

# 1 Occupation and Cognitive Rehabilitation

## The scope of cognitive rehabilitation

Occupation is described as being 'purposeful or meaningful activities in which humans engage as part of their normal daily lives . . . all aspects of living that contribute to health and fulfilment for an individual' (McColl *et al.*, 2003, p. 1). It has been more broadly defined as 'everything people do to occupy themselves including looking after themselves and contributing to the social and economic fabric of their communities' (Law *et al.*, 1997, p. 32).

That any health problem can have implications for all aspects of life, and not just the physical and mental state of the individual, is becoming an accepted view. It is endorsed and embodied within the World Health Organisation's definition of health as 'a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity' (World Health Organisation, 1946). By accepting the definitions of occupation given above, it can be appreciated that the occupational components of an individual's life become central to health and well-being.

For individuals with neurological damage, cognitive deficits are often the source of functional problems but they are unseen or difficult to manage. Poor task performance, in the absence of motor deficits, may originate in poor object recognition or sequencing (see Figure 1.1). The person who cannot recognise his or her family may be mistakenly labelled with memory loss. The person who does not respond to questions may have an attention problem which is often confused with deafness. Also, there are several possible reasons which account for a person who lives alone being unable to organise a daily routine.

Disorders of brain structure or function, inherited or acquired, may give rise to difficulties in the ways that people think, feel and/or act. These difficulties can result in loss of, or difficulties in acquiring or maintaining, abilities and skills. This results in changes in the social, economic and home circumstances of



**Fig. 1.1** Cognitive deficits result in problems with task performance.

the individual and his family. Within the context of occupation, cognitive deficits are likely to impact on some, if not all aspects of life, and occupational therapy forms a significant component of rehabilitation.

Occupational therapists engage with people as patients, clients, students, workers and family members, in a range of environments such as hospitals, day centres, schools, the workplace and the home. Hence, occupational assessment becomes paramount to investigate the full impact of cognitive deficits upon the life of the affected individual, and also upon the people he/she relates and interacts with.

The scope of cognitive rehabilitation arguably embraces virtually all aspects of life. Assessment is only one part of a process that seeks to enable an individual to function optimally within his or her usual environment(s), to maintain health and well-being, and engage in valued occupations (Crepeau *et al.*, 2003). The causes (for example traumatic brain injury, cerebrovascular disease, infection) and nature of cognitive deficits may require intermittent or long-term engagement with rehabilitation and/or support services, at any point in life.

## Cognition, occupation and the International Classification of Functioning, Disability and Health

Effective therapeutic intervention requires a means of gathering and organising information (a *framework*). This needs to address not only neurological functioning, but also the individual's capacity for and ability to engage in necessary and valued occupations. It requires the means to address the interrelationship of the person and his/her occupations with the environments and contexts in which they occur.

Occupational therapists have become accustomed to working within frameworks derived from theoretical models of practice and theories of human occupation. In parallel, over the last few decades, the World Health Organisation (WHO) has been working towards a framework for the definition and classification of all aspects of health and related factors.

*The International Classification of Functioning, Disability and Health* (ICF) (WHO, 2001) is a multi-purpose system of classification developed through international collaboration, that codifies health and health related aspects of human life. Its chief aim is to provide a common language of concepts, definitions and terms for examining health and the individual's ability to function. It is designed to do so in a way that provides for:

- Clear communication between professionals, agencies, the public and service users
- Comparison of data from disparate sources (different countries, different health care disciplines)
- Systematic coding for health information systems

In doing so, the ICF also provides a framework for systematic examination of the relationship between disorders of health, the ability to undertake occupations and the interaction of the individual with the environment.

