Dynamic Performance Analysis: A Framework for Understanding Occupational Performance

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Occupational therapy is now consistently described as a profession concerned with enabling occupation. A crucial step in enabling occupation is understanding the occupational performance of our clients. Dynamic Performance Analysis (DPA) is a new approach to occupational analysis that focuses on the client's actual performance. DPA, acknowledging that optimal performance is the product of the interaction of person, environment, and occupation, and thus highly individualistic, places the client and his or her occupation, in interaction with the environment, at the center of the analysis process. Embedded in a top–down framework, DPA is a dynamic, iterative process, carried out as the client performs the occupation. The purpose of DPA is to identify where performance breaks down and test out solutions. In this article, the rationale, origins, and basic assumptions of DPA are discussed, and a detailed description of the DPA process together with two clinical examples is presented.


In the process of setting treatment goals, Jonathan, a child referred to occupational therapy for coordination difficulties, expressed his eagerness to learn to tie a bowline knot. He had bought a book that outlined all the steps for tying a bowline knot. Although he had followed all the steps in the book, he was unable to tie the knot. Frustrated by this experience, he came to therapy wanting help to learn how to do it. Later, when the therapist recounted this story to her husband, a firefighter, he commented that a lot of the firefighters had a hard time learning how to tie knots “the right way,” but that they all figured out ways of getting it done competently, “their way!”

How do you teach a child to tie a knot? How do you help anyone learn to perform any occupation? Is there a right way? Is there a best way? Is it the same best way for all our clients? These are important questions for a profession concerned with enabling people to achieve their occupational goals. Experience and common wisdom suggest that there is “more than one way to skin a cat.” Reed and Sanderson (1983) pointed out that people rarely perform activities in a step-by-step fashion. Researchers in the area of motor performance have noted that different synergies of muscles can combine to achieve the same movement (Stelmach & Diggles, 1982). Yet, as occupational therapists, we are taught to carry out activity or task analyses that are based on how an activity or task is typically done, often in absence of the person (Breines, 1995; Creighton, 1992; Lamport, Coffey, & Hersch, 1996).

In recent years, occupational therapy has been consistently described as a profession concerned with enabling
Occupational performance and occupational competence have been acknowledged to be complex dynamic interactions involving person, environment, and occupation (Baum, 1998; CAOT, 1997; Christiansen & Baum, 1997; Kielpinski, 1995; Law, 1998; Polatajko, 1992, 1994; Yerxa, 1994). Leaders in the field have identified the need for assessment procedures that focus on occupational performance (Fisher & Short-DeGraff, 1993; Trombly, 1993). It has been suggested that such procedures should be embedded in a top–down approach (Fisher, 1998; Fisher & Short-DeGraff, 1993; Trombly, 1993); that is, rather than assessing performance components, assessments should be based on the direct observation of persons performing the occupations they need to, want to, or are expected to do (Fisher, 1998). In other words, there has been a call for a departure from historically typical approaches to activity and task analysis (Fisher & Short-DeGraff, 1993).

In her 1998 Eleanor Clarke Slagle Lecture, Fisher presented an occupational therapy intervention model focused on occupational performance that provides a specific framework for understanding “why, and how, a person performs the tasks she or he does and why certain aspects of the task performance may result in the person experiencing difficulty or dissatisfaction” (Fisher, 1998, p. 514). A key feature of Fisher’s model is its emphasis on performance analysis as a means to understanding occupational performance. Fisher’s Occupational Therapy Intervention Process Model is based on the premise that a crucial step in an occupational therapy intervention program is understanding the actual performance of the client.

The purpose of this article is to introduce Dynamic Performance Analysis (DPA), a new approach to occupational performance analysis that is performance based. DPA is a dynamic, iterative process of analysis that is carried out as the client performs an occupation. DPA is a framework for the analysis of actual performance that is focused on enabling clients to achieve competence in the occupations they want to, need to, or are expected to perform. In this article, the rationale for, origins of, and basic assumptions of DPA are presented. Then a detailed description of the DPA process and two clinical examples are provided.

