

Inattention opens door for unconscious processing during continuous flash suppression

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RATIONALE: Growing evidence indicates that our brain performs semantic analysis for the consciously unavailable stimuli presented due to continuous flash suppression. In the present study, rather counterintuitively, we hypothesized inattention facilitates the extent to which the suppressed stimulus is semantically processed based on the previous findings. First, previous studies indicate that invisible stimuli due to inattention are processed (Luck et al., 1996; Giesbrecht et al., 2007). Second, when attention was diverted, rivalry suppression was attenuated (Zhang et al., 2009; Brascamp et al., 2012). Third, the location of the suppressed stimuli was uncertain in those studies showing semantic processing of the invisible stimulus induced by the continuous flash suppression (Costello et al., 2009; but see Kang et al., 2011). Taken together, if the locus of attention is different from the location of the suppressed stimulus due to its position uncertainty, it can attenuate rivalry suppression. Thus, inattention to the location of the suppressed stimulus opens door for highlevel analysis in the absence of awareness.

METHOD: We manipulated attention by adopting a cueing paradigm while measuring the N400 component, a sensitive, electrophysiological index for semantic analysis. Specifically, participants performed a related and unrelated semantic judgment task for the sequentially presented pairs of words. In the inattention condition, the target word was rendered invisible by the continuous flash suppression and presented in the cued location. In the outattention condition, the target word was rendered invisible and presented in the uncued location. In the dioptic condition, the target word was presented dioptically on the continuous flash suppression stimuli.

RESULT: In the dioptic condition, the N400 was robustly produced with a high semantic judgment performance. Critically, despite the chance level semantic judgment performance, a significant N400 was found in the outattention condition while the N400 was not found in the inattention condition. In particular, the magnitude of the N400 of the outattention condition was about a half of its magnitude obtained from the dioptic condition.

CONCLUSION: This result demonstrates that lack of attention is critical for unconscious semantic processing for the suppressed stimuli induced by the continuous flash suppression.

* This work was supported by the National Research Foundation of Korea (NRF) grant funded by the Korean government (NRF20110025005, NRF2013S1A5A8025812).