

# ScholarWorks@UMass Amherst

## OPEN ACCESS DISSERTATIONS

### **Title**

Gradients and Ranges of Visually Selective Attention Based on Location, Objects, Color, and Size: Gradients are Universal, but Range is Uniquely Spatial

### **Author**

William S. Bush, *University of Massachusetts Amherst* Follow

### **Date of Award**

9-2012

### **Document Type**

Open Access Dissertation

### **Degree Name**

Doctor of Philosophy (PhD)

### **Degree Program**

Neuroscience and Behavior

### **First Advisor**

Kyle R. Cave

### **Second Advisor**

Lisa D. Sanders

### **Third Advisor**

Matthew C. Davidson

### **Subject Categories**

Neurosciences

### **Abstract**

Two interesting properties of the distribution of spatially selective attention have been noted in the behavioral and electrophysiological literature. First, there is a graded field of attention that expands from the center of the attended area. Second, the size of the attended area can be adjusted to be either larger or smaller in order to match the demands of the current task. Five event-related potential (ERP) studies are presented that extend these findings in several important ways; 1) The time frame of these two distribution properties is different. Results are consistent with a two stage model of spatial attention in which visual processing is initially enhanced for all stimuli presented near the center of the attended area as indexed by the amplitude of the first negative peak in the waveform (N1). Subsequently, the effects of narrowing or expanding the attentional field to the relevant size affects visual processing as indexed by the amplitude of the second negative peak (N2). 2) Object boundaries had limited impact on either the spread of the initial gradient of spatial selection or the scale of attention. 3) When selecting visual stimuli for attentive processing based on features such as color and size there is also a gradient of facilitation, but the impact of this graded selection on visual processing is not observed until later in processing, and is indexed by the amplitude of the selection negativity (SN). Furthermore, similar to the lack of interaction between object boundaries and the range of cued locations, the gradients of feature-based selection are not affected by the range of cued features.

### **Recommended Citation**

Bush, William S., "Gradients and Ranges of Visually Selective Attention Based on Location, Objects, Color, and Size: Gradients are Universal, but Range is Uniquely Spatial" (2012). *Open Access Dissertations*. 633.

[https://scholarworks.umass.edu/open\\_access\\_dissertations/633](https://scholarworks.umass.edu/open_access_dissertations/633)

[Download](#)

DOWNLOADS

Since December 11, 2012

Included in

Neurosciences Commons

Share

COinS