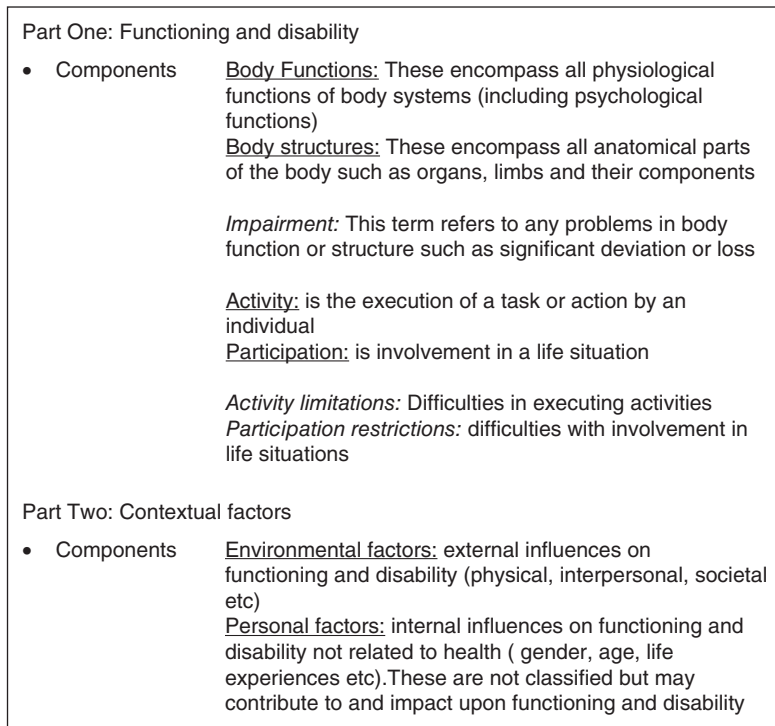
The ICF is introduced here as a means to facilitate and enhance the assessment, rehabilitation and support of people with cognitive deficits. It is a *biopsychosocial* framework that considers health in relation to activities, participation, environmental and other factors. It therefore allows a holistic and comprehensive approach to identifying, measuring and treating health-related difficulties for any individual.

The ICF is structured in two parts. Part 1 classifies and defines *body structures* and *functions*, and human *activities* and *participation*

(in life situations). Part 2 classifies and defines *contexts* of human function – *environmental* (external influences) and *personal* (or internal influences). Figure 1.2 gives an overview of the major components of the ICF.

The comprehensive and precise qualities of the ICF provide the potential for it to be used as a basis for the development of accurate evaluation tools that can measure the interactions of an individual’s disability with all aspects of his/her life. Within each component of the ICF, all terms are clearly defined and broken down further. All elements are coded, so that, for example, within the component of ‘Body functions’ we find ‘Mental functions: Global mental functions’, within which b110 is the code for ‘Consciousness functions’ defined as ‘General mental functions of the state of awareness and alertness, including the clarity and continuity of the wakeful state’ (WHO, 2001, p. 48).

From a rehabilitation perspective, the ICF categorises and codifies all components of a person’s life that could be affected by health status, or could in turn have an effect upon health. In the



**Fig. 1.2** The International Classification of Functioning, Disability and Health (WHO, 2001): components and definitions.

case of persons with impairments of cognitive functions, it facilitates the assessment of, and planning interventions for, consequent activity limitations and participation restrictions.

Table 1.1 presents an example of how the framework could be used to track the relationship between impairments of body structure and function, through to activities and participation and relevant contextual factors, for an individual with an acquired brain injury.

Measurement of such interactions between biological, environmental and personal factors, to result in a particular level of functioning, has been considered lacking in the field of neuropsychology (Bilbao *et al.*, 2003). Many of the studies of cognitive function in neuropsychology are laboratory based and may not take into account the person's gender, occupation or lifestyle. However, over recent years there has been a move to increase ecological validity in studies in psychology. Investigations of memory, topographical orientation and executive functions, in particular, have measured the responses of both normal and brain damaged people during everyday living (Shallice & Burgess, 1991). Also, in single case studies in cognitive neuropsychology, a full case history of the person is given. It is hoped that a greater awareness and understanding of cognitive function, and the use of systematic frameworks like the ICF, will enhance measurement and understanding of the impact of cognitive deficits upon function.

