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Occupational Therapy for People Experiencing Illness, Injury or Impairment

Promoting occupation and participation

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ELSEVIER

COGNITIVE STRATEGY USE AND THE PRPP SYSTEM OF TASK ANALYSIS AND INTERVENTION

Relative to occupational performance, cognitive strategies are defined by the four information processing quadrants of the PRPP System of Task Analysis and Intervention. Strategies are aligned with attention and perception (Perceive); learning, memory and recall (Recall); planning, decision making and judgement (Plan); and the ability to act on a decision and follow through with plans (Perform). When using the PRPP Assessment, occupational therapists can assess the extent to which people with physical impairments are able to use cognitive strategies in a variety of home, work and community occupations. Cognitive strategies used during occupational performance are determined largely by the processing demands of the occupation, the performance context and the processing capacity of the person doing the occupation. At times of stress or illness, people experience difficulty processing the information needed for occupations. Although for most people this is temporary, people who have sustained significant physical or neurological impairments are likely to experience a persistent processing disorder resulting in a long-term impact on occupational performance. The nature of the disorder is not viewed as a deficit in cognition per se, but an inability to apply cognitive processing strategies to occupations in context.

People have individual ways of performing occupations, and occupational therapists increasingly are coming to understand the limitations of traditional deficit-specific approaches to assessment that measure impairment in isolation from daily occupation (Burgess et al., 2006; Chapparo, 2010; Chapparo & Ranka, 1997b; Fisher, 1993). Performance of each task throughout the day poses unique demands on information to be processed and used for a specific purpose. This is particularly true when learning new or adaptive processes for task performance or relearning occupational tasks in the presence of physical impairments. A new set of motor tactics has to be chosen, constructed, processed, stored, recalled and organised with reference to the context in which occupation will occur (Morris & Ward, 2004).

For example, Bryce is a 32-year-old male who sustained a traumatic transhumeral amputation in a motor vehicle crash. Bryce is married and has a young child. His wife works night shift. Bryce currently uses a hybrid prosthesis with a switch locking elbow, a friction wrist and a myoelectric hand. Bryce wears his prosthesis most days and, although he can operate the prosthesis, he has limited use of the prosthesis in functional tasks. Bryce identified the occupational goal of picking his daughter up from her cot at night when his wife was at work. Bryce demonstrated difficulty monitoring his body and arm position during this task, did not organise himself or the task environment before beginning the task and did not choose the best approach to take. He was unable to analyse the errors he was making and so did not adjust how he performed the task. Bryce needed to learn a new set of motor tactics to position himself relative to his daughter's cot and store and retrieve this information on each occasion of task performance. The context in which this task occurred was specific and placed limitations on the range of movement available, the need for sensitive calibration and smooth motor performance. Dynamic cognitive strategies were required to monitor and make musculoskeletal adjustments in response to the task demands and in response to movements of his daughter during the task.

This ecological approach to evaluation and intervention is a fundamental and core aspect of the PRPP System of Task Analysis and Intervention. Further, the PRPP Assessment recognises and incorporates the individuality of occupational task performance by enabling the occupational therapist to observe a sample of occupations that are pertinent to the person's situation and judge whether performance is effective compared with the person's expectations of performance and expectations of others in the person's contexts, rather than constraining the evaluation of performance to a set of standard occupations that all people do. The assumption underlying this assessment structure is that people, with or without disorders of cognition, use the same general set of cognitive strategies when they carry out everyday occupations (Aubin, Chapparo, Gélinas, Stip, & Rainville, 2009; Chapparo & Ranka, 1997b; Nott, Chapparo, & Heard, 2008).

PRPP ASSESSMENT

The PRPP Assessment is conducted in two stages. In Stage One, a *behavioural* task analysis is used to break down everyday occupation into steps for the purpose of identifying errors. An overall measure of mastery for specific and relevant occupations is computed (Kirwan & Ainsworth, 1992). Stage Two focuses on information processing strategies required for performance by using a *cognitive* task analysis. Cognitive task analysis is a family of assessment methods that describe the cognitive processes that underlie performance of occupations within real-world situations (Militello & Hutton, 1998; Schraagen, Chipman, & Shalin, 2000). This chapter focuses on the use of Stage Two of the PRPP Assessment as an observational instrument when evaluating adults with physical impairments.

The PRPP [Stage Two] conceptual model (Fig. 17.2) is centred on four processing quadrants with multidirectional arrows that mirror the multistaged flow of information in theoretical models of information processing. These quadrants include attention, sensory perception (Perceive), memory (Recall), response planning and evaluation (Plan) and performance monitoring (Perform).

