

## **"Effects of generation mode in fMRI adaptations of semantic fluency: Paced production and overt speech."**

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Verbal fluency paradigms are widely used for neuropsychological assessment and investigation. Unfortunately, unpaced (self-paced) versions of the verbal fluency paradigm typically used in behavioral studies are not ideal for study with functional magnetic resonance imaging (fMRI). The purpose of this study was to investigate the behavioral and functional neuroanatomical effects of using a paced version of a verbal fluency task. In addition, overt and covert versions of the task were compared by having subjects generate exemplars aloud or silently in different functional scans. There were four conditions in the fMRI experiment: paced-overt, paced-covert, unpaced-overt, and unpaced-covert. Twelve right-handed adults (4 males, 8 females) ages 21–37 participated in one fMRI scan of each condition. Behavioral data indicated that the number of exemplars generated in the overt conditions was comparable for the paced and unpaced conditions. Comparisons of imaging data obtained during the paced and unpaced conditions revealed significantly greater activation during the paced conditions in a number of frontal and temporal regions that have been previously reported in unpaced fluency paradigms. In addition, there was significantly greater activation during the paced conditions in frontal regions that have not been reported in unpaced fluency paradigms, but that are often associated with sustained attention, motor planning, and response inhibition. In the comparison of overt and covert conditions of the task, a number of frontal and parietal regions showed significantly greater activity during the covert conditions, but there were no regions in which activity was significantly greater during the overt conditions. We conclude that paced overt paradigms are desirable for adaptations of conventional semantic fluency in fMRI, given their superiority with regard to control over and monitoring of behavioral responses.