Global interference and field independence in hierarchical visual processing

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Background and Research Questions

- Hierarchical visual stimuli include a large structure (global level) made up of small details (local level)
- Research suggests that there is independent processing of global and local level.
- Global information is reported faster and more accurately than local information.
- Previous research from our lab: Global Precedence Effect (faster response to Global level) was not affected by the type of stimulus.

Current study:
- Field Independence: ability to differentiate local shapes from within a global structure.
- Global Interference: attention on the global level interferes with processing information on the local level.

Research Questions

1. Does the type of stimuli (meaningfulness) affect field independence and global interference?
2. Does field independence correlate with global interference, and is this correlation affected by the meaningfulness of stimuli?

Methods

EFT task – measures Field Independence

Click on the context figure that contains the target shape

EFT stimuli

Target
Object context figures
Inverted-object context figure
Non-object context figures

Navon task – measures Global Interference

Is the target present in the compound stimulus?

Navon task stimuli

<table>
<thead>
<tr>
<th>Target</th>
<th>Global Analysis</th>
<th>Local Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Target Present</td>
<td>A, S, F, E</td>
<td>A, S, F, E</td>
</tr>
<tr>
<td>Target Absent</td>
<td>A, S, F, E</td>
<td>A, S, F, E</td>
</tr>
<tr>
<td>Target Invisible</td>
<td>A, S, F, E</td>
<td>A, S, F, E</td>
</tr>
</tbody>
</table>

Results

EFT task

Object = Inverted-object > Non-object

Navon task

Global interference

Letter > Object = Non
Letter < Object = Non

Conclusions

- Meaningfulness of the stimuli does affect performance in both tasks.
- EFT: better performance for the object condition compared to the non-object condition.
- Navon: letter stimuli had better performance than objects and non-objects.
- Navon: more interference from the global level when stimuli were letters than when the stimuli were objects and non-objects.
- No correlation between Navon task and EFT, suggesting separate processes for the two tasks.