The four central quadrants are further divided into 12 subcategories that can be seen in the middle ring of Fig. 17.2. Key descriptive words used to name and frame information processing strategies that are observable during task performance are

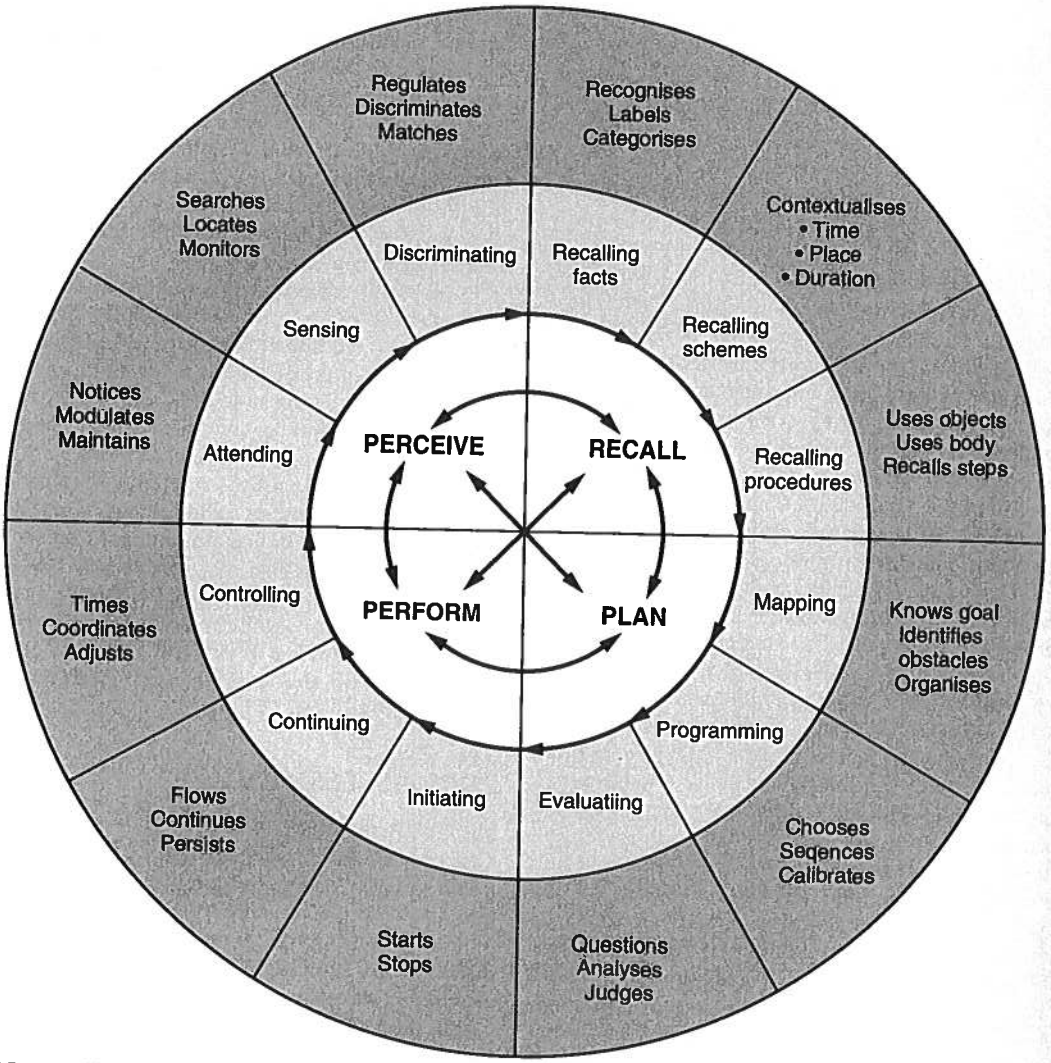

FIG. 17.2 ■ The PRPP System of Task Analysis [Stage Two] Conceptual Model. *(From Chapparo & Ranka, 2011.)*

termed *descriptors*. These form the outer layer of the system. Each descriptor is rated on a 3-point rating scale relative to the task criterion for that descriptor: (1) descriptor performance does not meet criterion expectations and inhibits performance; (2) descriptor performance meets criterion expectations but concerns indicated because of safety, timing or prompts needed; and (3) descriptor performance meets criterion expectations, reasonable time, without assistance or prompts.

An underlying assumption of the assessment system is that a person's capacity to process the demands inherent in everyday tasks can be observed, identified and used to determine the need for occupational therapy intervention (Chapparo & Ranka, 1997b; Chrenka, Hutton, Klinger, & Aptima, 2001). The purpose of the assessment is to identify difficulties in application of specific information processing strategies during task performance and to provide a focus for intervention (Fry & O'Brien, 2002; Nott & Chapparo, 2008, 2012; Nott et al., 2008).

