

Asymmetry of switch costs when switching between speech production tasks: basic level picture naming and category identification

K. Keuper, A. Jorschick, P. Zwitterlood
University of Münster, Germany

Introduction.

In the task-switching paradigms subjects respond alternately with two different tasks to one type of stimuli. For example, subjects switch between basic level and category naming in response to consecutively presented simple line drawings (“Elephant” or “Animal”). We were interested in the application of this paradigm for research on speech production processes. If the standard findings of switching tasks can be replicated with a speech production task one might in future experiments combine this paradigm with picture word interference tasks by adding written distracters to the line drawings. One question that might be addressed is, are semantic interference effects influenced by cognitive processes underlying the switching task. This might give us new information about the nature of interference effects during lexicalisation.

First we wanted to replicate the standard findings of task switching experiments with a speech production task.

Second we wanted to see the effects of the number of trials requiring the other task that preceded the switch.

Methods.

In our experiment we visually presented line drawings of simple objects. These objects should either be named with their basic level name (“Elephant”) or with their category (“Animal”). The background colour indicated which of the two tasks was required. Moreover, we manipulated if the subjects had to respond with the same task as in the preceding task (no-switch) or if they had to change the task (switch). In the switch condition we varied the number of preceding trials that demanded the opposing task (trials before switch): For example, the category naming task could be preceded by one, two, three or four trials of the basic level naming task.

Results.

The data shows, that naming latencies were significantly slower in switch-trials than in no-switch-trials. Also, naming pictures with their basic level name was faster than category naming. In addition, as in former studies (e.g. Allport, Styles & Hsieh, 1994; Rogers and Monsell, 1995) we found an asymmetry of switch-costs (difference between switch- and no-switch-trials) such that the switch costs when changing from category naming to basic level naming were higher than *visa versa*.

Finally, we found an interaction between the task and the number of trials before the switch. We expected higher switch costs if the preceding trial type had been repeated many times. We observed this effect when subjects had to switch from category description to basic level naming. However, when they had to change from basic level naming to category description the effect was reverse: The trials before the switch, the smaller the switch costs.

Discussion.

The finding of asymmetrical switch costs for basic level naming and category description is in line with the standard findings of task-switching experiments (e.g. Allport, Styles & Hsieh, 1994; Rogers and Monsell, 1995). This suggests that this paradigm may be useful for research on processes of speech production. We will discuss the theoretical implications of our findings including the effects of the number of trials before the switch that require the opposing task.

References.

Allport, A, Styles, E., & Hsieh, S. (1994). Shifting Intentional Set: Exploring the Dynamic Control of Tasks. In C. Umiltà & M. Moscovitch (Eds.), *Attention and performance XV: Conscious and Nonconscious Information Processing* (pp. 421-452). Cambridge, MA: MIT Press.

Allport, A., & Wylie, G. (2000). Task Switching, Stimulus-Response Bindings, and Negative Priming. In Monsell & J. Driver (Eds.), *Attention and Performance XVIII: Control of Cognitive Processes* (pp. 35-70). Cambridge, MA: MIT Press.

Rogers, R.D. and Monsell, S. (1995) The Costs of Predictable Switch Between Simple Cognitive Tasks. *J. Exp. Psychol. Gen.* 124, 207-231