Name ____________________________

Perception Laboratory: Basic Visual Processing

1. Ganzfeld
Tell me approximately how long it took you for the effect to kick in and describe your perceptual experience when it happened. What does that say about the importance of edges?

2. Mach Bands
Explain the role of lateral inhibition in producing the Mach Bands. Focus your explanation on the receptive fields (A-E) illustrated in the figure. For example, how would the ganglion cell connected to Receptive Field A differ in firing from the ganglion cell connected to Receptive Field B? What about D and E? Explain why B would produce less firing than A and D would produce more firing than E?

3. Lightness in Context
How might you explain the different perception of identical stimuli (in this case identical gray squares)? What might your experience have to say about the relative nature of perception? Why does your perceptual experience of the gray squares differ in A, B, and C?

A

B

C
In D, which four gray squares (on left or right) seem darker? Given the immediate background, which four gray squares should seem darker?

In E, which of the two gray lines (on left or right) seems darker? Given the immediate background, which line should seem darker?

In both D and E the target lightness that emerges is not driven by the immediately surrounding lightness, so how would you explain the perception of lightness that emerges?

In F, do the two gray triangles (on left or right) differ in lightness? Note that the surround of the two triangles is identical (two sides surrounded by black and one side surrounded by white). Some people may not perceive a difference in lightness. For those who do, the effect may not be particularly strong. What do you experience? Why do you think you have the experience of lightness that you do?
Why are the two squares (labeled A and B) in Adelson’s demonstration perceived as different in lightness, even though they are identical?

Why do the gray ellipses in the room appear to differ in lightness? (Of course, they are identical.)

Actual depth relations have an impact on perceived lightness (e.g., Gilchrist study, above left).

Both Mach’s Book and Kersten’s demonstration rely on mentally changing the depth relations in a stimulus. Note that the retinal stimulation doesn’t change. As a result, one might predict that the lightness perception would not change. However, that’s clearly not the case. Can you explain why?
### 4. Lightness/Brightness Illusions and Demonstrations

#### a. R. Beau Lotto Site Illusions

<table>
<thead>
<tr>
<th>Illusion</th>
<th>Your explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td></td>
</tr>
<tr>
<td>H</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td></td>
</tr>
<tr>
<td>L</td>
<td></td>
</tr>
</tbody>
</table>

#### b. Adelson Site

<table>
<thead>
<tr>
<th>Demonstration</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simultaneous Contrast</td>
<td></td>
</tr>
<tr>
<td>(why does the articulated background enhance the effect?)</td>
<td></td>
</tr>
<tr>
<td>Craik-O’Brien-Cornsweet Effect</td>
<td></td>
</tr>
<tr>
<td>Vasarely Illusion</td>
<td></td>
</tr>
</tbody>
</table>

Based on these experiences, what factors (besides the differences in retinal activity) seem to you to be responsible for our experience of lightness/brightness?
5. Hermann Grid, etc.
The Hermann Grid provides you with another example of a perceptual experience that is not consistent with the visual stimulus. Why might you be seeing dark spots on the grid when no dark spots are actually present? And why might shrinking the stimulus lead the dark spots to disappear?

The "scintillating grid" demonstration was discovered by Elke Lingelbach. It's similar to the Hermann grid, but not identical in its effect. What is your experience like? Why do you think that the stimulus leads to your perception?

As you are already beginning to observe, our visual system is a "value added" system. It takes in stimulation from the outside world, but it processes that input in ways that may lead to perceptual experiences that are quite different from the visual input. What occurs at the blind spot is a great illustration of the contributions of filling-in processes that are ubiquitous in the processing of incomplete stimuli.

What is your perceptual experience of each stimulus? Why?

a. 

b. 

The Hermann Grid provides you with another example of a perceptual experience that is not consistent with the visual stimulus. Why might you be seeing dark spots on the grid when no dark spots are actually present? And why might shrinking the stimulus lead the dark spots to disappear?

The "scintillating grid" demonstration was discovered by Elke Lingelbach. It's similar to the Hermann grid, but not identical in its effect. What is your experience like? Why do you think that the stimulus leads to your perception?

As you are already beginning to observe, our visual system is a "value added" system. It takes in stimulation from the outside world, but it processes that input in ways that may lead to perceptual experiences that are quite different from the visual input. What occurs at the blind spot is a great illustration of the contributions of filling-in processes that are ubiquitous in the processing of incomplete stimuli.

What is your perceptual experience of each stimulus? Why?

a. 

b. 

The Hermann Grid provides you with another example of a perceptual experience that is not consistent with the visual stimulus. Why might you be seeing dark spots on the grid when no dark spots are actually present? And why might shrinking the stimulus lead the dark spots to disappear?

The "scintillating grid" demonstration was discovered by Elke Lingelbach. It's similar to the Hermann grid, but not identical in its effect. What is your experience like? Why do you think that the stimulus leads to your perception?

As you are already beginning to observe, our visual system is a "value added" system. It takes in stimulation from the outside world, but it processes that input in ways that may lead to perceptual experiences that are quite different from the visual input. What occurs at the blind spot is a great illustration of the contributions of filling-in processes that are ubiquitous in the processing of incomplete stimuli.

What is your perceptual experience of each stimulus? Why?

a. 

b. 

The Hermann Grid provides you with another example of a perceptual experience that is not consistent with the visual stimulus. Why might you be seeing dark spots on the grid when no dark spots are actually present? And why might shrinking the stimulus lead the dark spots to disappear?

The "scintillating grid" demonstration was discovered by Elke Lingelbach. It's similar to the Hermann grid, but not identical in its effect. What is your experience like? Why do you think that the stimulus leads to your perception?

As you are already beginning to observe, our visual system is a "value added" system. It takes in stimulation from the outside world, but it processes that input in ways that may lead to perceptual experiences that are quite different from the visual input. What occurs at the blind spot is a great illustration of the contributions of filling-in processes that are ubiquitous in the processing of incomplete stimuli.

What is your perceptual experience of each stimulus? Why?

a. 

b. 

The Hermann Grid provides you with another example of a perceptual experience that is not consistent with the visual stimulus. Why might you be seeing dark spots on the grid when no dark spots are actually present? And why might shrinking the stimulus lead the dark spots to disappear?

The "scintillating grid" demonstration was discovered by Elke Lingelbach. It's similar to the Hermann grid, but not identical in its effect. What is your experience like? Why do you think that the stimulus leads to your perception?

As you are already beginning to observe, our visual system is a "value added" system. It takes in stimulation from the outside world, but it processes that input in ways that may lead to perceptual experiences that are quite different from the visual input. What occurs at the blind spot is a great illustration of the contributions of filling-in processes that are ubiquitous in the processing of incomplete stimuli.

What is your perceptual experience of each stimulus? Why?

a. 

b. 
What is your perceptual experience of these stimuli? Why?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>c.</td>
<td></td>
</tr>
<tr>
<td>d.</td>
<td></td>
</tr>
</tbody>
</table>

What is your perceptual experience of these stimuli? Why?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>e.</td>
<td>f.</td>
</tr>
</tbody>
</table>

f. (what happens to the vertical and horizontal lines?)

What is your perceptual experience of these stimuli? Why?

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>g.</td>
<td>h.</td>
</tr>
</tbody>
</table>

Basic Visual Processes Lab - 6
What is your perceptual experience of these stimuli? Why?

i.

j.

What is your perceptual experience of these stimuli? Why?

k.

l.

What is your perceptual experience of this stimulus?

m.

What does activity at the blind spot tell us about filling-in processes?