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Orientation to Place

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While orientation is classified as a general mental function, which also includes the knowing of one's relation to self, time, and others; the term is generally used to refer to the function identified by the International Classification of Functioning, Disability and Health (ICF) as orientation to place (WHO 2001). Orientation to place may be defined as simply as being aware of one's location in the environment (i.e., in one's immediate surroundings, neighbourhood or town) (Berube 1991, Hill and Ponder 1976, Jacobson 1993, Jansson 2000, La Grow and Weessies 1994, Long and Hill 1997). More expansively, it can be thought of as 'the process of familiarizing oneself with a new setting, so that movement and use do not depend on memory cues, such as maps' (Vanderboss 2007 657). Ultimately it is essential to the act of wayfinding, which is considered a fundamental human activity involving purposeful and directed movement to reach a predetermined destination (Darken and Peterson 2002, Mast and Zahle 2008).

The process involved in establishing orientation is, for the most part, an automatic and largely unconscious activity (i.e., one looks up and notes where he or she is) which occurs overtime. While primarily perceptual, and mostly visual, it also has a cognitive component as memory and a degree of spatial and environmental conceptualization is required (Bentzen 1997, Thinus-Blanc and Gaunet 1997). Wayfinding, on the other hand, is a more conscious activity involving some skill in both planning and problem solving (Long and Hill 1997). As a result, myriad sensory, perceptual and/or cognitive deficits may impose limitations on orientation and one's ability to wayfind (Blasch et al. 1997). However, a number of alternative strategies, techniques and devices may be used to overcome these limitations (Bentzen 1997, Blasch et al. 1997, La Duke and La Grow 1985, La Grow et al. 1990, Ponchillia et al. 2007, Rieser 2008). The most extensive and codified of these have been developed for those who are blind or visually impaired and are known collectively as orientation and mobility techniques (See Blasch et al. 1997, Hill and Ponder 1976, Jacobson 1993, La Grow and Weessies 1994).

Establishing Orientation

Orientation to place is dependent upon the gathering of information available from the various senses (e.g., vision, hearing, kinaesthetic, touch) and interpreting that information in such a way as to establish knowledge of both self-to-object (i.e., the spatial relationships which exist between one's current position and significant objects in the environment) and object-to-object relationships (i.e., the spatial relationships which exist between objects) (Hill and Ponder 1976, Jansson 2000, Long and Hill 1997). A number of concepts are required to establish this knowledge including those which may be categorized as body,

object, spatial and environmental concepts (Hill and Blasch 1980, Long and Hill 1997). Body concepts refer to the understanding of the potential positions of the body and its parts (e.g., front, back, side), including laterality (right or left). Object concepts refer to the knowledge that objects are relatively constant (i.e., do not disappear when not seen, heard or touched) and have characteristics which can be defined by shape, size, colour and function (e.g., mail box, intersection, escalator, school, office building, etc). Body and object concepts are fundamental to understanding simple self-to-object relationships as these are generally understood in relation to body plane or facing position (i.e. object is in front of, to the left, right or behind me). Spatial concepts include knowledge of position or location of self and/or other objects in relation to objects in the environment in terms of relative and/or compass direction (e.g., across from, behind, in front of, before, after, next to, to the left of, to the right of, north/east/west or south of). Object and spatial concepts are necessary to form object-to-object relationships and more complex self-to-object relationships (e.g., I am north and east of the train station). Environmental concepts, including knowledge of layout, which includes paths of travel (e.g., streets, sidewalks, hallways, stairways, escalators and elevators), structure (e.g., single or multi-floor environments) and function of built environments are necessary to place objects in context and with spatial concepts are used to form a conceptual understanding, or cognitive map, of a given environment (Bentzen 1997, Guth and Rieser 1997, Long and Hill 1997). These objects (i.e., significant objects in the environment which form the essence of the cognitive map) may or may not be immediately perceptible to the individual (Jansson 2000). Those which are not immediately perceptible may be either beyond the range of the senses utilized for perceiving them (e.g., too far away to see, hear or feel) or they may be masked by other objects in the environment (e.g., around a corner, behind a building). This conceptual understanding is required to navigate most environments (Thinus-Blanc and Gaunet 1997).

Wayfinding

Environmental navigation or wayfinding requires a degree of spatial and environmental conceptualization, planning and problem solving (Long and Hill 1997). This is especially true in the case where the destination of travel is not immediately perceptible (e.g., either too far or blocked by other environmental features). Directing one's movement toward an immediately perceptible object (i.e., self-to-object relationship) is often straightforward and typically consists of executing a straight line of travel directly guided by visual perception (Thinus-Blanc and Gaunet 1997), while moving toward an object that is not immediately perceptible is more likely to be mediated by the paths available for traversing a given environment (i.e., aisles, hallways, footpaths, streets and public transit routes, stairs, escalators and elevators) and, therefore, may require one to mentally keep track of the intended destination while executing one or more changes of direction. In the latter, the traveller may have to travel a route consisting of two or more sections (e.g. hallways, blocks, bus routes, stairways) to reach the desired object (i.e., destination). The end of each section constitutes a decision point (e.g., continue forward or turn to the left or right) where a correct choice must be made (Long 2008). These choices are generally pre-planned (i.e., route planning) and based on one's awareness of his or her current position within the

environment when progressing along a selected route of travel (i.e., wayfinding) (Guth and Rieser 1997, Jansson 2000, Long 2008, Long and Hill 1997).

