Methods:

1. *Participants*. 5 healthy participants with normal vision at the ages 21-28 participated in all different parts of the experiment. 3 females, 2 right-handed with right dominant eye, 3 right-handed with left dominant eye. All participants were given full and detailed explanation about the eye tracker device and the behavioral task, and were paid for their participation. Informed consents were obtained from all the participants, in accordance with the approved Declaration of Helsinki for this project.
2. *Experimental Setup*. The experiment took place in a dark and quiet room where the participants sat in front of a high-resolution, fast response time computer screen (VPixx, 1920x1080, 120Hz) and their EyeM were recorded and used for manipulation in real-time using an eye-tracker device (EyeLink II). Throughout each trial only the dominant eye of the participant was opened and tracked (at 100Hz sampling rate) – the other eye was covered with a blindfold. The participants sat 1 meter away from the screen and placed their chin on a chinrest to prevent head movements.
3. *Experimental Design*. We tested the performance of participants in a five forced choice shapes recognition tasks: Images of 5 basic shapes were taken from a SenSub experiment (Zilbershtain-Kra et al., 2014) and were pre-processed (see next sub-section, *Stimuli processing*) and used in each part of the experiment. Square, rectangle, circle, triangle and a parallelogram. Each trial lasted up to 30 seconds, each session about 10 minutes.

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| --- | --- | --- | --- | --- |
| Day 1 | Day 2 | Day 3 | Day 4 | Day 5 |
| Big + Small (tunneled) | Big + Small (tunneled) | Big + Small (tunneled) | Small + Small (tunneled) | Big + Small (natural) X 2 |

*Tunneled vision sessions*. Participants had to identify a shape that was “hidden” on the screen. At any moment only a “window” around their current gaze position was exposed. See next section, *Stimuli processing,* for ‘Big’ and ‘Small’ preparation steps. *Natural vision sessions.* Participants had to identify the same shapes, naturally viewing them with no constrains.

1. *Stimuli processing*. All following steps were made in order to constrain the visual bandwidth in a quantitative manner. We used constrains entailed by the SenSub device (Zilbershtain-Kra et al., 2014). Two kinds of analogs were created and used (‘Big’ and ‘Small’). The SenSub device had 3 finger pads containing 4x8 pins, and the average size of the shapes was about 25x25 pixels, which means about **4.5x4.5 times** bigger than the ‘window size’ (the array size). This ratio between the image size and the window size was kept in both following analogs. *‘Fovea analog (BIG)’.* The part of the finger with the highest receptor density is an area about 0.5 (Haven, 1989) in the fingertip, which is the area that is covered by the pad of the SenSub device. In order to compare between the eye’s fovea and the finger’s fovea two resizing steps were made: resizing the shape to a 25x25 pixels size to ensure a fixed amount of “informative pixels” reached the eye’s fovea, and resizing the new pixelated image back to 4.5x4.5 times bigger than the eye’s fovea size (eye’s fovea is ~1.2 degrees, the screen is 1 meter away, final size is about 158x158 pixels). In this analog the final size of the image is about **10.6 degrees**. *‘Receptors analog (SMALL)’*. The density of the nerve fibers in the finger’s fovea is about 300 fibers per (Roland, 1987) while the eye’s fovea contains ~ 14,000 receptors ( Shroff & Anand, 2011). In order to compare the actual amount of receptors activated, only 75 retinal receptors got sensory information. This was done by resizing the pixelated image to a much smaller final image size of about 51x51 pixels, which are only about **0.8 degrees.** In addition a last processing step of filtering the images was taken, as a comparison to the finger’s skin smoothing constrain. The size of the filter was computed according to the ‘elastic moduli’ (a number that measures an object resistance to being deformed elastically when a force is applied to it) of the fingertip skin (Dandekar, Raju, & Srinivasan, 2003).
2. *Eye movement processing*. A velocity based algorithm developed by Amos Arieli (based on previous algorithm introduced by Engbert and Kliegl, 2003 and improved by Bonneh et al., 2010) was used for detecting all saccades and drift. We used the following threshold parameters for saccades detection: 8 and 16 deg/sec minimal and maximal velocity respectively, 0.3 deg minimal amplitude. Each detected saccade was manually examined to verify the quality of saccadic detection. Fixation periods between saccades were labeled drift only if they exceeded 3 samples, a 30ms minimum duration.
3. *More detailed on the different analysis made for each figure?? (or those details are written in the captions?)*