The Ecology of Human Performance: A Framework for Considering the Effect of Context

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Key Word: environment

In theory and in practice, context (as an area of concern to occupational therapists) has not received the same attention as performance components and performance areas. The Ecology of Human Performance serves as a framework for considering the effect of context. Context is described as a lens from which persons view their world. The interrelationship of person and context determines which tasks fall within the person's performance range. The Ecology of Human Performance framework provides guidelines for encompassing context in occupational therapy theory, practice, and research.

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A person does not exist in a vacuum; the physical environment as well as social, cultural, and temporal factors all influence behavior. Taken together, those factors that operate external to the person are identified as *context* for the purposes of this article. Each person's contextual experience is unique, although many elements are shared among persons.

Consider the unique way that adults talk to young children. They may change the tone of their voices, carefully select their words, bend down to make themselves smaller, or use gestures that animate the conversation. Adults make these adaptations because they recognize the importance of context when talking to young children, such as the level of the child's communication skills or how the child might feel about talking to a big person. Use of these adaptive strategies by an adult speaking at a work meeting would be considered inappropriate because the context of a work meeting dictates other communication methods. The same need for contextually selected behavior exists in many realms of daily life. A Catholic who attends services at a synagogue derives different meaning from the experience than does her Jewish friend. When a family eats at a fast-food restaurant, a different repertoire of behaviors may be sanctioned than if that same family went to a restaurant with menus at the table. Context influences behavior and performance in many ways; disciplines that address human behavior must consider the effect of these contextual features on target behaviors.

A recurring theme in the occupational therapy literature is the concept that environment (i.e., context) is a critical factor in human performance. Despite this emphasis, the potential contribution of contextual features in evaluation and intervention relative to performance components and performance areas has received little attention. For example, occupational therapy has many assessments that examine muscle strength, social skills, vestibular function, dressing, or use of leisure time. However, contextual features such as the physical qualities of an environment, the cultural background of the person, or the effect of friendships on performance are often missing from assessment tools typically used in occupational therapy. The Ecology of Human Performance (EHP) framework has been developed by the occupational therapy faculty members at the University of Kansas in response to the lack of consideration for the complexities of context. The framework provides a structure for thinking of context as a key variable in assessment and intervention planning, while elucidating the inherent dangers in examining performance out of context.

Ecology is concerned with the interrelationships of organisms and their environments. Occupational therapy is interested in the interrelationship of humans and their contexts and the effect of these relationships on performance; hence this framework is entitled the Ecology of Human Performance.

The EHP framework provides guidelines directed at including contextual features in occupational therapy research and practice (Mosey, 1992). It draws from occupational therapy and social science knowledge to contribute a complementary perspective of ecological principles. As a framework, it delineates and defines the relevant concepts and describes relationships among variables. It provides direction for the development of specific frames of reference concerned with context or the reexamination of existing frames of reference and their attention to context. The following literature review acknowledges the major contribution of others in the development of this framework and provides the groundwork for understanding the EHP.

Relevant Literature from Social Science

The EHP framework is founded on and synthesizes the work of scholars in several disciplines who have considered the interaction between person and environment. Much of the original work was conducted by environmental psychologists who examined the interrelationship of the physical environment and human behavior or experience. In environmental psychology, persons are considered to be interdependent with their immediate environment; the focus of research is on the interaction of the physical elements of a person's immediate environment with behavior (Holahan, 1986; Wicker, 1979).

Although the EHP framework shares this emphasis on examining the interdependent relationship between the person and the physical environment, it expands the concept of context–environment to include physical, temporal, social, and cultural elements. Employing a broader definition of environment allows researchers to make explicit those elements that have frequently been left implicit by the environmental psychologists. For example, Wicker (1979) described the effect of settings on behavior and detailed how behavior might be modified to be appropriate for a particular environment. Implicit in his analysis is the assumption of a shared concept of the external environment. The use of context in the EHP framework balances the emphasis on the external environment presented in environmental psychology and suggests that the researcher–practitioner consider what the environment means to the person.

