

# Effects of brain injury on sensory & perceptual skills

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

Such areas of the brain integrate the input from different senses. For example, the senses involved in recognizing 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 color, 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 visual-spatial skills**

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

- Drawing or copying objects
- Recognizing objects (agnosia)
- Telling left from right
- Doing mathematics (dyscalculia)
- Analyzing 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 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 sideswipe parked cars and posts on the left side of her car. Elsie felt that her eyesight might 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'.

### **Management of visual-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 program for managing visual-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. practice at drawing an object while receiving feedback. This approach tends to be more effective with specific skills than others.

#### **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 visual-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 specialized technology or equipment may also be available to fit into a person's home or assist with community access. Some external prompts may include color stickers for object recognition, bright lights on the floor, musical or sound prompts, stencils or transparent paper for copying, handrails 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.

A neuropsychologist, occupational therapist or physiotherapist may develop the rehabilitation strategies described. The eventual goal of the program 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.

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