Rationale for Dynamic Performance Analysis

Occupational performance and occupational competence have been acknowledged to be complex dynamic interactions involving person, environment, and occupation (Baum, 1998; CAOT, 1997; Christiansen & Baum, 1997; Fisher, 1998; Kielpinski, 1995; Law, 1998; Polatajko, 1992, 1994; Reed & Sanderson, 1983; Yerxa, 1994). Evaluation of this complex process and the identification of factors that contribute to effective or ineffective performance require a framework that supports the careful analysis of actual performance (Fisher, 1998).

The conventional approach the profession has taken to the analysis of occupations has been activity or task analysis. Although a number of definitions of and approaches to activity analysis can be found in our professional literature (for recent examples, see Breines, 1995; Creighton, 1992; Crepeau, 1998; Cynkin & Robinson, 1990; Hagedorn, 1997; Lamport et al., 1996; Llorens, 1993; Pedretti & Wade, 1996; Reed & Sanderson, 1983; Trombly, 1995b; Watson & Llorens, 1997), all describe essentially the same approach. In essence, activity analysis involves the breaking down of an activity to identify the physical, cognitive, and affective components of the activity, with the intent of determining the abilities required of a person to perform the activity and the inherent therapeutic properties of the activity. The analysis is generally done by considering the activity as it is typically or normally done, in the absence of the person (Breines, 1995; Creighton, 1992; Crepeau, 1998; Lamport et al., 1996). The occupational therapist uses the results of this analysis, in concert with knowledge of the client’s strengths and weaknesses, to determine whether the client is capable of performing the activity, whether and how the activity may need to be modified for the client, or whether activity has the therapeutic potency to meet the client’s needs (Creighton, 1992).

In traditional activity analysis, the occupational therapist infers the client’s ability to perform the activity. In recent years, the usefulness of the traditional activity analysis has been called into question. Davis and Burton (1991) commented that the “failure to account for performer capabilities relative to the requirements of the task” (p. 159) is a major problem with traditional activity analysis. Christiansen (1993) and Trombly (1993) cautioned that such inferences should not be taken for granted; that, in many cases, there is insufficient evidence in the literature to support such inferences.

Fisher (1998) suggested that an approach be used to analyze performance that obviates the need for inferences. She proposed the adoption of an approach to the analysis of performance that is based on direct observation of actual performance, noting that such an approach to performance analysis is quite distinct from activity analysis in that performance analysis does not focus on identifying underlying abilities and deficits. Performance analysis seeks to determine actual performance and requires the therapist to “observe the quality of the transaction between the client and the environment as the client performs a task” (p. 517).

Fisher (1998) suggested two approaches to performance analysis, the Assessment of Motor and Process Skills (AMPS) (Fisher, 1997) and informal observation. The AMPS is an important new contribution to occupational performance assessment (Ortenbacher & Christiansen, 2000).
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Origins of DPA

DPA evolved in concert with the development of a cognitive approach to the treatment of clients with mild motor problems; this approach is now called CO-OP, an acronym for Cognitive Orientation to Occupational Performance. CO-OP enables clients to develop competency in self-identified occupational goals (Martini, 1994; Martini & Polatajko, 1998; Wilcox, 1994; Wilcox & Polatajko, 1993). This approach is a client-centered, individually tailored intervention focused on the identification of cognitive strategies to support performance. CO-OP is embedded in Meichenbaum’s (1977) cognitive behavioral modification approach, Feuerstein’s instrumental enrichment (Feuerstein, Rand, Hoffman, & Miller, 1980), and occupational therapy’s philosophy of client-centeredness (CAOT, 1997).

CO-OP, by its very nature, is a top–down approach and, hence, necessitates the identification of actual performance issues. CO-OP draws heavily on the therapist’s expertise in occupational performance analysis. Originally, typical activity analyses approaches were used to complement the CO-OP approach; however, they proved insufficient. A new, dynamic, iterative approach to performance analysis was needed—hence the development of DPA.

Observation of the performance of 40 children and the analysis of more than 120 occupational goals has led to the design of the DPA framework presented here. Experience with DPA has led to the incorporation of this framework as an integral feature of CO-OP. Further, experience with DPA has pointed toward a theory of occupational performance.

Basic Assumptions of DPA

Fundamental to DPA is a rudimentary theory of occupational performance that views Human Occupation from an Ecological Perspective (HOEP). An amalgam of behavioral, cognitive, and contemporary motor theories, HOEP views performance from a top–down perspective as described by Fisher and Short-DeGraff (1993) and Trombly (1993).