PRPP INTERVENTION

The PRPP Intervention is a task-oriented information processing approach that simultaneously focuses on task training and cognitive strategy training within the context of everyday performance (Chapparo, 2010; Chapparo & Ranka, 2007; Nott et al., 2008). It is an extension of the 'Stop Think Do' programme developed for use with children and adolescents

(Beck & Horne, 1992; Murphy & Cooke, 1999). The core intervention principles in PRPP Intervention are defined in Table 17.1.

Occupational therapy using PRPP Intervention focuses on teaching people to apply a sequence of processing strategies to 'Stop/Attend, Sense, Think, Do' – that is, gain the required level of arousal/attention for the task (Stop/Attend), perceive sensory information relevant to the task (Sense), engage in recall (Think to remember) or planning strategies to develop a plan of action (Think to problem solve), then implement the plan (Do/monitor). People learn to apply these strategies to their task performance by initially observing and modelling the therapist. The therapist's role as a cognitive mediator fades as the person begins to internalise the strategies and apply them across a range of tasks and settings.

The prompts of 'Stop, Attend, Sense, Think, Do' (given via verbal, visual, gestural and/or physical modes) are used as content-free 'metaprompts' to focus on the information processing task requirements rather than procedural or skill-based task requirements. Content-free prompts have been shown to enhance monitoring of current and future goals in performance, as well as the strategies necessary to achieve these goals (Fish et al., 2007). This approach extends traditional skills training to improve performance. In other words, gaining the capacity to do a task does not necessarily result in mastery. Instruction is also needed that will support a person's capacity to think about doing in many different occupational contexts so that the skill learned may be generalised throughout their occupational life. These global prompts are followed up with more specific content-based behavioural prompts, selected by the therapist based on findings from the assessment component of the system. One or two descriptor strategies from each processing quadrant for 'Stop, Attend, Sense, Think, Do' are selected by the therapist to prompt a sequence of information processing.

USING THE PRPP SYSTEM OF TASK ANALYSIS AND INTERVENTION: JONAS

Before observing a person's occupational performance, therapists should have a clear understanding of the type and level of information processing required to perform the target occupations. The goal of observation is to determine whether people are able to process information required by a particular occupation in a particular context. In other words, successful observation is referenced to particular criteria that are determined by the nature and complexity of the occupation, the expectations

TABLE 17.1
Core Principles of PRPP Intervention

Principle	Definition
Intervention goal is task mastery	■ Expected outcome is improved functional performance in everyday tasks required by the person's occupational roles and context. ■ Intervention success is therefore measured by increased functional performance.
Application of evidence-based principles of systematic instruction	■ Goal of intervention is clear to person. ■ Least to most prompt hierarchy is used. ■ Multiple opportunities for practice of the task and target cognitive strategies are offered and performance errors are prevented. ■ Learning occurs across natural contexts and tasks to promote generalisation. ■ Feedback is specific to task mastery and the cognitive strategy that is the target of intervention.
Target descriptors (cognitive strategies) are behaviourally defined and measurable	■ Descriptors required for task performance are identified using the PRPP Assessment (outer ring, Fig. 17.2) and their effectiveness measured before and throughout intervention.
'Chunking' of descriptors across multiple PRPP quadrants is planned	■ Starting with *'Stops'* to correct errors, one or two descriptors only are targeted from each processing quadrant for *'Attend/Sense'* (Perceive quadrant), *'Think to remember'* (Recall quadrants), *'Think to evaluate'* (Plan quadrant) and *'Do'* (Perform quadrant). ■ Training in single descriptors is not used. ■ A line of processing required for the task mirrors the direction of arrows in the centre of the PRPP Model (see Fig. 17.2).
Focus of intervention is on application of cognitive strategies (descriptors) to real-world performance	■ The descriptor behaviours form the central verbal, physical or visual prompts given during performance and are modelled by the therapist if required. ■ The person is taught to self-instruct in the strategies if possible.

PRPP, Perceive, Recall, Plan and Perform.

of the person and other people in the performance context and the sensorimotor characteristics of the task context. This approach differs from a norm-referenced model of assessment that specifies one general standard of performance against which everyone's performance capacities are measured.

Three questions guide therapists' observations of ability in information processing:

- What type of processing does this occupation demand?
- What type of processing does the performance context demand?
- Is there evidence (through observation or inquiry) that the person is processing to the level needed to perform this particular occupation?

Jonas' story (Practice Story 17.1) is used to illustrate how observations of everyday function can be interpreted using the PRPP System of Task Analysis and Intervention.

PRACTICE STORY 17.1

Jonas

Jonas was 60-year-old man who sustained a right hemisphere cerebrovascular accident (CVA). Jonas was found in bed by his son with a dense left hemiparesis, slurred speech and facial droop. Computed tomography scanning revealed a right frontoparietal intraparenchymal haemorrhage that was surgically evacuated. Jonas was initially admitted to inpatient rehabilitation with a dense left hemiparesis, left-sided sensory impairment and left visuospatial deficits and inattention. He spent 4 weeks on an inpatient rehabilitation ward before being transferred to a transitional living unit (TLU).

