

## 1. Introduction

Most studies of attention focus on its spatial domain. New branch of approaches highlights the idea that temporal attention can be focused to a specific moment in time. Temporal expectations about following events might improve response performance on a par with spatial attention.

### Temporal attention

**Attention** may be considered as the process of allocating information-processing resources, whereby allocation can be achieved by multiple modes and domains.

- 4 domains - space, **time**, sense, and task
- 2 modes (for each domain) – **exogenous** (reflexive, bottom-up stimulation) and **endogenous** (non-reflexive, related to contingencies and inner goals of subject)

The main purpose of temporal attention studies is to describe independent functioning of these modes and understand its automatic or voluntary nature.

However, the dual capacity for the signal (cue) to engage both exogenous and endogenous modes of temporal attention is a huge **methodological confound**.

## 2. Methodology

Lawrence and Klein (Lawrence & Klein, 2013) found very elegant way to isolate endogenous and exogenous modes of attention and check the interaction between them. To do so they combined two methods:

### The Rescorla's "Truly random" control paradigm

Contingency manipulation.  
Procedure, where is no any contingencies between cue (S) and target (T). S and T are presented randomly and independently.

### New signal stimulus paradigm

Intensity manipulation.  
Audial cue, consisting of 2 parameters:

- change in interaural correlation from 1 to 0 and then back to 1.
- Volume (baseline or higher).

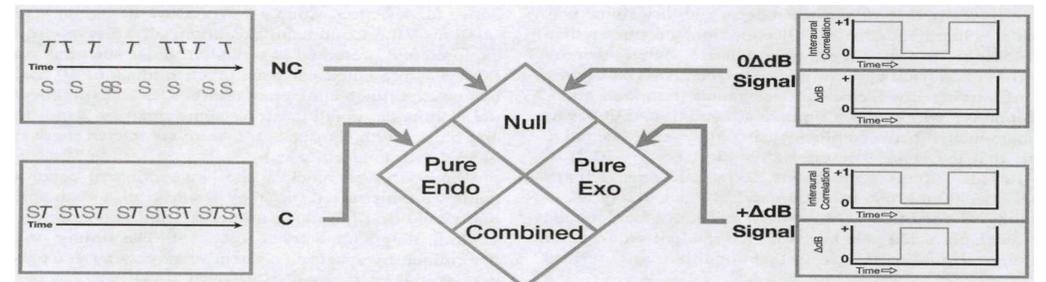


Figure 1. Variables manipulated and meaning of their combination (Lawrence & Klein, 2013).

## 3. Research Proposal

### Hypothesis

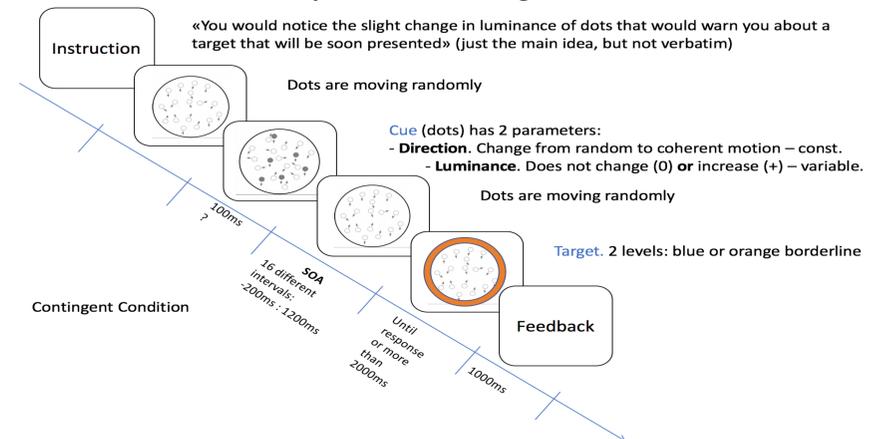
Our **main goal** is to replicate Lawrence and Klein experiment by adding some changes:

