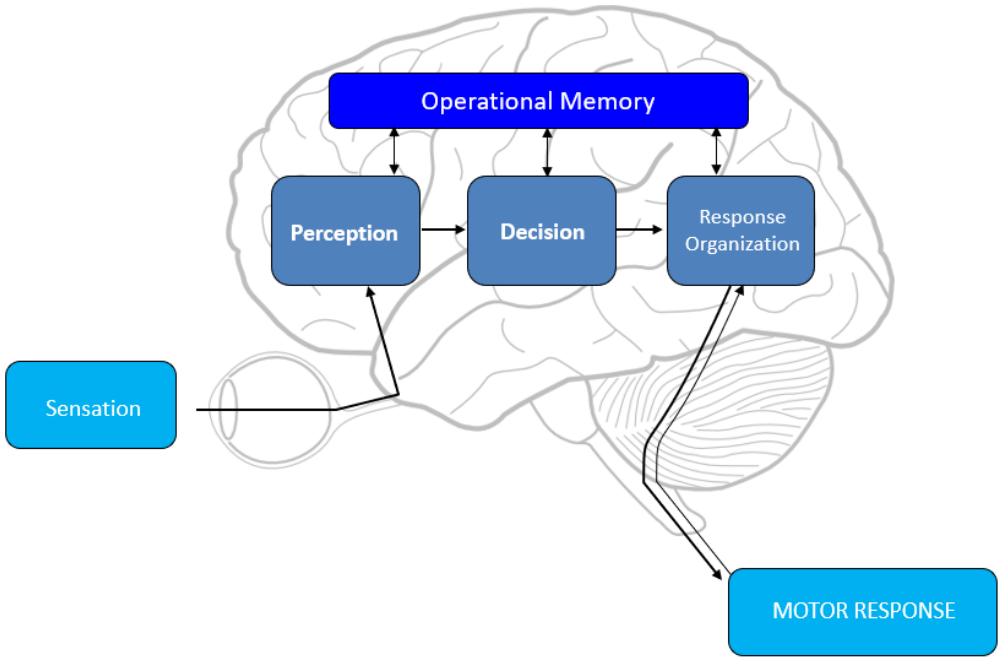
The Science Behind Sensory Training

The eyes and brain work together to gather and process information from the external world. The internal structures of the eye must refract light precisely and the brain must move the eyes to focus the view of the world to the retina under ever changing conditions. The better the eye and brain work together, the better the information received by the individual.

70% of all sensory receptors in the human body are in the eyes. There is more information at the 126 million photoreceptor cells in the eyes than what can be sent to and processed by the brain. The bipolar and ganglion cells encode this information to send to the brain through just over a million optic nerve bundles that connect each eye to the brain. Visual sensation occurs at this initial stage.

Once the information is passed through optic nerve, the information continues through pathways to the visual cortex of the brain. This is where visual perception occurs. The visual cortex organization is its retinotopic layout. In other words, the surface of the visual cortex is a map of the retina. Because of this mapping, examining visual perception by the brain can provide clues about the state of the visual system.

Alan Welford's model of information processing identifies components of sensation, perception, and other contributors that lead to a motor response. Operational memory (short term and long term) provides the context of previous experiences. The decision component compares the current situation to previous experiences. The response organization prepares the motor program needed to execute the desired action. Once the action is executed, resulting in a motor response, the motor response will also provide vestibular and proprioceptive information to be considered in the next planned action.



Researchers have examined human ability by studying these components, in isolation or integrated. Visual performance research has studied these components that athletes are superior to lesser level and non-athletes. Visual skills varies by sport and position. These skills also increase and decrease with age.

The Senaptec Sensory Station is the world's most robust and holistic solution for measuring and comparing sensory skills across individuals. By creating a standardized sensory assessment (validated by 3rd parties) and running this assessment across thousands of individuals, the Sensory Station can be used as a reliable normative baseline for vision and sensorimotor skills.

Research has also shown that sensory skills can be improved because of neuroplasticity. Neuroplasticity is the ability of the brain to reorganize itself by forming new neural connections in response to changing demands. Several studies have shown that the brain's sensory processing skills are modifiable. Neuroplasticity allows the neurons in the brain to adapt to new situations and to compensate from injury or disease. Senaptec relies on this capability for sensory improvement. The primary principle behind the improvement of vision is the same as that for most human improvement techniques – resistance. Sensory performance can be improved by challenging the brain to accomplish a task with less information or more quickly than normally required. The brain overcomes this resistance to become more efficient at processing the information from the eyes and other senses (e.g. proprioception). The result is improved sensory performance and a corollary improvement in competitiveness or general ability to function in the world.