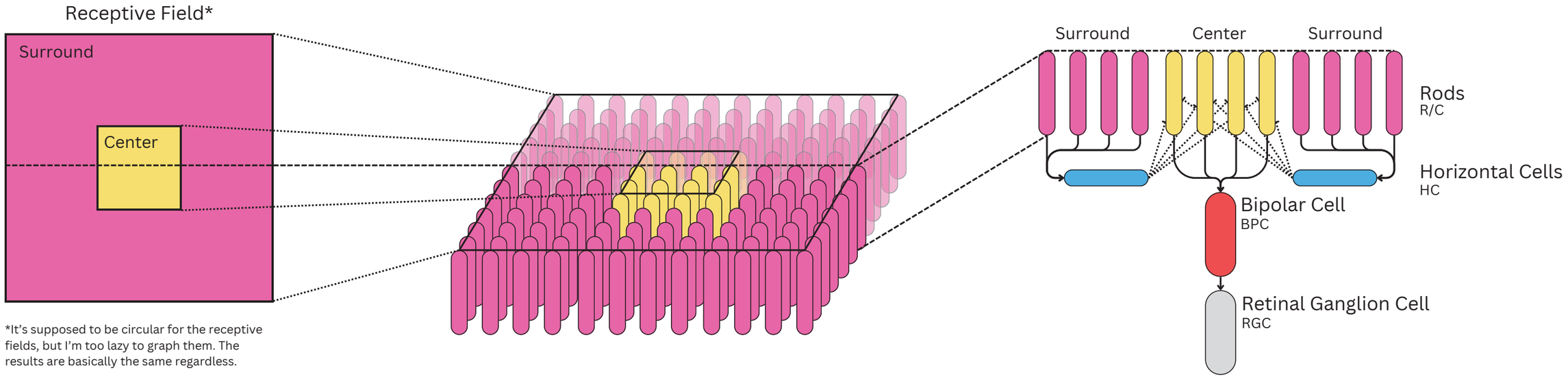
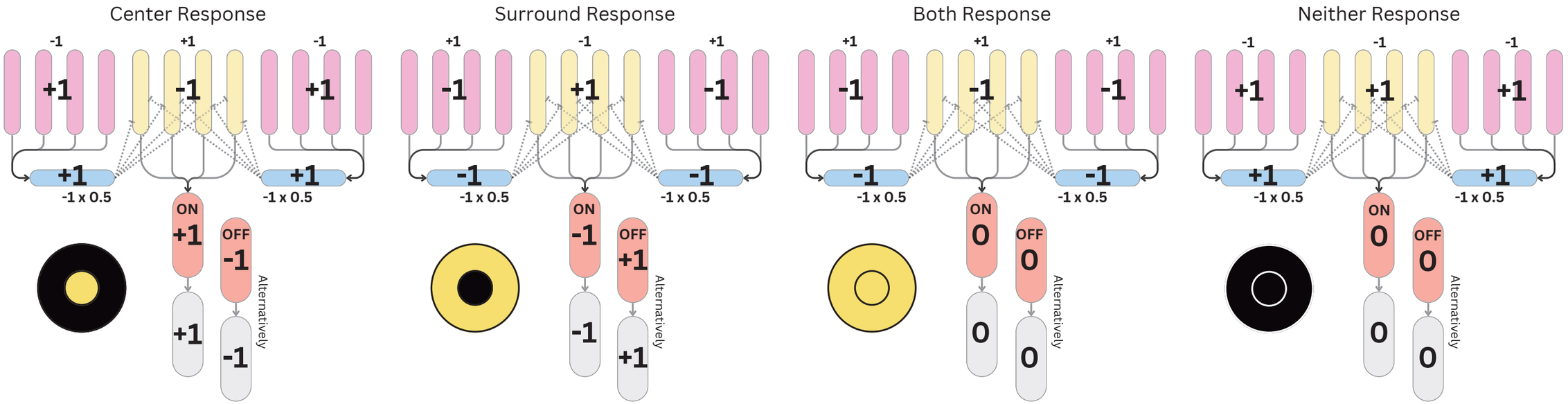


*It's supposed to be circular for the receptive fields, but I'm too lazy to graph them. The results are basically the same regardless.



Parameter Manipulation

This model takes in 2 inputs and shoots out a gradient output.

The 2 inputs are:
- The light activates the rod (+1)
- The light does not activate the rod (-1)

The output gradient is between -1 and +1, signaling the magnitude of RGC depolarization.
- -1 represents maximal hyperpolarization
- +1 represents maximal depolarization
- 0 represents spontaneous activity

hyperpolarization	spontaneous	depolarization
-1	0	+1

Depending on the cell type, the input signal can be manipulated.

- R/C apply a (-1) multiplier because in the presence of light, they hyperpolarize.
- HC apply a (-1) multiplier because they are inhibitory cells that release GABA.
- ON-BPC apply a (-1) multiplier because they express mGluR.
- OFF-BPC apply a (+1) multiplier because they express iGluR.

At every synapse, the values add up. If the value exceeds the range, simply cap it at the boundary.

To achieve a gradient, each R/C connection to HC will have a "weight". For simplicity, each HC will hold a weight of the inverse of the number of HC within that receptive field.

Similarly, for simplicity, the weight of each rod will be the inverse of the number of rods connected to HC or BPC.

For this model, we won't be considering color vision. Color vision will be modeled with a 4-dimensional vector with specific filtering matrices for corresponding cones.

We will also not go into detail regarding phototransduction and molecular mechanisms behind each cell.

Receptive Field Overlap

In this model, it is easy to assume that a R/C can only correspond to 1 RGC, similar to an surjective function.

However, the correlation between R/C and RGC are nothing like a typical function.

- An RGC can correspond to multiple R/C on average.
- A R/C can correspond to multiple RGCs as well.

An exception to this correlation would be the fovea, where a 1:1:1 R/C:BPC:RGC average ratio is maintained for high-definition vision.

As a result, the following needs to be taken into consideration.
- An R/C cell can be in a center RF for one RGC while being a surround RF for another.

In other words, RGC receptive fields overlap.