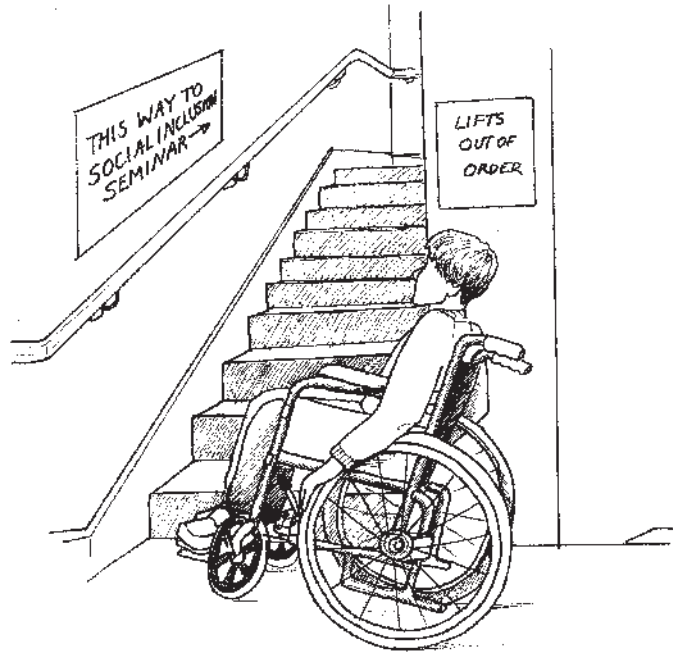
### **The ICF in relation to occupational therapy**

Within its framework, the ICF includes all those human activities, tasks and roles that conventionally fall within the professional domain of concern of occupational therapists. The College of Occupational Therapists (UK) considers that the ICF usefully 'shifts the concept of health and disability from cause to impact by considering the issues and problems for individuals within their own context rather than by medical diagnosis' (COT, 2005, p. 3) (see Figure 1.3). In support of this assertion, it can be seen that the classifications used by the ICF usefully parallel current occupational therapy concepts and definitions of humans as occupational beings. Frameworks of practice utilised by occupational therapists bear significant similarities to large sections of the ICF, making it possible to translate profession-specific findings and information into *and* draw such information out of this multi-agency, multidisciplinary and internationally recognised format. This is illustrated

**Table 1.1** An example of the categories of the ICF used to organise and track the possible consequences, difficulties and contextual issues for an individual with an acquired brain injury.

<p><b>Body functions *for example</b>  <i>Global mental functions:</i>                  Orientation                  Intellect  <i>Specific mental functions:</i>                  Attention                  Memory                  Thought                  Higher-level cognitive functions</p>	<p><b>Body structures *for example</b>  <i>Structures of the nervous system:</i>                  Structure of brain                  Frontal lobe                  Parietal lobe                  Temporal lobe                  Occipital lobe</p>
<p><b>Impairments</b> of brain structures and functions will take the form of deficits or changes, for example <i>loss</i> of cortical tissue, <i>inattention</i>, <i>disorientation</i>, etc. In turn, impairments may affect activities and participation (capacity for and/or performance of) giving rise to <b>activity limitations</b> and <b>participation restrictions</b> . . .</p>	
<p><b>Activities and participation *for example</b>  <i>Learning and applying knowledge:</i>                  Acquiring complex skills                  Thinking                  Reading and writing                  Solving problems                  Making decisions    <i>Community, social and civic life:</i>                  Engaging in hobbies                  Socialising</p>	<p><i>General tasks and demands:</i>                  Undertaking a complex task                  Undertaking multiple tasks    <i>Work and employment:</i>                  Maintaining a job</p>
<p>. . . such limitations and restrictions, their impact and importance, would be affected by other factors. Similarly, other factors could be manipulated to mitigate the effect of impairments upon activities and participation.</p>	
<p><b>Environmental factors *for example</b>  <i>Products and technology:</i>                  For communication                  For employment</p>	<p><i>Support and relationships:</i>                  Immediate family                  Friends                  People in positions of authority</p>

\*Every component and sub-component of the ICF has a detailed definition and a code number. These enable precision and clarity of understanding, recording and communicating of information. This table only gives selected examples of some categories of the ICF that would be relevant in this case.