All travel to a destination that is beyond immediate perceptual experience is based on one's conceptual understanding of the area, and requires the traveller to continuously update (i.e., spatial updating) his or her location within that area (Bentzen 1997, Long and Hill 1997). As a result, the traveller must be able to maintain his or her orientation while moving (i.e., dynamic spatial orientation) and re-establish orientation if it is lost (Cummins and Rieser 2008, Fougeyrollas et al. 1998, Guth and Rieser 1997). To do this successfully, spatial information (e.g., object-to-object and self-to-object relationships) must be processed continuously or at least updated regularly (Jansson 2000, Long and Hill 1997, Mast and Zaehle 2008).

Establishing and maintaining 'orientation is a fundamental ability. We move in a 3-D space and must be able to orient ourselves and navigate in space' (Mast and Zaehle 2008 239). Environmental navigation or wayfinding is a multifaceted skill requiring the processing and interpretation of sensory information, conceptual knowledge, problem solving, reasoning and decision making (Long and Hill 1997). Limitations in any of these functions may result in restrictions for participation in myriad social, vocational, educational and recreational activities of daily living (Blasch et al.1997).

Orientation and Mobility for Blind and Visually Impaired Persons

The inability to rely on vision to orient oneself to the environment, preview paths to be travelled and validate one's immediate position in space has been consistently identified as being among the greatest functional limitations experienced by blind and visually impaired people (Carroll 1961, Lowenfeld 1948, Yablonski 2000). However, it is clear that one can learn to use information gleaned from other sensory modalities (or to supplement information gained from limited visual input) to successfully navigate environments of varying complexity (Rieser 2008).

The various skills, techniques and strategies used by blind and visually impaired people to achieve independence in travel are collectively known as orientation and mobility or O&M (see Hill and Ponder 1976, Jacobson 1993, La Grow and Weessies 1994). Orientation refers to the skills required to obtain orientation to place, while mobility refers to act of moving through space in a safe and efficient manner. Together they result in directed and purposeful movement and culminate in the ability to navigate environments of varying complexity or wayfind (La Grow and Weessies 1994).

Success in O&M is dependent upon accurate perception resulting from the successful interpretation of sensory clues into meaningful travel information. Teaching blind and visually impaired people to attend to and accurately interpret sensory information gained while travelling and to use that information along with knowledge of the environment of travel to direct movement is central to O&M instruction. O&M instruction is fundamental

to the provision of vision rehabilitation services and recognized as part of the expanded curriculum for blind and visually impaired children (Crouse and Bina 1997, Hatlen 1996, Lewis and Allman 2000).

Orientation is not only dependent upon the gathering of information through all available sensory channels (e.g., remaining vision, hearing, touch, kinaesthetic, olfactory) but also on an understanding of the regularities and exceptions to the regularities of built environments (i.e., environmental concepts). This information is used to develop a conceptual understanding of the environment of travel, plan routes of travel and re-establish orientation if lost. However, none of the information available to these travellers is as comprehensive or definitive as that normally available through vision. Thus, the traveller is taught to (a) assign meaning to sensory input not normally attended to by others, (b) selectively attend to various sensory inputs, (c) critically analyze the incoming information in relation to the structure of the environment of travel, and then (d) decide which input(s) is most informative at the moment and act upon it.

Orientation to more complex environments is informed by the use of both landmarks and information points (Guth and Rieser 1997, Jansson 2000, Long and Hill 1997). Landmark is the term used to describe perceptible, permanent features of environments that when recognized permit travellers to know their precise location in a known environment (e.g., the only fountain in a Mall), while information points (also known as cues, clues and dominant clues) are two or more features that, although not sufficient in themselves to serve as landmarks, when linked spatially, serve the same purpose (e.g., the escalator on the mezzanine floor outside of a given department store) (Long and Hill 1997). Orientation to place may be assisted by the use of tactile and high contrast maps and models, talking signs and directories (Bentzen 1997) and more recently global positioning systems (GPS) especially adapted for use by blind pedestrians (Ponchillia et al. 2007).

The realization of orientation to place in the form of successful wayfinding (i.e., directing one's movement to desired locations), however, is dependent upon mobility as well. The traveller could not be expected to attend to sensory input and environmental layout if a degree of safe and efficient movement was not assured. Safety is insured, as much as is possible for non-visual travel, through the use of primary mobility devices, including the use of human guides, long canes, guide dogs and some electronic travel aids (La Grow and Weessies 1994). These devices provide both surface (i.e., detections of changes in level) and object (i.e., presences of objects in the path of travel) preview (Blasch et al. 1996). The manner in which these devices are used determines the extent to which preview and thus safety is provided. In addition to safety, the non-visual traveller must move efficiently in order to (a) establish and maintain a straight line of travel, (b) successfully perform and recognize changes in direction, (c) circumvent objects in the path of travel while maintaining a basic line of travel, and (d) recover from veers and other unintended or unexpected changes in direction (Guth and Rieser 1997). As a result of the use of these techniques and the instruction provided, most blind and visually impaired people can travel safely and independently in most environments most of the time and therefore overcome the limitations associated with the complimentary skills of orientation and mobility

resulting from limitations in visual function (Jansson 2000, Long 2008).

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