![Figure 1. Occupational performance hierarchy: bathing.](image)

Congruent with the empirical evidence provided by Thelen and her colleagues (Thelen 1986; Thelen et al., 1991), HOEP holds that occupational performance must be viewed holistically, that is, as a “whole task” phenomenon resulting from the dynamic interaction of the person, the occupation, and the environment and that each combination of these three factors produces a unique performance. The magnitude of the whole task depends on the size of the performance unit of interest; for example, self-care versus grooming, versus bathing, versus towelling off. Any size unit of performance can be considered the whole task, and every whole task can be considered to consist of a hierarchy of ever-smaller performance units. For clarity and ease of discussion, it is proposed that a distinction be made between these levels of occupational performance by calling the first level of interest the whole task and calling subsequent levels segments, units, and subunits, (see Figure 1). Note that although the levels of performance can get quite specific, as can be seen from Figure 1, the hierarchy does not go down to the level of performance components because these are generally not a consideration in task performance.

Performer Prerequisites

There are assumed to be two performer prerequisites for optimal occupational performance: motivation and task knowledge.

Motivation. In the motor learning literature, it has been empirically demonstrated that a person’s motivation for a task influences the acquisition of skill, task performance, and task persistence. As well, motivation has been shown to enhance the ability to deploy existing skills and knowledge, and affects willingness to continue when a task

1In the occupational therapy literature, there is little agreement about the size of the unit of performance that is intended by the terms occupation or task. However, in practice, it is clear that the occupations and, hence, the range of the size of performance units with which therapists concern themselves are relatively prescribed and that tasks are considered smaller units than occupations, as described by Christiansen and Baum (1997). Here, the term occupation is used to refer to a midrange of performance units (e.g., self-care, grooming); the term task is used to refer to the smaller units (e.g., bathing) seen to be nested in the occupation. Micro units of performance (e.g., motoneuron activity) are considered beyond the scope of DPA and, hence, this article.
becomes exceedingly challenging (Anshel, Weinberg, & Jackson, 1992; Deci & Ryan, 1992; Dweck, 1986). In the occupational therapy literature, it has been posited that humans have a basic need (i.e., an intrinsic motivation) for occupation (Dunton, 1928; Kielhofner, 1995; Polatajko, 1992, 1994; Wilcock, 1998). However, as is self-evident, not all occupations are motivating for all people. Therefore, it is argued that a necessary condition for an occupation to be initiated is that the person must have a minimum level of (intrinsic or extrinsic) motivation for the occupation. Further, Ferguson and Trombly (1997) have shown that adding purpose and meaning to an occupation, which increases motivation (Trombly, 1995a), enhances motor learning and performance.

Task knowledge. Pressley, Borkowski, and Schneider (1987) suggested that a prerequisite to performance is an understanding of what the task requires. For example, if a person wants to write a letter, he or she must have knowledge of the rules of letter writing, spelling, grammar, letter formation, and spacing. Clients are unable to develop strategies if they do not have a sufficient understanding of the task demands (Pressley et al., 1987). Brown, Pressley, Van Meter, and Schuder (1996) provided evidence that task knowledge is integral to strategy development for performance. CO-OP experience has suggested that task knowledge, at least in part, is often missing in children with subtle motor problems and that providing this knowledge results in improved performance (Mandich, 1997).

Performance Requisites

A primary requisite for occupational performance is the ability to achieve a balance between the ability of the performer and the supports and demands of the occupation and the environment (see Figure 2). Competent occupational performance is considered to be the outcome of an interaction in which performer ability is in balance with occupational and environmental supports and demands (Polatajko, 1992, 1994). This outcome has been demonstrated in a number of studies based on Lawton and Nahemow's (1972) ecological theory, which holds that optimal performance arises out of a balance between individual ability and environmental press (Lawton, Nahemow, & Yeh, 1980; Nahemow, 1986). Experience with CO-OP suggests that this balance is necessary not only at the whole task level, but also at every level of the performance hierarchy. Thus, the requisites for performance are achieving a balance at all levels of the task.