**Fig. 1.3** Medical diagnosis is not the only barrier to participation.

in Table 1.2, where comparisons are drawn between the ICF and one of the commonly used occupational therapy frameworks, the Occupational Therapy Practice Framework (OTPF) produced by the American Occupational Therapy Association (AOT, 2002). The ICF and the OTPF will be used as the frameworks that inform our discussions about the role and functions of occupational therapy in cognitive rehabilitation.

Because of its multi-purpose, multi-professional nature, the ICF cannot incorporate all possible variations upon categorisation of the human state, since each health care profession will require focus and specificity upon different aspects, and will need its own language and concepts for this. Table 1.2 illustrates how the OTPF specifies the need for occupational therapists to analyse activities in terms of their properties and demands upon the individual, as well as the individual's ability to perform the activity. Hence, *performance skills*, *performance patterns* and *activity demands* are components of and demands upon human functioning that do not map neatly onto the ICF framework. However, they reflect the enhanced detail and performance-related information needed by occupational therapists in the analysis of an individual's functional needs and performance difficulties.

**Table 1.2** Illustration of the relationship between the ICF and a current practice framework used in occupational therapy (Occupational Therapy Practice Framework, AOTA, 2002).

ICF	<u>Body functions and body structures</u>	<u>Activities and participation</u>	<u>Environmental factors</u>	<u>Personal factors</u>
<i>Categories correspond to:</i>				
<b>Occupational Therapy Practice Framework</b>	Client factors Body functions and body structures	Areas of occupation Activities of daily living Instrumental ADL Education Work, play, leisure Social participation	Physical Social Temporal Virtual	Spiritual Personal
<b>Additional components identified in the AOTA Practice Framework, not found in the ICF</b>	{..... Motor skills Process skills	{..... <u>Performance skills</u> ..... Communication/ interaction skills {..... <u>Performance patterns</u> ..... Habits Routines Roles		
	{..... <u>Activity Demands</u> ..... Required actions Sequence and timing Required body structures and function	Objects and their properties	Space demands Social demands	



