

PROCESSING OF TONAL INFORMATION IN WORKING MEMORY

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Background

Models of working memory, such as Baddeley's multi-component-model of working memory, have rarely been applied to the field of music information processing. Little is known about working memory mechanisms underlying activities such as listening to music or performing music. Furthermore, it is unclear whether there is an overlap in the functional mechanisms underlying the processing of tonal information and auditory components of verbal information.

Aims

The aim of the present study was to test whether the phonological loop, a subsystem in Baddeley's model of working memory, is responsible for both verbal and tonal information processing. Some researchers have suggested that structural modifications of the model are necessary.

Method

Two experiments were conducted in which subjects had to perform short-term-retention-tasks with tonal and verbal information while concurrently performing verbal and non-auditory tasks. In a third experiment, the retention interval for tonal sequences was varied in order to dissociate passive and active mechanisms involved in the short-term-retention of tonal information.

Results

Applying the dual task method, performance was impaired not only in the verbal condition but also in the tonal condition. A non-auditory task did not influence performance. Similar patterns of results were found in subjects without musical training and in subjects with a medium level of musical expertise. Experiment 3 suggested that retention of tonal information is to some extent based on a passive phonetic store but also on an active rehearsal mechanism.

Conclusions

Results indicate that there is an overlap between working memory functions involved in the processing of tonal and verbal information. Obviously, the phonological loop is responsible for the processing of tonal information. It can also be concluded that both the phonological store and the rehearsal process are involved in the short-term-retention of tonal sequences.