On admission to the TLU Jonas's Functional Independence Measure (FIM) total score was 76 (motor = 54; cognitive = 22). Higher FIM scores indicate greater level of independence with motor tasks such as showering/bathing, upper- and lower-body dressing and transfers, and cognitive abilities, including memory and attention. Scores range from 18 to 126. Jonas required assistance of one person for showering and dressing; he was able to eat his food using his right upper limb, without assistance, once all food had been prepared (e.g. cut to size and packages opened). He was able to ambulate with a four-point stick and near supervision. He did not have any residual expressive or receptive language deficits. During the day and when he went on weekend leave he experienced significant fatigue.

His programme goal was to be discharged home where he lived with his wife and adult son. He was employed full time as a bus driver before his stroke. At this stage of his rehabilitation, Jonas had not decided if he would resume employment in the future or if he would retire.

Perceive: Observing Sensory Processing Strategies During Occupation

Once sensory input captures a person's attention and that person focuses on it, details of the information are registered and the person creates sensory pictures of occupation. Sensory registration serves to interpret and maintain the information from the input receptors long enough for it to be perceived and analysed. It becomes sensory perception, registered sensory input that is meaningful. Information processing research has demonstrated how copies of sensory images are stored very briefly, for seconds only (Huitt, 2003). Unless there is an effort to pay attention to sensory images, the information is lost from the sensory register.

In the top left hand quadrant of Fig. 17.3 specific behaviours from the PRPP Assessment associated with this Perceive stage of information processing are outlined. These behaviours are observable signs that people are attending to and purposefully dealing with specific sensory input that is needed for the particular occupations being performed (Chapparo & Ranka, 1997b).

The Perceive assessment findings for Jonas are presented in Box 17.1 along with related intervention implications.

Recall: Observing Information Storage and Retrieval Strategies During Occupation

In the second stage of information processing, incoming sensory images are transferred to short-term working memory, the temporary information processing storage facility. Working memory is what a person is thinking about at any given time. It is created when a person pays deeper attention to sensory input, or a thought that 'comes to mind' (Ranka, 2005). Working memory has a limited capacity, so incoming information continually replaces information that is already in this short-term storage. It will initially last somewhere around 15 to 20 seconds unless it is repeated, at which point it may be available for use for up to 20 minutes, the length of a typical therapy session early in rehabilitation. If information is not placed into long-term storage for use at a later time, it fades.

Long-term memory storage is where people store their wealth of occupational experience, bringing pertinent information back into working memory for use when they need it (Levy, 2011; Nee et al., 2013; Smith & Jonides, 1999; Sodorow & Rickabaugh, 2002). Each person has a unique occupational memory, a platform of knowledge from which information is retrieved for quick and automatic performance, allowing a person to 'think' and 'do' simultaneously. This automatic process breaks down when a person needs to engage in new learning (e.g. learning a compensation strategy in the presence of physical impairment) or relearning occupations that have been done successfully for years when the task procedures have been forgotten (e.g. in neurocognitive disorders).

Memory for occupational performance involves two important information processing operations: *recognition*, or the capacity to perceive something previously known, and *retrieval*, or the