## Applying theoretical frameworks

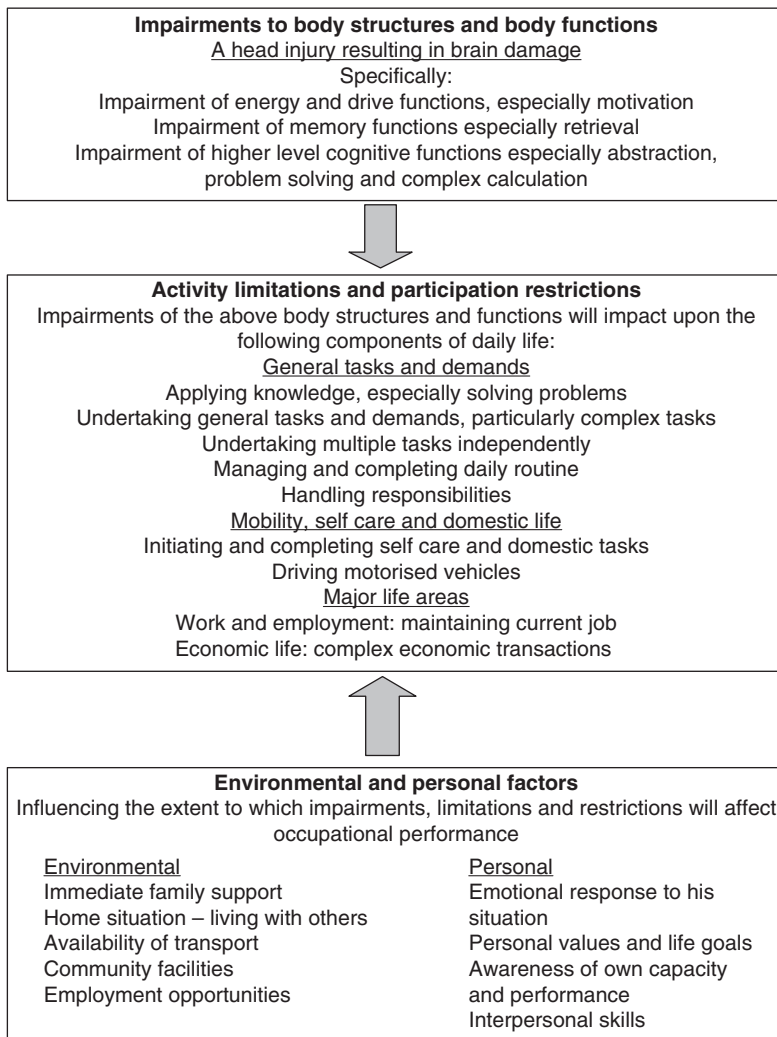
Most students and practitioners of occupational therapy use a range of theoretical models and frameworks to delineate, organise and understand the occupational needs and problems of the individuals and groups of people that they work with. In the preceding sections of this chapter, the ICF was introduced and compared to the OTPF. These two frameworks help us to organise large and sometimes quite disparate amounts of information in a systematic way, and to identify the relationships between them. What these frameworks *do not* do is provide theories or explanations about *why* a particular phenomenon or relationship exists; nor do they promote or guide the therapist as to tools, methods or techniques they might use to address an individual's occupational needs and problems. These latter functions are served by theories of cognition, rehabilitation and the tenets of the occupational therapy profession. These are referred to further in Chapter 3.

The use and value of the ICF and OTPF can be illustrated by the use of a case example. First, the applicability of the ICF will be considered.

### Case study

Mr B is a 35-year-old man who sustained a traumatic brain injury when he was knocked off his bicycle by a car. He sustained some soft tissue injuries (bruising and cuts) but these resolved quite quickly. He worked serving customers in a fast food restaurant, and lived with his parents. Mr B was discharged home after two weeks in hospital, and referred to the community occupational therapy team. At initial interview Mr B identified some difficulties with his memory. His parents had observed changes to his behaviour – a lack of initiative in self-care and domestic tasks, and a tendency to be forgetful and easily distracted from the task in hand – which Mr B did not acknowledge. Further specific assessments identified some difficulties with recall and recognition, problem solving, abstract thinking and calculation. Other aspects of cognition, for example short-term memory, sequencing and simple maths skills were within normal limits.

Using the ICF framework, these cognitive impairments and their implications for occupational performance can be organised and identified in relationship to each other and to the contextual factors of Mr B's life (see Figure 1.4).



**Fig. 1.4** Illustration of the use of the ICF to delineate activity limitations and participation restrictions arising from a head injury.

*Why are frameworks useful?*

This case example shows the use of the ICF framework and descriptors to identify in a systematic way how a change in health status impacts upon Mr B’s occupational performance. From this point the unique skills and knowledge of occupational therapy are essential to explore, understand and diagnose the interaction of these elements as well as their individual contributions to his difficulties. In addition to the basic framework of components and definitions, the ICF identifies two components of any individual’s

activity and participation that together determine his/her ability; these are termed *capacity* and *performance*.

