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COMMENTARY

# No evidence yet for functional independence of verbal short-term memory and long-term verbal knowledge

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Bormann et al. (2025) argue that their case studies provide 'unequivocal evidence for the functional independence of short- and long-term memory'. We would like to challenge this conclusion. First, theories assuming that verbal short-term memory (STM) or working memory (WM) depends on language do not imply that language impairment always leads to verbal STM or WM impairment. Acquired language impairment can affect different linguistic representations and processes. These impairments affect verbal STM if and only if they concern representations or processes that are involved in STM tasks. In verbal immediate serial recall tasks, participants need to be able to decode, identify and repeat the verbal stimuli. This requires access to underlying sublexical and lexical input and output phonological representations, and potential additional access to associated semantic representations. Impairments to these processes can furthermore be highly specific relative to the type of material, with low frequency words being often more affected than high frequency words, or nonwords more than words. This situation is demonstrated by verbal STM performance of patients with semantic dementia. These patients show progressive loss of semantic representations associated with words and objects. Their verbal STM spans can be reduced for word but not nonword lists, and, most critically, they are reduced for those words which they do not know anymore (Majerus et al., 2007; Patterson et al., 1994). To argue that the conjunction of preserved performance on a verbal STM/WM task with impaired performance on various language tasks is evidence for a functional independence of verbal STM and language systems, it needs to be demonstrated that patients have difficulties in perceiving, identifying and repeating specific words in a language task but not in a verbal STM task.

Second, theories assuming a close relation between verbal STM/WM and language also do not imply that verbal STM/WM impairment should always go along with impaired performance on language tasks. This assumption can also only be properly tested if exactly the same stimuli are used for the STM and language tasks and if the language tasks test those linguistic processes that are involved in tests of STM/WM (e.g. repetition of verbal sequences). Furthermore, even within a cognitive model that reduces verbal WM to an emergent property of the language system (e.g. Martin et al., 1996), dissociations between performance in language tests and STM tests are possible. Computational modelling of the profile of patients with deep dysphasia, a repetition-based aphasic condition, suggests that depending

on the severity of an impairment of the decay rate of activated phonological, lexical and semantic representations, either more selective difficulties in verbal STM tasks (in case of a mildly reduced decay rate) or associations between STM and deep impairment in single word repetition tasks can be observed (in case of a more severely reduced decay rate) (Martin et al., 1996). This is also in line with a review of published STM cases that had shown that, overall, there is an association between the severity of STM impairment and residual language processing deficits, despite dissociations at the individual level (Majerus, 2009).

Finally, as Bormann et al. (2025) acknowledge, most verbal STM/WM accounts positing strong interactions between STM/WM and language systems do not reduce STM/WM to language activation only (e.g. Cowan, 2019; Majerus, 2013). Many models assume additional mechanisms such as attentional focalization/control and/or mechanisms for representing serial order (e.g. Oberauer, 2021). The latter can be selectively impaired relative to item-based aspects of retention and, furthermore, show complex and subtle interactions with language processing (e.g. Majerus et al., 2015; Tian et al., 2025).

## AUTHOR CONTRIBUTIONS

All authors contributed to the writing of the comment.

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