Description of DPA

DPA is a framework for analyzing the performance of a person actually carrying out an occupation, task, or activity. The purpose of DPA is to solve performance problems by identifying where performance breaks down and by testing solutions. DPA focuses attention on task breakdown and requires the therapists to draw on his or her task knowledge, theoretical perspective, and clinical reasoning skills to identify the effective and ineffective aspects of the performance. At times, theoretical perspectives may point the therapist to performance components or environmental contexts that require further evaluation. However, as stated previously, DPA is intended to be embedded in a top–down approach, and component-based approaches are only invoked when top–down approaches do not result in improved performance.

Unlike activity analysis, DPA does not assume that there is a single sequence of a priori steps for optimal performance. Rather, DPA acknowledges that optimal performance is the product of the interaction of person, environment, and occupation and, thus, highly individualistic. DPA places the client and his or her occupation in interaction with the environment at the center of the analysis process.

In keeping with the assumption that the performer prerequisites and performance requisites operate at every level of the performance hierarchy, DPA is a dynamic and iterative process. The DPA framework is a decision tree designed to guide the occupational therapist in his or her analysis of task performance (see Figure 3). In DPA, the therapist uses the series of questions in the decision tree to determine where the client's performance breaks down and to test solutions. Performance is first examined at the whole task level and, if there is a breakdown, at the appropriate unit levels. Frequently, there are several points of breakdown at various levels of performance, and each must be examined.

Step One: Establishing Whole Task Prerequisites

First, the performer prerequisites are examined. To do this through questioning or observation, the therapist first determines the client's motivation for the occupation. If the client is at least somewhat motivated to perform the occupation, the therapist next determines, again through questioning, the client's general level of whole task knowledge. It is important to determine whether the client has sufficient task knowledge to initiate the task. If the client either does not have the motivation to perform the task or sufficient task knowledge to initiate the task, DPA cannot proceed. The therapist must first work to establish these. Only when
general task knowledge and motivation have been established can the examination of the performance requisites begin.

**Step Two: Analysis of Observed Performance**

Given the motivation to perform the occupation and sufficient whole task knowledge to initiate performance, analysis of actual performance begins. At this stage, the client performs the occupation, and the therapist observes.

Drawing on his or her observation skills and task knowledge, the occupational therapist identifies the place(s) where the client demonstrates performance difficulties. The therapist uses the questions in the decision tree, in sequence, to establish the source(s) of these difficulties. The client’s abilities, relative to the environmental and occupational supports and demands, are weighed to determine the source of performance imbalance and potential avenues for change. Once all the sources of imbalance have been identified, the therapist can initiate intervention to redress these imbalances. The therapist’s theoretical orientation will drive this process.

**Clinical Example 1**

Anna, an 8-year-old girl who had been referred to occupational therapy, had a coordination disorder that affected on a number of her daily occupations, including skipping rope. Anna’s mom, older sister, and the physical education teacher had all tried to teach Anna to skip rope, but had been unsuccessful. Anna’s goal in therapy was to learn how to skip rope so that she could skip rope with her friends.

To carry out a DPA of skipping rope, the therapist used the DPA decision tree. First, the therapist questioned Anna to determine whether the performer prerequisites were in place:

1. *Did Anna want to skip rope?* Yes, Anna was highly motivated because all her friends skipped rope at recess.
2. *Did Anna generally know how to skip rope?* Yes, Anna had a general understanding of the occupation of skipping. She knew that she needed to jump when the rope turned.

The therapist then asked Anna to skip rope. The therapist observed the whole task performance and determined the following:

3. *Was the performance competent?* No, although Anna was quite eager to skip, frequently telling the therapist that she was ready to skip, she continually stepped on the rope, got it tangled between her feet,
and jumped before the therapist turned the rope.

4. Where in the performance were the breakdowns? The therapist noted several difficulties in Anna’s skipping. One point of breakdown was Anna’s body position relative to the rope. Anna generally was too close to the end to clear the rope. She either did not start to skip in the middle of the rope or drifted toward the end of the rope on each jump.