'Capacity' is a qualifier which refers to a person's *capability*, that is their highest or best level of performance in a standardised environment (for example in a laboratory or rehabilitation kitchen). 'Performance' refers to a person's *actual* performance within the contexts of their normal environment (for example in their local shop or their own kitchen). In Mr B's case, he may be able to produce a cooked meal within the familiar environs of his own kitchen due to being prompted by visual and contextual cues that are present, but may be unable to do so in an unfamiliar rehabilitation kitchen. This highlights the importance of assessing both components of an individual's abilities, as limited capacity for a particular activity would not necessarily predict limited performance. Conversely, successful performance of an activity could not be assumed to indicate normal capacity.

Applying this issue to clinical practice, a neuropsychological test of object recognition might identify a limitation in this cognitive process. This would need further exploration in the person's usual environment and contexts to determine the extent and impact of the deficit.

### *Why an occupational therapy framework is important for effective rehabilitation*

The ICF identifies capacity and performance as dimensions of carrying out activities and participation. It also acknowledges the influence that contexts may have upon the individual's situation (for example physical environment or economic status) and identifies that these can either act as *facilitators* or *barriers* to a person's ability to function (WHO, 2001). But beyond the definitions of capacity and performance, the ICF does not offer any further framework for the analysis of human abilities. It does suggest measurement scales for rating levels of impairment, activity limitation and participation restriction, but these are generic and do not allow for describing the nature of a problem in any given area. It allows description of a difficulty but not diagnosis of its precise nature or cause.

Occupational therapists therefore need an *occupational* framework to further identify and diagnose the precise nature of an individual's occupational difficulties – and strengths – in order to plan effective treatment or other interventions. The OTPF (see Table 1.2 above) provides a structure by which:

- The demands an activity makes upon an individual can be further defined
- The environmental aspects can be fully analysed
- The performance skills and patterns a person needs to carry them out can be analysed

Without such knowledge, it would be difficult to analyse fully the impact of any given impairment (of body structure or function) upon an individual's occupational performance. To illustrate this, let us consider the example of driving a car. Most adults have a general appreciation of what driving a car entails and the skills it requires, whether or not they know how to drive. Most of us, if asked, would identify that driving requires the ability to:

- Coordinate upper and lower limbs
- See clearly
- Know and apply the rules and laws of the road
- Operate the controls of a car

However, what are less obvious are the *demands* the activity makes upon the individual in terms of their performance skills, and how contexts can influence these. Such performance skills would include the ability to:

- Maintain energy and an effective pace of performance
- Sustain attention and selectively attend to important visual, auditory and tactile information
- Utilise knowledge (using short-term, procedural and topographical memory) to achieve a desired goal (reach destination safely)
- Organise self and the immediate environment for effective operation of the car
- Initiate, sequence and terminate the tasks involved in driving appropriately
- Maintain position and produce coordinated sequences of movements, working bilaterally and unilaterally to operate controls
- Notice, respond and adjust to changing conditions and unexpected events

The extent to which these performance skills are needed or used at any time in a period of driving would change according to the

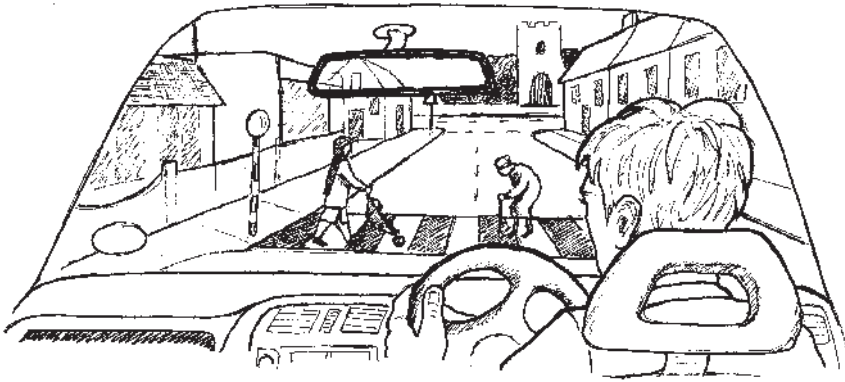


Fig. 1.5 Driving a car makes multiple demands upon the individual.

road conditions, local geography and the actions of other road users (see Figure 1.5).

