Cognitive, or "Top-Down", Approaches to Intervention

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For a variety of reasons, pediatric therapists have begun to investigate the possibility of using cognitive approaches during intervention with children with neurodevelopmental disabilities. While these approaches have a long history in the disciplines of education and psychology, they are relatively new to most therapists in rehabilitation. The purpose of this Keeping Current is to familiarize therapists with some of the terminology that is used in the cognitive literature and to provide an overview of a few key concepts so therapists can make educated decisions about instructional courses that may be offered. Therapists who receive training and utilize these approaches may also find this document helpful to share with families.

What do we mean by "top-down" and "bottom-up" approaches to intervention?

Therapists are beginning to explore the feasibility of moving from "bottom-up" approaches - those that emphasize remediating children's motor deficits - to "top-down" approaches, focusing on the performance difficulties that children with disabilities experience everyday. "Bottom-up" therapies are based upon the assumption that, if foundational motor skills are developed, motor control will emerge and task performance will be improved. "Top-down" approaches assume that the motor requirements for any task are variable and that motor control for a particular task becomes more efficient when children understand what is expected. These "top-down" approaches are often referred to as **cognitive approaches** since the emphasis in therapy is upon assisting a child to identify, develop and utilize cognitive strategies to manage daily tasks more effectively. Conducting a literature search on cognitive approaches is usually not helpful to the therapist who is unfamiliar with this area due to the vast amount of literature on "cognitive therapies", "cognitive treatment methods", "cognitive mechanisms", "cognitive-behaviour modification", "cognitive strategy research" and studies of "metacognition". In this issue, we will define some of these terms and provide an overview of the key concepts that are needed for a therapist to understand and think about using "top-down" interventions with children.

When we say we are using a "cognitive" approach, what do we mean?

The first distinction that needs to be made is between cognitive approaches that *teach cognitive skills* and those that try to *change faulty or distorted cognitive processes*.

Cognitive distortions are often found in children who are depressed or have behavioural and/or anxiety disorders and interventions are usually referred to as "cognitive therapy" or "cognitive-behaviour therapy". (Note: excellent review articles have been written by Spence (1994) and Kendall (1993)). These cognitive treatment methods usually target, and try to change, irrational thoughts or problematic self-perceptions by bringing them to conscious awareness. When we talk about becoming more "top-down", or cognitive, in interventions, we are usually not planning to use these types of cognitive therapy.

The types of cognitive approaches that are more useful to most pediatric therapists are those that involve working with children as they perform daily tasks and helping them to become more aware of their cognitive processes and strategies. **Cognition** has been described as the child's capacity to acquire and use information in order to adapt to environmental demands (Lidz, 1987). Most children with neurodevelopmental disabilities can be taught the cognitive, and possibly the physical, skills that they need to know in order to perform basic tasks; however, they may not automatically transfer these skills from one task to another or one setting to another. If a child is going to adapt to the demands of a daily life situation, he or she has to recognize the need to use the skills that have been taught in therapy. **Metacognition** - knowing about one's cognition - is what is needed for transfer and generalization of these skills to daily functioning. Oddly enough, it is *metacognitive development*, not cognitive development, that is targeted in most cognitive approaches.

What is "metacognition"?

Metacognition is believed to have two basic components (Flavell, 1979; 1985): *metacognitive knowledge* and *self-regulation*. If you are asked to remember a list of words, you will probably employ a *cognitive strategy* such as rehearsing the list, grouping the words into categories or trying to visualize the words. We use these types of cognitive strategies all the time in order to learn new things, perform tasks efficiently, problem-solve, reason, memorize, etc.; however, we usually don't think about the strategies that we use unless we are asked to describe how we were able to perform a task. This request accesses our *metacognitive knowledge:* we stop and become aware of our cognitive processes. If we encounter a problem - for example, a task that we cannot do - we usually stop and think about possible solutions, select one to try, try it and evaluate whether or not it has been effective. This process of selecting task-appropriate strategies, monitoring and evaluating their use, is called *self-regulation* and is the aspect of metacognition that allows children and adults to transfer learning from one situation to another.

Why do "cognitive approaches" seem to be needed with children with neurodevelopmental disabilities?

Children with disabilities often seem to have a smaller repertoire of the cognitive strategies that we have been discussing. In particular, they seem to have difficulty learning and internalizing the many rules and strategies that people use which are implicit in the world around us (e.g., how to introduce oneself, that events occur in a predictable

sequence, that you begin to read at the left side of the page, that you should think about a task before you begin it). Most of these "rules" are never taught or explained to children. Through multiple examples of similar events, children typically discover, learn and then apply the strategy. By watching many people greet each other, children learn that an appropriate response to the question, "How are you?" might be to say, "Fine, thank you". Children with neurodevelopmental disabilities may simply have fewer opportunities to observe problem-solving situations, and children who have additional learning and attentional disorders may fail to recognize the similarities in events that they have seen a hundred times. In either case, these children are unable to access and apply strategies that would be useful for task performance. As a result, they often appear to have organizational, planning and memory difficulties and may have difficulty learning new things. (Note: for an excellent discussion of the possible relationship between metacognitive deficits and frontal lobe processes, see Jarman, Vavrik & Walton, 1995).

How do "cognitive approaches" help?

