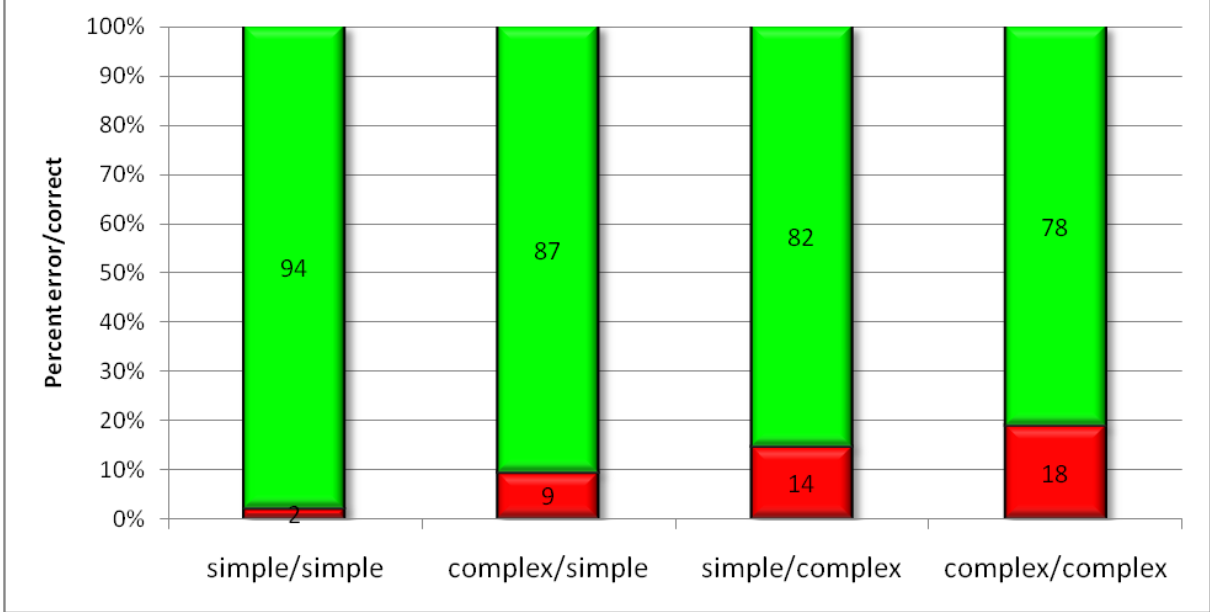


Figure 3.: Number of errors vs. correct responses in the various conditions of experiment 2.

Looking at the reaction times (sentence initial latencies, figure 4) in the various conditions of experiment 1, one can observe that the complex/complex structures led to the longest reaction times, as expected. The most interesting difference, however, is the difference between the two conditions complex/simple and simple/complex. In opposition to the error rate, the sentences beginning with a complex structure (two coordinated noun phrases) lead to longer reaction times than the sentences with a simple structure in the beginning. Therefore, it can be argued, that only the first part of the sentence is fully prepared in advance of typing. Though, the verb phrase also seems to be planned to some extent, as the simple/simple construction can be initiated even faster.

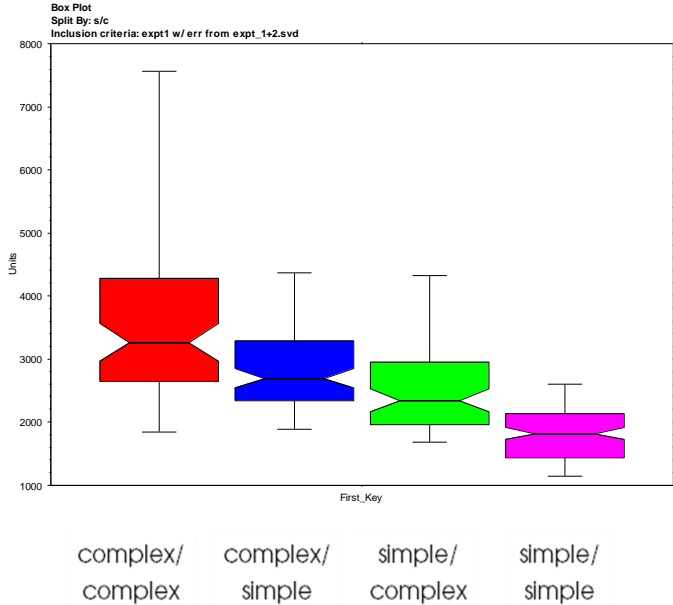


Figure 4.: Sentence initial latencies in the various conditions of experiment 1.

Future collaboration with host institution

As stated above, a bi-national grant application is scheduled for June 2009.

Projected publications/articles resulting or to result from the STSM

Preliminary results of the pilot study were presented at the COST workshop in Barcelona (COST ISO703, ERN_LEARNING TO WRITE EFFECTIVELY, workgroup 4, Barcelona 5-7 April 2009).

As soon as the main results of the study are analyzed we plan to publish them as a research report in *Psychological Science*.