

Effects of Acquired Brain Injury on Sensory and Perceptual Skills

Sensory and perceptual problems commonly occur following damage to either the right side of the brain or the parietal and occipital lobe region.

Such areas of the brain integrate the input from different senses. For example, the senses involved in recognising an apple may include touch (firm, spongy and smooth), sight (red or green, round, spotty, large etc.), sound (crunching and chewing), smell (fresh or rotting) and taste (a granny smith versus a red delicious, sweet or tangy).

The effects of brain injury may involve a range of sensory and perceptual problems which are often described according to the sensory perceptual system involved.

These systems include:

- auditory (perception of sounds)
- visual (perception of colour, shape, size, depth and distance)
- tactile (the perception of touch relating to pain, pressure and temperature)
- olfactory (perception of smells)
- gustatory (perception of taste).

A Closer Look at Visuo-Spatial Skills

While deficits may occur within each sensory system, the area of visuo-spatial is often more dramatic. Visuo-spatial deficits may include difficulties in the following areas:

- drawing or copying objects
- recognising objects (agnosia)
- telling left from right
- doing mathematics (dyscalculia)
- analysing and remembering visual information
- manipulating or constructing objects
- awareness of the body in space e.g. climbing stairs
- perception of the environment e.g. following directions.

People may experience select difficulties or several deficits depending upon the nature of their injury. One well known syndrome involves neglect where the individual ignores certain aspects on one side of the world in front of them, which is most typically the left hand side. For example, a person with neglect may ignore food on the left side of a plate or fail to copy aspects on the left side of a picture.

Case Study - Elsie

Elsie was a 52 year old woman who had a stroke three years ago. Following the stroke she returned to driving and noticed that she had more accidents on the road. For example, she would side-swipe parked cars and posts on the left side of her car. Elsie felt that her eyesight may have deteriorated so she visited her doctor. Elsie's doctor referred her to a neuropsychologist who diagnosed the problem as left-sided neglect. The neuropsychologist asked Elsie how she had managed to drive her car for three years. She replied, 'I kept my car on the road by keeping in the left lane - if the wheels went off the left side of the road I could hear and feel them, and know to steer to the right'.

A less well-known syndrome is 'prosopagnosia', also known as face blindness, in which the ability to recognise faces is impaired or even lost completely. In the most extreme case, known as aperceptive prosopagnosia, an individual is unable even to see a difference between photos of different faces, or to determine emotional cues from faces. Individuals with aperceptive prosopagnosia need to use other cues, such as voices, hairstyles or clothing, to identify other people. Prosopagnosia is usually caused by a brain injury, but can have a genetic or developmental cause.

Case Study - Lincoln

Lincoln was in a car accident and sustained an injury to a very specific area of his brain. As a result, he cannot recognise faces. His ability to recognise and name objects is unimpaired but, although he can recognise a face as a face, he cannot recognise whose face it is, although he can see each individual feature. Lincoln cannot even recognise a photo of himself. Lincoln reports that if he is separated from his wife, or from friends, while in a large crowd he is completely unable to find them again, and this can lead to feelings of fear. One of the biggest problems he faces, however, is that other people find it so hard to understand that he can see, and can recognise objects, but cannot recognise their face.

Management of Visuo-Spatial Deficits

As shown with Elsie, the presence of neglect may be undiagnosed despite significant safety issues. Individuals with neglect are often unaware of their problems and tend to use other explanations for the mistakes caused by the neglect. A key component of rehabilitation is therefore to educate the person and increase their awareness of the impact of the perceptual deficit in everyday living. Further components to a programme for managing visuo-spatial problems may include retraining skills, changing the environment or expectations, or compensatory strategies.

Retraining skills

One approach involves retraining the skill until the person regains, in varying degrees, the functional skill. Retraining typically involves repetitive and intensive exercises for a specific skill or task e.g. practise at drawing an object while receiving feedback. This approach tends to be more effective with specific skills.

Changing the environment or expectations

A second approach involves modifying the environment to provide more support or reduce the demands of a particular skill. One example may involve building a ramp or fitting a handrail for a person who finds it difficult to climb a flight of stairs to their house. Sometimes, the change in the environment can be as simple as shifting furniture to ensure greater space when walking around the house. The person may also learn to adjust their expectations and educate other people about their difficulties.

Compensatory strategies

People often learn or may be taught a range of strategies to compensate for visuo-spatial problems. These strategies may be as simple as a person learning to turn their head or body to scan their environment, or moving objects into their ideal position. A range of specialised technology or equipment may also be available to fit into a person's home or assist with community access. Some external prompts may include colour stickers for object recognition, bright lights on the floor, musical or sound prompts, stencils or transparent paper for copying, hand rails and other safety devices. An example of a compensatory approach for object recognition involves the person learning to rely more upon other senses such as touch, hearing and smell. They may choose to shut their eyes to avoid inconsistent information from the visual system.

The rehabilitation strategies described may be developed by a neuropsychologist, occupational therapist or physiotherapist. The eventual goal of the programme is greater independence and use of self-management strategies. However, family members, friends and support workers can provide valuable support and reinforcement of rehabilitation techniques.

Synapse Reconnecting Lives Australia: (n.d.). *Sensory Perceptual problems after a brain injury*. Retrieved from <http://synapse.org.au/get-the-facts/effects-of-acquired-brain-injury-on-sensory-and-perceptual-skills-fact-sheet.aspx>