The OTPF identifies performance *skills*, performance *patterns*, and activity *demands* as being dimensions, emphasising that it is not only the individual's personal attributes (body structures and functions) that determine ability, but the environment and characteristics of the activity or role itself that are important to its execution. This highlights three things:

1. Occupational therapy emphasises performance rather than capacity; that is the person's ability to 'do' or function in his or her normal environments and contexts.
2. Occupational therapists recognise that the nature, content and context of an activity will also influence how it is performed, and therefore affect the demands it makes of an individual.
3. When working to resolve a person's occupational difficulties, it is not just the individual's own health and abilities that need to be addressed but also the contextual aspects of his or her performance, because these may be acting as *facilitators* or *barriers* to performance.

Hence, it can be seen that combining the two frameworks provides a systematic mechanism by which the occupational therapist can:

- Analyse the characteristics and demands of any given task, activity or occupation

- Determine the individual's impairments, activity limitations and participation restrictions that need further investigation and assessment

### *Why knowledge of cognition is needed for analysing occupations, tasks and activities*

The individual mental processes that constitute cognition involve complex neural mechanisms in themselves (perception or memory, for example), but always operate within a larger complex of integrated and interrelating functions. Perception requires memory, because without memory we would not learn what objects are, and therefore we would not be able to recognise them. Conversely, establishing memories requires perception, because without perceptual processing we could not attach meaning to an experience.

Let us return to the example of driving a car, and think about the activity of driving down a busy street. The driver will need a mental map of the route he is taking. This requires memory, and the ability to constantly take in the scene around him and compare it to his 'mental map', in order to know how far he has got. In other words he must be able to perceive incoming visual information, integrate it with stored knowledge, and use this to plan his next actions.

In addition, he must at all times maintain attention to the activity of driving the car, using the controls and checking his speed and position on the road. He must monitor events around him; pedestrians, other vehicles, traffic lights and signs. He may also simultaneously be conversing with a passenger or listening to a radio.

To achieve all this, our driver must be capable of:

- Attention – sustained, selective and shifting
- Perception – visuo-spatial, auditory, tactile
- Use of short-term, procedural and topographical memory
- Motor planning and execution of skilled movements
- Executive functions: problem solving and rapid decision making

This analysis of driving demonstrates the fundamental importance of cognitive processes, their integration and interaction. The earlier example of Mr B also illustrated the importance of individual cognitive functions in daily living, when loss of a single function such as calculation could lead to inability to maintain a job.

### *Why knowledge of impairment is important*

So far it has been established that knowledge of cognitive processes is important in the analysis of occupational performance and the diagnosis of occupational difficulties (activity limitations and participation restrictions). But it is also important for occupational therapists to go further and be able to differentiate the relative contributions of different cognitive *impairments* in any given occupational dysfunction.

In the case of Mr B, his problems with completing complex tasks could have one or several causative factors:

1. Difficulties with recall might prevent him from remembering a set of instructions.
2. Problem-solving deficits might result in inability to apply rules to novel problems.
3. Lack of drive might mean he is readily discouraged from attempting something which appears difficult.

Knowledge of the possible sources of difficulty enables the therapist to identify which aspects of cognition need assessing, and how to decide upon the best treatment for this dysfunction. If Mr B's difficulty was arising predominantly from his poor recall, then provision of written instructions would enable him to succeed. But if the major difficulty was his problem-solving deficit, it would require treatment that enabled him to learn rules and practise their application in a graded programme of tasks that gradually increased in complexity.