- Audial cue → Visual cue
- Posner cueing task → Random dot motion coherent task

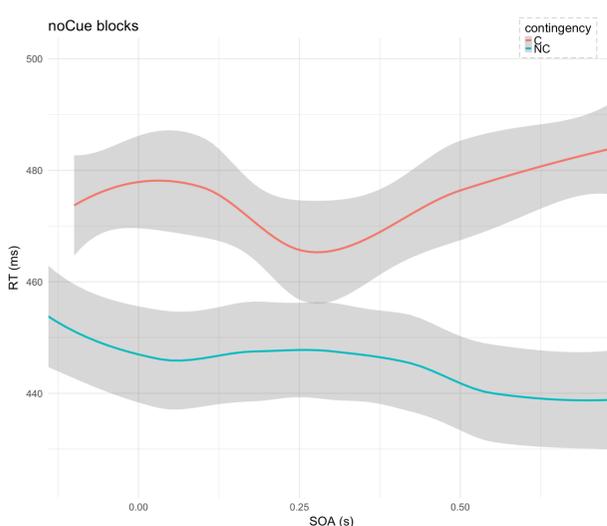
**Overall Hypothesis:** The change of modality of alertness cueing from audial to visual will give the same results as in the Lawrence and Klein experiment.

**Participants:** 16 participants were recruited.

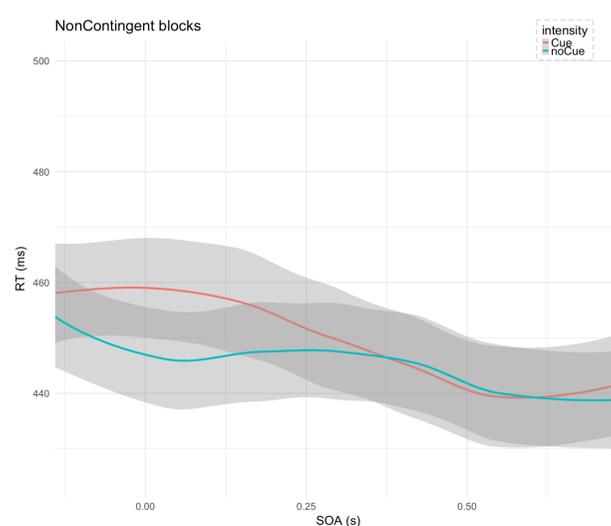
## 4. Experimental Design



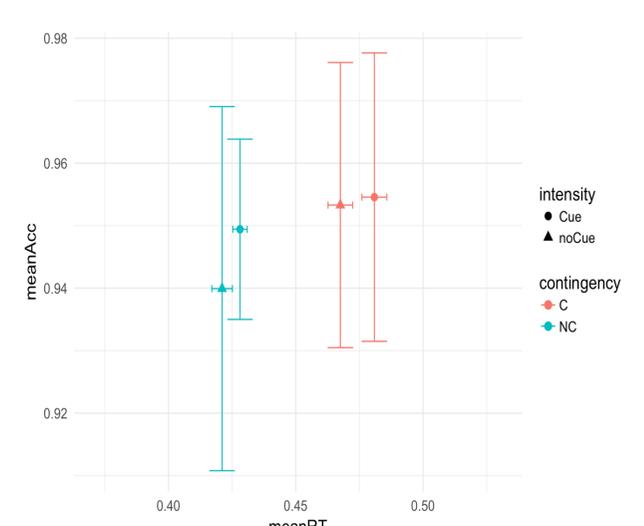
## 5. Results



**Main Effect of Contingency\***  
Purely Endogenous attention (red line)



**Main Effect of Intensity\***  
Purely Exogenous attention (red line)



**Speed-Accuracy Trade-off**

## 6. Discussion

- For both Intensity and Contingency main effects we've got significant results. However they are totally opposite to Lawrence and Klein results:
  1. Instead of early facilitation for exogenous attention we have early Inhibition of return (IOR).
  2. Instead of faster responses in Endogenous condition, we observe slower responses.
- Pure costs in Intensity and Contingency are not because of Speed-Accuracy Trade-off (is not significant).
- These unexpected results might be explained in terms of several ways:
  1. True modality differences
  2. Insufficient amount of data (pilot experiment)
  3. Exogenous attention does not always bring early facilitation. One of the reason for this explanation is an attentional set that might change the allocation of attention to the cue

### References

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