Hart (1979) conceptualized the environment as an instrument of socialization. He presented the concept of environmental competence as the "knowledge, skill and confidence to use the environment to carry out one's own goals and to enrich one's experience" (p. 343). Like other environmental psychologists, he emphasized that the process of learning about self and the environment is interactional and he limited the concept of environment to the physical environment.

The idea that context and person are interactional is fundamental to the EHP. It is assumed that persons both affect and are affected by their context. Although the interactional relationship between person and environment is of primary importance to environmental psychologists, none has described this process as completely as Bruner (1989). He developed the concept of transactional contextualism as a process in which the person constructs the self in the context of the environment. For example, a child who grows up in a large family develops a different construction of self than a child who grows up without siblings.

Lawton's conceptualization of environment more closely resembles that of the EHP than do those of other environmental psychologists. He presented a broader concept of environment that includes the personal, suprapersonal, and social as well as the physical (Lawton, 1982). Applying Murray's (1938) concept of environmental press to the physical environment, Lawton (1982) developed an ecological model of aging that describes the dynamics of ecological change, competence, and environmental press in which a person's environment affects perceptions of competence. In this model, behavior is thought to be "a function of the competence of the individual and the environmental press of the situation" (p. 43).

Hall (1983) and Zerubavel (1981) have examined the concept of time as an aspect of environment. Both considered time as context. Hall portrayed time as a factor that is different when persons live it and when they consider it. He argued for a contextually bound, culturally idiosyncratic, realistic concept of time. Zerubaval asserted that time is a major parameter of environment and that the two must mesh to produce a meaningful gestalt. Csikszentmihalyi (1990) described "flow" experiences in which persons are so immersed in a selected task that they are unaware of the passage of time. These authors' discussions of time as context provide excellent examples of the importance of considering time to be a component of context.

Several issues have been raised by those who have considered the relationship of environment to behavior. Many authors have distinguished between the phenomenological and physical nature of the environment. The EHP recognizes the role played by both. Gibson (1986) discussed both these aspects in his consideration of the relation between ecological context and visual perception. He suggested that the environment is both physical and phenomenological in that persons perceive objects in the environment by the affordances they offer. The environment–context is meaningful to the person by what it offers or allows the person. The EHP framework incorporates this interpretive phenomenological perspective in its consideration of the relationship between the person and context.

Developmental psychologists have also examined the effect of environment on behavior. For the most part, they have emphasized social aspects of environment.

Bronfenbrenner's (1979) ecological model for human development applied an ecological systems model to human development. It presented a system of social relationships that provided the context for child development. Bronfenbrenner also developed the concept of ecological validity, in which he argued that research was not valid unless it was grounded in context. The EHP framework might enable professionals to consider whether therapeutic intervention could be valid if it were not grounded in context.

Vygotsky (1978) also examined the contribution that social environment makes to development. Wertsch (1985) summarized Vygotsky's principles by describing how context could affect development in the theory of the zone of proximal development. For Vygotsky, the zone of proximal development was the distance between a child's actual development and a higher level of potential development. Vygotsky argued that intervention during periods of sensitivity might allow the child to develop to a higher level than might have otherwise occurred, that is, an alteration of the child's regular context could affect development.

The importance that the EHP framework places on context is consistent with the emphasis placed on ecology and context by Auerswald (1971). Auerswald's work on ecological epistemology was among the earliest applications of an ecological perspective to therapeutic intervention. He argued that the processing of information from a holistic ecological perspective should replace simpler linear cause-and-effect thinking in therapeutic intervention. He identified a keynote of this kind of ecological thought as the "concern with the context in which a phenomenon occurs" (1971, p. 263). His position was that contextual issues should be considered before any therapeutic intervention began.

Relevant Occupational Therapy Literature

The environmental psychologists have contributed to the thinking of many occupational therapists. Kiernat (1992) applied the Lawton-Nehamow ecological model in her discussion of the environment as a modality. Barris (1982) drew from the work of Wicker and Hall in her conceptualization of environmental interactions. Howe and Briggs (1982) described an ecological systems model for occupational therapy that included the theories of Auerswald, Bronfenbrenner, and Wicker, whereas Spencer (1991b) used the ideas of Hall and Lawton in her discussion of physical environment and performance.