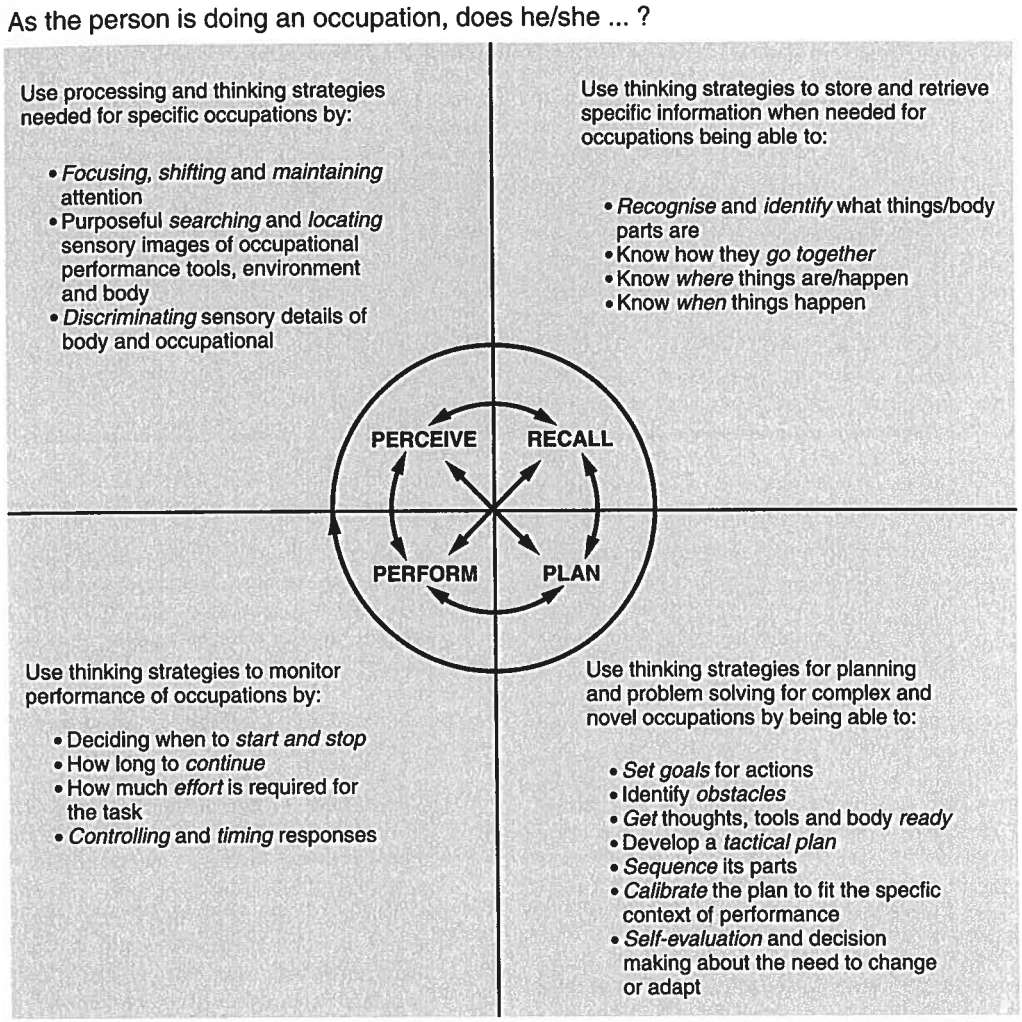

FIG. 17.3 ■ Information processing strategies observed during occupations performance. *(From Chapparo & Ranka, 2005.)*

BOX 17.1
PERCEIVE: JONAS'S ASSESSMENT FINDINGS AND INTERVENTION IMPLICATIONS

PERCEIVE: ASSESSMENT FINDINGS

When Jonas was observed making a sandwich in the transitional living unit kitchen, he had difficulty:

- noticing incoming sensory information on his left-hand side towards the end of the task;
- changing the focus or modulating his attention from small details in front of him (one object in the pantry) to the 'big picture' of the task context (kitchen, his four-point stick and the general layout of the environment);
- searching for and locating the objects he needed (systematically searching for the knife and chopping board); and
- monitoring use of his body (mainly lower limbs) and his four-point stick (bumping into fridge door, pantry door when opening).

The occupational therapist could hypothesise that part of the reason Jonas was not performing to expectations in a well-known task was because he was not processing some of the necessary sensory information in the first stage of information processing. He did not have some of the critical attention and sensory processing strategies in place to give him updated information about what he had to do, how to do it in an unfamiliar kitchen and when to use some unfamiliar tactics to accommodate his reduce physical ability.

Continued on following page

BOX 17.1

PERCEIVE: JONAS'S ASSESSMENT FINDINGS AND INTERVENTION IMPLICATIONS *(Continued)*

Based on this finding the therapist might decide to assess how Jonas did the same task in his own kitchen where the need to search and find sensory information would be reduced.

Jonas's noticing and attending met task requirements at the commencement of the task; however, this reduced towards later stages of task performance as fatigue began to affect Jonas's ability to use these cognitive strategies in occupational performance.

PERCEIVE: INTERVENTION IMPLICATIONS

Jonas had to learn to process the information needed to think about where and how to look for things required for performance, and how to shift the focus of his attention from the small details to the broader environment and back as he proceeded through the task. Jonas's relatives could be given concrete ideas about how to encourage him to think about how he needs to look for things during home and community tasks (e.g. shopping) for safe and effective performance. Most importantly Jonas could be taught more effective 'search and find' strategies to direct his own performance when he 'got lost' in a task (Nott et al., 2008).

capacity to regain stored memories. Both recognition and retrieval are dependent on adequate prior processing of sensory information, successful storing of information and purposeful use of strategies that allow a person to access stored information and answer the question, 'Do I know ...?' (Chapparo, 2010; Ranka, 2005). The purpose of occupational therapy assessment is, in part, to determine what people have learned (know), how their knowledge is constructed and how functional it is for everyday living.