The therapist then examined this point of breakdown: positioning of the body relative to the rope.

a. Did Anna know where to skip relative to the rope? No, the accelerator for the cart was most close to the end to clear the rope. One point of breakdown was Anna’s body position relative to the rope. Anna generally was too close to the end to clear the rope. She either did not start to skip in the middle of the rope or drifted toward the end of the rope on each jump.

b. Did Anna want to skip in the middle of the rope? Yes, once Anna understood\(^1\) that she needed to stay in the middle of the rope, she attempted to do so.

c. Could Anna start in the middle of the rope and stay there on successive jumps?

i. Did Anna have the ability to get in the middle of the rope and stay there on successive jumps? No, Anna did not understand that she had to be in the middle of the rope, nor did she realize that her body was drifting forward with each subsequent jump.

ii. Were the occupational demands or supports appropriate? No, there were insufficient cues identifying the middle of the rope or Anna’s position relative to the middle of the rope.

iii. Were the environmental demands or supports appropriate? No, there were insufficient environmental cues marking the place to position her body relative to the rope.

For this breakdown, the therapist identified an imbalance between the number of cues Anna needed to maintain her body position relative to the number of cues available. Next, the therapist repeated this process to identify the sources of imbalance for the other areas of difficulty Anna was having in skipping rope. Having identified all the sources of difficulty, the therapist initiated intervention.

Clinical Example 2

Mrs. James was a 50-year-old woman with multiple sclerosis who lived in a condominium complex with her 55-year-old retired husband. Mrs. James fatigued easily and had to pace her participation in activities. She enjoyed visiting with her friends in the complex and played cards three times a week, which required her to travel to various homes within the complex independently and have sufficient energy to engage in activities when she reached the homes of her friends. Her goal was to identify a means of independent, energy-efficient travel around her complex.

First, the therapist questioned Mrs. James to determine whether the performer prerequisites were in place:

1. Did Mrs. James want to travel around the complex? Yes, she was highly motivated.

2. Did Mrs. James generally know how to travel efficiently around the complex? No, Mrs. James was unaware of all the options available to her; however, she did not want to use a scooter.

In this case, the therapist stopped the DPA here and explored options with Mrs. James. A golf cart was identified as a potentially acceptable option to the scooter. The therapist then continued the DPA process to determine whether there was a balance among Mrs. James’s ability, the energy demands of operating the golf cart, and the environmental support for a golf cart.

Arrangements were made to obtain a golf cart. The occupational therapist observed Mrs. James negotiating the cart in her complex and determined the following:

3. Was the performance competent? Not quite; Mrs. James was able to maneuver most of the environment with the golf cart but had difficulty negotiating curbs.

4. Where in the performance were the breakdowns? Mrs. James experienced two difficulties in negotiating curbs: She approached the curb too quickly and at an unsafe angle.

The therapist then examined this point of breakdown: approaching curbs too quickly.

a. Did Mrs. James know at what speed she could safely approach the curb? Yes; however, she had difficulty controlling the speed of the cart.

b. Did she want to safely approach the curb? Yes.

c. Could she approach the curb at a safe speed?

i. Did Mrs. James have the ability to control the speed of the cart? No, Mrs. James had decreased sensation in her right leg and, therefore, had difficulty gauging the amount of pressure she put on the pedal.

ii. Were the occupational demands or supports appropriate? No, the accelerator for the cart was most readily accessed by the right leg.

iii. Were the environmental demands or supports appropriate? Yes.

For this breakdown, the therapist identified an imbalance between Mrs. James’s ability to use her right leg and

\(^1\)If the client does not understand requisite parts of the task, the therapist must intervene before DPA can continue.
the design of the cart. Next, the therapist examined Mrs. James’s angle of approach. Having identified all the sources of difficulty, the therapist initiated intervention.

Summary
In keeping with the current emphasis in the profession on enabling occupation, leaders in the field have identified the need for assessment procedures that focus on occupational performance (Fisher & Short-DeGraff, 1993; Trombly, 1993). DPA is a framework for the analysis of actual performance that enables clients to achieve competence in the occupations they want to, need to, or are expected to perform. DPA is embedded in a top–down approach. Unlike activity analysis, DPA does not assume that there is a single sequence of a priori steps for optimal performance. Rather, DPA acknowledges that optimal performance is the product of the interaction of person, environment, and occupation and, thus, highly individualistic. Performance is viewed as nested: Each unit of performance builds on the next and contributes to the successful completion of the occupation. DPA places the client and his or her occupation, in interaction with the environment, at the center of the analysis process. DPA is a framework that occupational therapists can use to incorporate a top–down approach into their clinical practice. ▲

References


