Vision Sciences Society Annual Meeting Abstract | September 2021

The Top-down Modulation of Task-Irrelevant Sounds Processing

Shari Cavicchi; Andrea De Cesarei; Matteo Valsecchi; Maurizio Codispoti

Author Affiliations
- Shari Cavicchi
  University of Bologna
- Andrea De Cesarei
  University of Bologna
- Matteo Valsecchi
  University of Bologna
- Maurizio Codispoti
  University of Bologna

Journal of Vision September 2021, Vol.21, 2049. doi:https://doi.org/10.1167/jov.21.9.2049

Abstract

Loud noises are salient events that mandatorily call for attention. It was observed that, despite being irrelevant for the ongoing task, they receive sufficient processing resources to have their spatial dimension identified, as reflected by an enlarged positivity observed over the contralateral visual cortex (ACOP, Auditory-Evoked Contralateral Occipital Positivity). However, it is still unclear whether task-irrelevant salient sound processing is solely stimulus-driven or, rather, can be modulated by top-down mechanisms. In the present study, we measured changes in the ERPs and oculomotor activity elicited by task-irrelevant sounds delivered unilaterally during the retention interval of a visual change detection task. Sounds were not included in the current attentional set, so their processing was purely stimulus-driven. Participants had to remember one or four colored squares occurring on the left or right side of the display, while avoiding overt gaze shifts. This manipulation allowed us to explore whether acoustic distractor processing as reflected in the ACOP is affected by endogenous spatial attention and Visual Working Memory (VWM) load. A significant ACOP was observed over parieto-occipital sites in the 280-500 msec time window after sound onset, and its amplitude was modulated by endogenous spatial attention. Specifically, the ACOP was attenuated when the task-irrelevant sound location was opposite to the one of the memoranda, but it was never suppressed. In addition, gaze was directed towards the VWM contents location after the memory array offset, and was never attracted by the acoustic distractor. Therefore, our results suggest that, when eye-movements are discouraged, the oculomotor system is mostly guided by VWM contents instead of being captured by auditory distractors in a stimulus-driven way. The present findings suggest that top-down mechanisms can modulate the extent to which acoustic distractors receive processing resources; however VWM load does not seem to affect the processing of task-irrelevant sounds.

This work is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License.