Hence, one activity limitation could have several possible causes, and require a different treatment approach depending upon those causes. Selection of treatment without knowledge of cognition, careful occupational analysis and assessment of impairments would result in an unsuccessful outcome.

### **Putting knowledge and frameworks together**

Frameworks such as the ICF and the OTPF provide us with tools to analyse human function, activities and the influence of environment and other contexts upon occupational performance. Skills of activity and occupational analysis provide the means to identify the components of human performance and the demands of the activities humans engage in. Neuropsychological theories, case studies and research methodology provide an understanding of cognitive

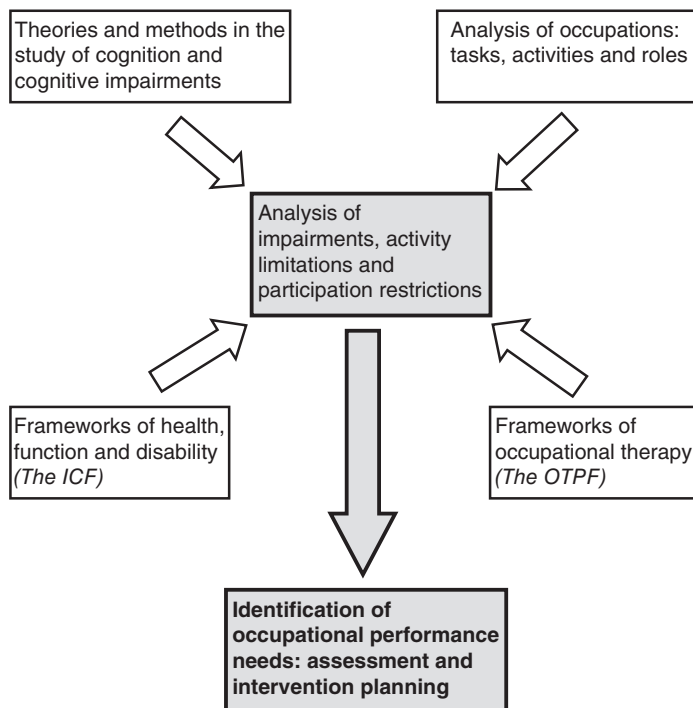


Fig. 1.6 Summary of the components of cognitive rehabilitation.

systems and their underlying processes. Neuropsychological tests provide health professionals with tools to measure impairments and a basis upon which to develop functional assessments.

When cognitive impairments occur as a result of trauma or disease, the knowledge, skills and tools of neuropsychology may act in combination with frameworks (which help us to structure and organise information) to provide a means to:

- Consider the possible nature of cognitive impairments from the location and extent of brain damage
- Screen, or specifically test for cognitive impairments
- Identify and analyse the cognitive components of activities and occupations
- Analyse and assess activity limitations and participation restrictions
- Consider and select effective treatment methods and strategies
- Determine the outcomes of intervention
- Consider the individual's longer-term needs



Figure 1.6 illustrates the contribution of knowledge and frameworks to the process of rehabilitation in which occupational therapists are engaged.

## Summary

1. Cognitive deficits impact upon every aspect of life and can create difficulties in all areas of occupation. Because of the central role of cognition in human functioning, occupational therapists must have an understanding of cognition, and how cognitive abilities contribute to occupational performance.
2. The World Health Organisation has produced a framework of health and health-related states (WHO, 2001) that can be used to organise, define and examine the relationships between all areas and levels of human functioning. This includes cognitive functions, their associated body structures and their relationship to human activities and participation.
3. The concepts incorporated within the ICF make it complementary to and compatible with the OTPF (AOTA, 2001). This is a professional framework that guides occupational therapists in their analysis and understanding of human occupation and occupational performance difficulties.
4. Together with knowledge of cognition and cognitive impairments, these frameworks can be applied within the clinical reasoning process to guide comprehensive analysis of occupational performance needs and deficits. This in turn facilitates appropriate and effective assessment of cognitive deficits, and intervention planning.