The terms *environment* and *context* are used interchangeably in the present review, dependent on the word contained in the original work. Although the occupational therapy literature has most commonly used the term *environment,* more recent authors have used the term *context.* The latter term was chosen for the EHP framework because context encompasses more of the person's physical, social, and phenomenological experience.

The concept of environment in theoretical occupational therapy literature is typically explained from two positions. In one, the environment is described primarily as a tool employed by the therapist in the intervention process. For example, Llorens (1970) defined occupational therapy intervention as the provision of environments that assist persons whose developmental cycle has been disrupted. Fidler and Fidler (1978) explained that persons develop skills and mastery through interaction with the human and nonhuman environment. She appreciated the individuality of this interaction and recognized the influence of social and cultural norms. King (1978) described intervention as the use of the environment to elicit adaptive responses.

In the other position, the relationship of the environment and the person is characterized from the perspective of general systems theory. The application of general systems theory to occupational therapy has facilitated the understanding of person and environment interaction. Reilly (1962) was the first to apply the constructs of general systems theory and to include the rules of hierarchy as organizing principles. The person and environment are therefore viewed as interdependent, interacting through a system of input, output, and feedback.

General systems theory and hierarchical structures provide a framework for the Model of Human Occupation (Kielhofner & Burke, 1980) The components of the environment are identified as objects, persons, and events that again interact with the person in an open system. Kielhofner and Burke included throughput as an element of the system that is made up of three hierarchically arranged subsystems: volition, habituation, and performance. Barris (1982) used the framework of the Model of Human Occupation to clarify environmental properties and their influence on the person.

Occupation science organizes the study of humans as occupational beings through the Model of Human Subsystems That Influence Occupation (Clark et al., 1991) This model, based on general systems theory, represents the person as six hierarchically arranged subsystems that interact with the environment in an open system.

Howe and Briggs (1982) developed the Ecological Systems Model, which uses general systems theory to portray interconnections of the person and the environment as concentric circles with the person at the center surrounded by environmental layers. They detailed the model's view of function and dysfunction, which considers both the person and the environmental context.

In defining occupation, Nelson (1988) described the dynamics of occupational form and occupational performance within the framework of a system. Occupational form was defined as "an objective set of circumstances, independent of and external to a person" (p. 633). Nelson emphasized that performance can only be understood in terms of the occupational form. Moreover, occupations

are characterized as occurring at different levels.

Christiansen (1991) discussed the effect that general systems theory has had on organizing the complex concepts involved in occupational therapy. General systems theory has allowed these complexities to be understood while avoiding reductionistic views that oversimplify phenomena.

General systems theory is congruous with the EHP. However, the conceptualization of the EHP is distinguished by a nonlinear, dynamic perspective. Dynamic principles describe systems as multiply determined, complex, and self-organizing (Thelen, 1992). They eschew schemas and static programs and emphasize variability. Persons may tend toward certain modes, behaviors, or patterns; however, small changes in the person or context alter these tendencies. Persons self-organize by adapting to these changes. When persons are unable to successfully self-organize, the occupational therapist provides interventions that encompass the complex relationship of the person and his or her context. In dynamic systems, hierarchies can exist to suggest patterns but are not requisite parts of the system.

The EHP provides a framework for examining situations that occupational therapists encounter every day. For example, the framework illustrates why some people in the intermediate stages of Alzheimer's disease may be able to live in a home environment, whereas others may be more comfortable in a nursing facility (i.e., the supports available to enable the person to function safely at home may be available to the first person, but not to the second one). The framework also illustrates why not all persons require prevocational training before they can work competitively (i.e., the contextual supports and cues available in the actual work environment may enable the person to perform the work task more consistently than in simulated task performance, which does not contain these supports). The EHP deciphers the variance in disruption of daily life that persons experience with disability, illness, or stress from a contextual perspective.

Recently, context's significance has received more attention in the occupational therapy literature. Mosey (1992) included context as one of three categories in occupational therapy's domain of concern. She classified age and environment as the components of context that "provide the perspective from which performance components and occupational areas are viewed relative to the individual" (1992, p. 260). Schkade and Schultz (1992) described occupational adaptation as a frame of reference that gives equal importance to the environment and the person. Occupational adaptation is organized by a holistic, nonhierarchical approach; however, the linear perspective of occupational adaptation distinguishes it from the nonlinear view of the EHP framework.