When we use cognitive approaches, we help children become aware of implicit rules by making them explicit, asking the child questions to prompt them to see and understand the link between one event and another. For example, if a child is getting ready to go outdoors in winter and does not know where to begin, the therapist may ask, "What did you put on yesterday when we went out to play?" . . . . (coat, hat, mittens) . . . "So, what do you think you will need to put on today?" We can also teach children specific cognitive strategies that are typically used by others to complete a particular task. For example, when motor learning or performance of motor tasks is the focus of therapy, the therapist may use cognitive approaches to help the child become more aware of strategies concerning his/her biomechanics (e.g., you need to reach out with both hands to catch a big ball), motor learning (e.g., first you watch someone else, then you try it), organization of sensory input (e.g., you need to watch the ball before you swing), task analysis (e.g., little balls are harder to catch than big ones), etc. This kind of learning, although performed physically, is still considered to be "top-down" since the child's motor experiences are organized and integrated with greater cognitive awareness.

There are so many "cognitive" approaches: which ones are most useful?

The major difference among various cognitive approaches is simply the way in which the strategies are taught. (Note: for a review of many cognitive intervention programs, see McCormick et al., 1989). In most instances, however, strategies are introduced in the context of the child's environment, using tasks that the child needs, or wants, to do. When a child uses a strategy that is introduced by a therapist, it initially serves a compensatory purpose. Through practice and improved metacognitive knowledge, the strategy becomes internalized and the child becomes able to regulate his or her behaviour and task performance more effectively (Vygotsky, 1978).

A therapist using any cognitive approach to improve a child's performance will proceed through some type of general problem-solving structure that includes most or all of the following steps:

1. Define the task
2. Anticipate this child's difficulties performing this task
3. Set up the environment to help the child explore possible strategies and select a strategy that s/he wishes to try
4. Encourage the child to apply the strategy to the task
5. Assist the child to evaluate and modify the strategy

In the literature, one can find many examples of this type of structure being used. In Verbal Self-Guidance (VSG; Wilcox, 1994), the structure is Goal-Plan-Do-Check. Camp and Bash's (1981) cartoon bear encourages children to ask, "What is my problem?", "How can I do it?", "Am I using my plan?" and "How did I do?". Many other examples of mnemonics that develop problem-solving abilities are available in educational and special education literature.

How does one become "more cognitive"?

Using a more cognitive approach sounds easier than it is in practice. The key is in the techniques that the therapist uses to help the child explore strategies, make decisions, apply and evaluate. The work of Reuven Feuerstein and colleagues (1980; 1986) and of Carl Haywood and colleagues (1987; 1988) on "mediational techniques" has been summarized and applied in an article that will, hopefully, be available soon (Missiuna, Malloy-Miller, & Mandich, 1997). Some aspects of the therapy session that appear to be different when a cognitive approach is used include (Missiuna & Malloy-Miller, 1996):

Purpose of the Session: Therapy goals are not related to the acquisition of a skill, but to the discovery of ways that the child can manage the task or the environment in order to facilitate performance. The emphasis is on the verbal and non-verbal interaction with the child and the goal is to develop an awareness of the cognitive strategies which the child will need for independence in the acquisition and performance of these, and any other, motor skills. Transfer and generalization of cognitive strategies is also emphasized.

Planning the Session: The therapy plan follows the problem-solving structure described earlier (task analysis, anticipation of difficulties, selection of strategies, application and evaluation). The environment is one of acceptance and support for risk-taking. While the selection of activities is guided by the child, the therapist is always aware of the strategies that the child needs to learn and tries to create opportunities for discovery of these to occur. Once a successful strategy has been discovered, the child is encouraged to think of (or try) other situations in which the strategy might be used.

Techniques: Throughout the session, the therapist uses techniques that help the child become more aware of the strategies that are being used and of their effectiveness. Some techniques include: 1) process questioning - use questions that focus on the process of learning or performing the skill; 2) bridging - create opportunities to link new learning to previous knowledge and to similar situations; 3) modeling - model step-by-step learning and problem-solving; and 4) challenging - challenge effectual and ineffectual strategies so the child learns to evaluate their outcome.

To summarize, it is possible for therapists to become more cognitive in their approach by:

1. Thinking about the tasks and roles that a child wants to perform, rather than foundational skill-building;
2. Using a general problem-solving structure that will allow a child to select, apply and evaluate the use of cognitive strategies during the performance of everyday tasks;
3. Using questions and other techniques to increase metacognitive awareness; and,
4. Planning for transfer and generalization of the skills that are learned.

Are cognitive approaches effective?

The use of cognitive, or "top-down", approaches with children can be supported from a theoretical perspective and seems to make a lot of intuitive sense. Since improvement in observable skills is not the emphasis of intervention, however, the efficacy of these approaches is very difficult to demonstrate. How does one measure improved metacognitive awareness, more fluid problem-solving, or effective usage of cognitive strategies? These types of questions have been researched with typically performing children in academic areas such as reading and mathematics and preliminary evidence would suggest that cognitive approaches produce more independent and able learners. We also have reason to believe that children with special needs are able to transfer and generalize learned skills more easily when these approaches are used. Efficacy studies with children with neurodevelopmental disabilities and studies of the strategies that are used to perform daily activities, however, are still in the very early stages of investigation.

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