Selective attention in scale space

- Hybrid Stimuli
  - Combine the LSF and HSF of two different images (LSF < 2 c/d and HSF > 6 c/d).
  - Multiplex information in scale space.
  - Enable the analysis of task-dependent scale biases.
  - Enable the study of selective attention in “scale space”

Figures removed due to copyright restrictions.

Oliva & Schyns, 1997

Selective attention in scale space

Different face categorizations elicited a different usage of spatial scales

Figures by MIT OpenCourseWare.

Selective attention in scale space

Mutually exclusive categorization of identical stimuli

Selective attention to a spatial scale (with overlapping stimuli at different frequencies) is possible

Figures by MIT OpenCourseWare.

Subjects were not aware of the presence of two scenes.

Oliva & Schyns, 1997

Selective attention in scale space

% of correct categorization

Figures removed due to copyright restrictions.

Oliva & Schyns, 1997
Selective and Divided Attention

- **Selective attention:** we choose to attend to stimuli and ignore others. The concentrated focus of attention on particular stimuli or some information of those stimuli enhances our ability to manipulate them for other cognitive processes.

- **Divided attention:** we allocate our available attentional resources to coordinate performances on more than one task at a time.

Divided Attention

- We often manage to engage in more than one task at a time and we **shift** our attentional resources to allocate them as needed.
- Example: experienced drivers easily can talk while driving under most circumstances, but they can quickly **shift** all their attention from talking and toward driving...
- Question: how difficult is it to do 2 or more tasks at once?
- \( \Rightarrow \) **Dual-task performance**

Divided attention while driving: a dangerous dual task

- A dual task performance in the real world.
- Legislation: prohibit drivers from talking on cell phones while behind the wheel.
- Using cell phones while driving is believed to be a major cause in 50% of highway accidents.
- The argument is: talking on a cell phone distracts the driver’s attention from navigating the vehicle on the road.

Talking on a Cellular Telephone Dramatically Increases Sustained Inattentional Blindness

**Brian Scholl, Nicholas Noles, Rachel Sussman, & Vanya Pasheva**

![Multiple-Object Tracking](http://www.yale.edu/perception/)

1. Requires **sustained** attention (vs. shifts)
2. Inherently **active** tracking (vs. monitoring)
3. No required strict timing constraints!
4. Yields relatively large & salient effects
5. **Can easily vary the attentional load . . .**

Method Notes

- Natural cell phone conversation
- MOT: Track 3 in 7 black circles
- Extra items: 4 white Ls
- Tracking for 15 seconds, UE (red cross) visible for 5 s
- 20 subjects / condition
- 4 Track-only trials preceding critical trial

Results (UE =+)

<table>
<thead>
<tr>
<th>Tracking Task</th>
<th>Tracking %</th>
<th>Noticing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>77.2%</td>
<td>70%</td>
</tr>
<tr>
<td>Cellphone</td>
<td>78.4%</td>
<td>10%</td>
</tr>
<tr>
<td>Talking</td>
<td>75.1%</td>
<td>25%</td>
</tr>
<tr>
<td>Listening</td>
<td>78.9%</td>
<td>5%</td>
</tr>
<tr>
<td>Shadowing</td>
<td>76.4%</td>
<td>25%</td>
</tr>
</tbody>
</table>

Figure removed due to copyright restrictions.

Implications

... for Human Factors (+Policy)

- Inattentional blindness may be a critical cause of collisions

... for Psychology

- Perception research can be ecologically valid!
- The multi-modal nature of attention
- Interference between modalities.