Three broad categories of memories are stored and retrieved for use during every task (Nee et al., 2013). These are factual memories, schematic memories and procedural memories. These are reflected by the subquadrants of the top right hand quadrant (Recall). Specific behaviours from the PRPP Assessment associated with this stage of information processing are outlined in Fig. 17.3.

- *Recalling facts:* Memory for factual information enables people to determine 'Do I know WHAT...' Knowing what things are, what they are called, what they go with and what they are used for is the basis for recognition and retrieval during occupational performance. When factual information is not stored or coded correctly, people may make mistakes of recognition during occupation. They will call things by the wrong name, put things together the wrong way or use things the wrong way.
- *Recalling schemes:* Schematic memory represents what people have learned about where, when and how long something happens. It answers the questions 'Do I know WHERE...', 'Do I know WHEN...', 'Do I know HOW LONG...'. Schematic information provides people with a personally constructed 'map' or a model for how, when, and where to act. When people are unable to develop stable schematic memory, their behaviour will not match the context. People may act impulsively, erratically or engage in tasks not suitable for their level of current ability and skills. Although people may be able to do what is required, they are unable to either retrieve the contextual rules for behaviour (now/not now, here/not here) or use metacognitive strategies to assess the appropriateness of behaviours across different contexts.
- *Recalling procedures:* Procedural memory enables us to automatically determine 'Do I know HOW...?' based on past experience. Procedural memory has been shown to be the most resistant to forgetting in people with CNS disorders (Sodorow & Rickabaugh, 2002). Examples of tasks that people do every day that rely on procedural memory are dressing, brushing teeth, and driving a vehicle. People can usually do these things without thinking because they have learned them so well. After a physical injury people may have difficulty storing and retrieving procedural knowledge; their movements may seem clumsy even when doing familiar tasks, because they are unable to remember how to use their bodies in the most efficient manner. They may consistently forget steps of previously well-learned tasks or steps of newly learned methods of task performance that compensate for physical impairments. These recall errors are more evident in the presence of pain or fatigue (Sanchez, 2011).

The Recall assessment findings for Jonas are presented in Box 17.2 along with related intervention implications.

Plan: Observing Strategies for Organising Information and Problem Solving During Occupation

Inability to plan significantly influences social participation, daily activity and functional outcome (Goverover, 2004; Reeder, Newton, Frangou, & Wykes, 2004). There is often

BOX 17.2
RECALL: JONAS'S ASSESSMENT FINDINGS AND INTERVENTION IMPLICATIONS

RECALL: ASSESSMENT FINDINGS

When Jonas was observed engaging with his wife in a community leisure task (going out for lunch), he had difficulty:

- categorising food items into similar groups (when ordering from the menu);
- contextualising to place: not knowing the correct place (here/not here) to set himself up to complete the task (positioned himself in wheelchair in central thoroughfare of café);
- contextualising to duration: unaware of time passing and the duration of task performance (nil comparison between own pace of performance and task partners); and
- recalling the procedures for using his body and task objects: not knowing how to position himself to avoid bumping into the edges and legs of the café table.

Jonas experienced memory related difficulties across the three subquadrants of recalling facts, recalling schemes, and recalling procedures. Performance errors that underpinned recognition, retrieval and categorisation led to Jonas ordering items from the incorrect section of the menu. Although Jonas was able to perform most aspects of this task competently, he was unable to either retrieve the contextual rules for behaviour in this context or use metacognitive strategies to assess the appropriateness of his own behaviour. He positioned his wheelchair in the central thoroughfare of the café, blocking access for other patrons, but was unaware of the implications of his choice. The interaction between Perceive and Recall was evident when Jonas attempted to recall the strategy for positioning himself in his wheelchair at the café table. His visual perceptual difficulties and reduced recall of procedures led to performance errors bumping his foot plates into the café table legs on several occasions.

RECALL: INTERVENTION IMPLICATIONS

A significant focus of intervention for adults who have sustained significant physical impairments involves enabling them to establish functional memory stores of how to 'do' occupations when needed. This has been referred to as 'skills training' or 'task specific instruction' (Hubbard, Parsons, Neilson, & Carey, 2009; Larkin & Parker, 2002). Efficient motor performance requires selection of information most relevant for the immediate performance situation – for example, remembering 'how to' use task specific objects including new objects such as adaptive aids and equipment, and also 'how to' use body parts in different movement patterns that may be necessitated after physical impairment (Schmidt & Wrisberg, 2008). Processing of information in long-term storage requires specific strategies for controlled and often effortful processing, involving rehearsal and making specific connections between new and previously learned information. People need to 'know the facts' before they can recall 'the facts' required for occupational performance.

dissociation between what a person wants to do and actually does (Eriksson, Tham, & Borg, 2006, Eriksson, Aasnes, Tistad, Guidetti, & Von Koch, 2012). Planning functions may be masked during familiar occupations but are most apparent when a person is required to function in situations that are difficult, less structured, require multitasking or require dealing with novelty and unexpected situations (Bootes & Chapparo, 2010; Burgess et al., 2006; Ranka & Chapparo, 2010). Examples of these latter types of occupations might include catching public transport, operating workplace plant and equipment, selecting and purchasing grocery items at the supermarket or organising a daily routine of occupations at home or work.

