

Doctoral Dissertations 1911-2013

Off-campus UMass Amherst users: To download campus access dissertations, please use the following link to [log into our proxy server](#) with your UMass Amherst user name and password.

Non-UMass Amherst users: Please talk to your librarian about requesting this dissertation through interlibrary loan.

Dissertations that have an embargo placed on them will not be available to anyone until the embargo expires.

Effects of Auditory and Visual Temporally Selective Attention on Electrophysiological Indices of Early Perceptual Processing

Patrick V. Taylor, University of Massachusetts - Amherst

[Download](#)

Available for download on
Wednesday, February
01, 2017

[SHARE](#)

Date of Award
2-2014

Document Type
Campus Access

Degree Name
Doctor of Philosophy

Degree Program
Neuroscience and Behavior

First Advisor
Lisa D. Sanders

Second Advisor
Kyle R. Cave

Third Advisor
Jane Couperus

Keywords
Biological sciences, Psychology, Selective attention, Electrophysiological, Early perceptual processing, Event-related potential, ERP, Temporal attention

Subject Categories
Cognitive Psychology | Developmental Psychology | Neuroscience and Neurobiology

Abstract
Temporally selective attention is preferential processing of sensory information at selected time points. Event-related potential (ERP) studies have shown that auditory temporal attention modulates perceptual

Enter search terms:

[Advanced Search](#)

[Notify me via email or RSS](#)

[Browse](#)

[Collections](#)

[Disciplines](#)

[Authors](#)

[Author Corner](#)

[Author FAQ](#)

processing by 80ms after sound onset, as does auditory spatial attention. The shortest-latency efforts of visual temporal attention on perceptual processing are consistently later than for visual spatial attention. Methodological differences in previous measures of temporal attention prevented direct comparisons between modalities. Most studies of temporal attention lacked distractors, which influence spatial attention, and may impact temporal selection.

In four ERP experiments, participants were trained to attend to a time around 500, 1000, or 1500 ms after trial onset, to detect rare deviants among common standards. Auditory or visual stimuli were presented as single isolated events or among sequences of temporal distractors.

Distractors increased auditory performance over visual at the long times, and decreased it at the short times, though overall performance was equal across modality. Three experiments showed a decrease in temporal discrimination from better at shorter than medium, to worst at long times; in the experiment with auditory distractors, there was no effect of deviant presentation time.

A negativity leading up to attended times (CNV) may have indexed timing-related processing. Independently, both targets and non-target standards/probes at attended times elicited a larger posterior positivity ~300 ms after onset (P3) compared to identical stimuli at unattended times. In both auditory experiments temporal attention appeared to elicit larger negativities in the auditory N1 time window to non-target standards/probes. Temporal attention also appeared to increase visual N1 amplitude, but only with single stimuli without distractors. Modulations of perceptual processing were observed at shorter latencies for sounds (auditory N1) than images (visual N1).

Individual variation was indexed by a positive correlation across all experiments in the ability to discriminate between temporal intervals. Behavioral ability to discriminate the time intervals did not explain variability in effects on early perceptual processing (N1).

Differences in temporal attention between the visual and auditory modalities likely exist. Temporal attention may act earlier in the auditory modality than visual, independent of experimental paradigm.

Recommended Citation

Taylor, Patrick V., "Effects of Auditory and Visual Temporally Selective Attention on Electrophysiological Indices of Early Perceptual Processing" (2014). *Doctoral Dissertations 1911-2013*. Paper 574.

http://scholarworks.umass.edu/dissertations_1/574

This page is sponsored by the [University Libraries](#).

© 2009 [University of Massachusetts Amherst](#) • [Site Policies](#)