Several authors have strongly advocated the inclusion of context in occupational therapy assessment. Dunn (1993) recommended using a contextual approach to assessment so that the assessment is relevant to the person and addresses the person's wants and needs. Kiernat (1990) stated that environment is a factor in disability and must be considered when assessing function. Fisher (1992) advocated for the recognition of occupational therapy's unique perspective of function in the assessment process. She emphasized the importance of considering the meaningfulness of the measure and placing the assessment within context. Ethnographic methods have been proposed as a means of including context in occupational therapy assessment (Spencer, Krefting, & Mattingly, 1993). Proponents of ethnography have suggested that these methods can present a more realistic analysis of the person relative to the expectations within a setting.

The current literature has also discussed the application of contextual elements. Spencer (1991a) studied the relationship of social and cultural factors to independent living alternatives. Barney (1991) identified culture as a basic contextual determinant when providing services to older adults in need of assisted living.

In summary, although the occupational therapy literature has consistently included environment as a salient feature of performance, no author has proposed a framework for systematic consideration of environment–context. It is imperative that occupational therapy begin to directly address the features of context; this knowledge will broaden perspectives on successful intervention possibilities.

The EHP Framework

The EHP was developed to provide a framework for investigating the relationship between important constructs in the practice of occupational therapy: person, context (temporal, physical, social, and cultural [American Occupational Therapy Association, in press]), tasks, performance, and therapeutic intervention, to better understand the domain of human performance. The primary theoretical postulate fundamental to the EHP framework is that ecology, or the interaction between person and the environment, affects human behavior and performance, and that performance cannot be understood outside of context.

The person in this framework includes one's experiences and sensorimotor, cognitive, and psychosocial skills and abilities. The person is represented by a simple stick figure in the circle (see Figure 1). The circle surrounding the person represents the person's context (physical, temporal, social, and cultural features); the only way to see the person is to look through the context. In Figure 1, a wedge has been cut out of the context to make the person easier to view. The ellipse in the diagram is the cut edge, enabling the reader to see the person. In this model, it is impossible to see the person
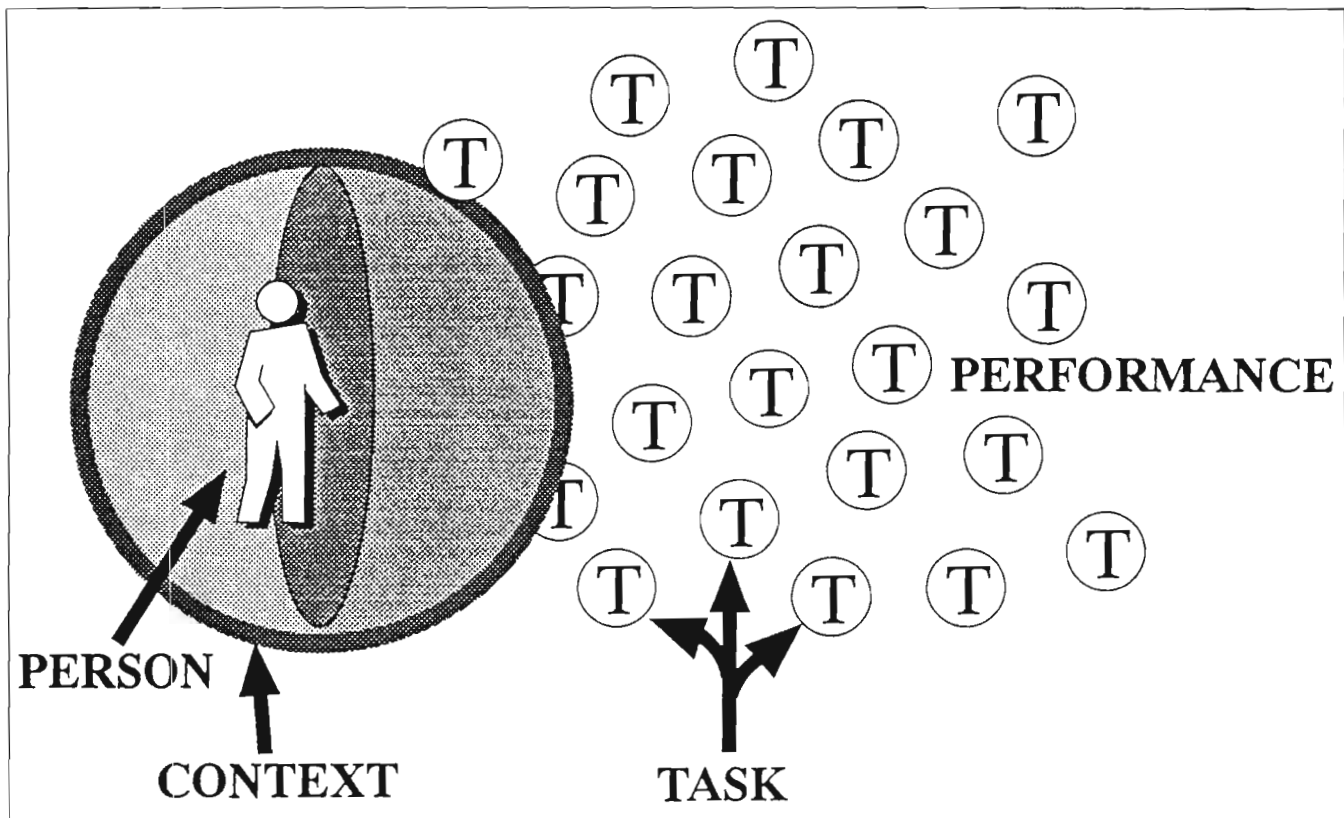
Figure 1. Schemata for the Ecology of Human Performance framework. Persons are embedded in their contexts. An infinite variety of tasks exists around every person. Performance results when the person interacts with context to engage in tasks.