Planning requires thinking strategies such as organisation problem solving, decision making, insight, and purposeful allocation of attention, all referred to as executive functions within the information processing system. This third stage of information can be thought of as the 'rules of operation' that people apply to problem solving and analysing information in any occupation. They are not linked to any particular type of sensory information or ability but are applied to all information that has to be organised for use. Every day, people rely on their executive skills by applying thinking strategies to what they do. This strategy application capacity allows people to orchestrate multiple occupations and parts of occupations into a seamless whole. Research suggests that people with neurocognitive disorders almost universally have difficulty with some aspect of planning and problem solving, giving rise to difficulties coping when occupation becomes complex (Burgess et al., 2006).

During the occupations that people do in every minute of every day, information flows into the processing system and presents it with a problem to solve. What is that object? What was I told to do? How can I do it differently? How much do I need to do? How can I do it without making a mistake? How does my work compare with others? Is that safe? Will it work? These are just a few of the typical problems that require the use of higher order information processing such as critical thinking, decision making and planning.

To engage in problem solving, planning and self-evaluation, people must construct and evaluate their own goal-oriented strategies for action. This means that they process information with reference to a particular goal, an idea, an understanding of what has to happen. People who have sustained significant injuries or acquired significant physical disabilities may have difficulty constructing an idea or a goal; they may have an incomplete idea of

the expected outcome; or the idea may fade when they begin to act, as performance becomes increasingly influenced by other motivations. When people engage in goal-oriented occupation, they initiate executive thinking operations that prepare them to put a plan into action. These strategies are different to mere memory retrieval and involve 'figuring out' extensions or elaborations to habitual responses that may be demanded by the occupation. People have to solve the following problems before, during and on review as they do complex tasks:

- What obstacles might/did get in the way?
- How can I get ready for action?
- What is the best choice of action, place and tool to use for this specific task?
- How do I have to sequence the task?
- What do I have to do to make my responses fit the expectation/context/my abilities?

In general, everyone wants to be responsible for their own engagement in occupation. This happens when they are able to reflect, evaluate their own plans and performance and make considered decisions about satisfaction, effectiveness and the need for correction or change. This evaluative thinking involves metacognition, where people think about their thinking. It is a type of cognitive monitoring that involves questioning, analysing their ideas and performance of occupation and making final judgements about their worth. Three thinking strategies appear to be critical for each person being able to evaluate their own performance:

- Being able to question whether their performance matched the expected outcome
- Being able to further analyse the reasons why they did or did not meet their goals
- Being able to make decisions about the need to carry on or change the goal and the plan
- Observations of a person's planning, problem solving and decision making can be guided by asking how well the person seems to know the answers to questions in the bottom right hand quadrant of Fig. 17.3 (Plan).

The Plan assessment finding for Jonas are presented in Box 17.3 along with related intervention implications.

BOX 17.3
PLAN: JONAS'S ASSESSMENT FINDINGS AND INTERVENTION IMPLICATIONS

PLAN: ASSESSMENT FINDINGS

Completing meal preparation activities in the unfamiliar transitional living unit (TLU) kitchen, in combination with recently acquired sensorimotor impairments, required Jonas to engage a number of executive processing strategies. Jonas was able to remember most processes (Recall); however, he could not rely on memory alone. He had to make an overall mental plan for what had to be done that would draw many sensing and thinking strands together into a coherent whole.

Jonas had difficulty with the basic executive functions required for this task:

- He was very slow to identify obstacles to task completion or generate an alternative plan around these.
- He was unable to organise his thoughts or actions and 'get ready' to complete the task in the required task environment.
- He was slow to sequence the steps without help and step transitions required prompting and additional time.
- He did not choose the best strategy or tactics for place, procedures or use of objects.
- His safety was questionable, highlighting difficulty with analyses and judgements.

Jonas had significant difficulty getting organised in his head before commencing this task. He had difficulty making a mental plan that integrated prior knowledge of how he had made lunch in the past, while adapting for his current sensorimotor deficits. This is an essential cognitive strategy for initiating and maintaining goal-directed occupational performance. He had difficulty figuring out or choosing where to do the task (e.g. on the kitchen bench or on a plate) and how to position himself (including a four-point stick) relative to the bench. His reduced decision making led to slowed performance and long pauses between task steps while Jonas tried to figure out what to do next or how to do the next task step. He had to purposefully shift his attention between each one of these operations in an ordered sequence and not get distracted by people moving around him in the TLU. As his performance continued, his ability to filter peripheral stimuli reduced, leading to increased distractibility and safety concerns during task performance.

PLAN: INTERVENTION IMPLICATIONS

Assessment of Jonas's performance indicated that simply practicing a variety of occupations would not help him. He needed to practice *thinking* about what he had to do, what he was doing and what he had done so that he could learn from his own occupational experience. Jonas needed to learn more effective ways of thinking that could assist him in solving the problems that arise for him during everyday occupations. Rather than simply direct his action, modelling of thinking from the therapist, together with scaffolding of thinking skills required to solve problems, was viewed as a 'best practice' instruction technique (Greber, Ziviani, & Rodger, 2007). In this approach, the therapist acts as a model who overtly and explicitly verbalises the strategic metacognitive strategies needed for successful performance. This would be done through teaching Jonas how to process information strategically and figure out solutions to problems and complexities that arise while he is doing daily occupations.

Perform: Processing Output and Performance Feedback

The last stage of information processing focuses on using thinking strategies to perform, or create output responses. Numerous researchers have linked reduced thinking strategies and reduced speed of processing to inefficient response control and timing (e.g. Schmidt & Wrisberg, 2008). Actively responding to information that is processed requires being able to plan and initiate both starting and stopping of action. Responses generate further input into the information processing system and result in the ability to self-monitor. Motor programmes operate within the motor system with feedback from sensory systems to produce skilled actions. It has been demonstrated that people adjust and slow their movements when interacting with task objects that require greater control (e.g. a full water glass) or when performing tasks with their nondominant limb (Schmidt & Wrisberg, 2008). This has implications for cognitive strategy use with adults who have physical impairments that may require a change in upper-limb dominance as a result of injury, amputation or paresis.

Observations of a person's performance monitoring strategies can be guided by the information processing behaviours listed in the bottom left hand quadrant (Perform) in Fig. 17.3. These information processing behaviours are dependent on the formation of an adequate plan, knowing the purpose of responses, and rapid and accurate processing of the changing body and contextual sensory details that are critical to task performance.

The Perform assessment findings for Jonas are presented in Box 17.4 along with related intervention implications.

CONCLUSION

This chapter described how an occupational therapist can employ elements of the PRPP System of Task Analysis and Intervention. Through the story of Jonas, this chapter explored a range of information processing problems that people with physical impairments may experience at home or in the community, and brief examples of intervention were given. The approach presented in this chapter is consistent with contemporary shifts in occupational therapy towards a more ecological and dynamic style of intervention where assessment and intervention are mutually informative and where the focus is on the particular occupational needs of particular people in particular contexts.

BOX 17.4
PERFORM: JONAS'S ASSESSMENT FINDINGS AND INTERVENTION IMPLICATIONS

PERFORM: ASSESSMENT FINDINGS

Jonas was very slow in his task performance and had difficulty with his initiation of a task. Based on observations listed in Fig. 17.3, Jonas had difficulty with the following information processing strategies:

- He had difficulty starting and restarting after distractions from other transitional living unit (TLU) residents.
- He had significantly reduced flow – starting, stopping and pausing between most task steps, often seeking reassurance from staff.
- He required verbal prompting to continue and keep his thinking 'on task'.
- He did not make the necessary motor adjustments to place his body in the correct position relative to task objects or environmental features such as the fridge door or café table.

Jonas's initiation difficulties may be closely linked to the observed difficulties in the Plan quadrant that highlighted poor thought or action organisation relative to the task goal. This links to poor initiation as Jonas did not have a clear mental picture of how to perform the task with his current sensorimotor deficits. Consistent with the research reported earlier, Jonas used motor control techniques that led to slowed performance when interacting with task objects that require greater control, such as a four-point stick for indoor mobility and a manual wheelchair for outdoor mobility. As reported in earlier areas of this assessment (Perceive and Plan), Jonas relied on external prompting to maintain task attention and modulate attention to reduce the impact of distractors. This linked with observed task difficulties in the Perform quadrant, requiring external supports to continue task performance and keep his thinking on track.

PERFORM: INTERVENTION IMPLICATIONS

Jonas's performance indicated that strategy training should not target relearning of specific tasks but should focus on teaching Jonas new ways to cognitively manage the problems resulting from his impairments. The cognitive strategies that he needed to practice thinking about were general cognitive strategies such as: 'When should I start/stop/resume task performance?' 'Am I on-track?' 'Do I finish now or keep going?' 'Do I move like this or like this?' 'What adjustments can I make?' These cognitive strategies would enable Jonas to apply relevant information to task performance, select and monitor his responses and simultaneously cope with internal and external distractions during task performance (Siegler, 2007).

http://evolve.elsevier.com/Curtin/OT

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