without first seeing the context.

The circles with the Ts inside represent the tasks that are available to persons. *Tasks* are defined as objective sets of behaviors necessary to accomplish a goal. Everyone has the opportunity or the possibility of performing myriad tasks. Persons use their skills and abilities to focus attention on specific tasks from these possibilities.

When persons use their skills and abilities to perform tasks, they use environmental cues and features to support performance. Figure 2 illustrates a typical person embedded in a context supporting regular behavior, who has a particular focus on a particular area of performance. For example, a person may notice that the red light is on at the street corner, indicating the need to stop. A person's contexts are continuously shifting; as contexts shift, the behaviors necessary to accomplish a goal also change.

When persons use their context to support performance, it is like using the lens within the eye to get a perspective on the world. As Figure 2 indicates, the contextual lens interacts with persons' skills and abilities to enable persons to perform certain tasks. The resulting scope of action is called the performance range (see Appendix) Persons view different potential tasks through their contextual filter, the accumulation of their experiences, and their perceptions about the physical, social, and cultural features of their current performance setting.

One person might look toward being a downhill skier and another might look toward being a writer or a cook, but everyone looks through a context to derive meaning about needs or desires.

Occupational therapy also considers a person's life roles. Figure 3 illustrates how roles may be characterized in this model: it displays three roles (cook, mother, and wife) as a constellation of tasks; some of these roles overlap. Each person who has the roles of wife, cook, and mother includes a unique configuration of tasks in each role as a consequence of her skills and experiences and the demands of her context. For example, if one person is a gourmet cook, she might have more tasks in the cook configuration than another person who uses a microwave oven to prepare meals or goes to restaurants.

The temporal context is also relevant to role characterization. For example, a child's role as cook might involve simpler recipes than an adult's. A person who has sustained an acute injury, such as a broken leg, may adapt the role of cook until it is possible to go out to restaurants again, whereas a person with a chronic disability, such as a head injury, may need to learn completely new cooking strategies. A person's configuration of the roles is based on the person's skills, abilities, context, and desires.

A person may have more limited skills and abilities but be embedded in a regular context that typically sup-
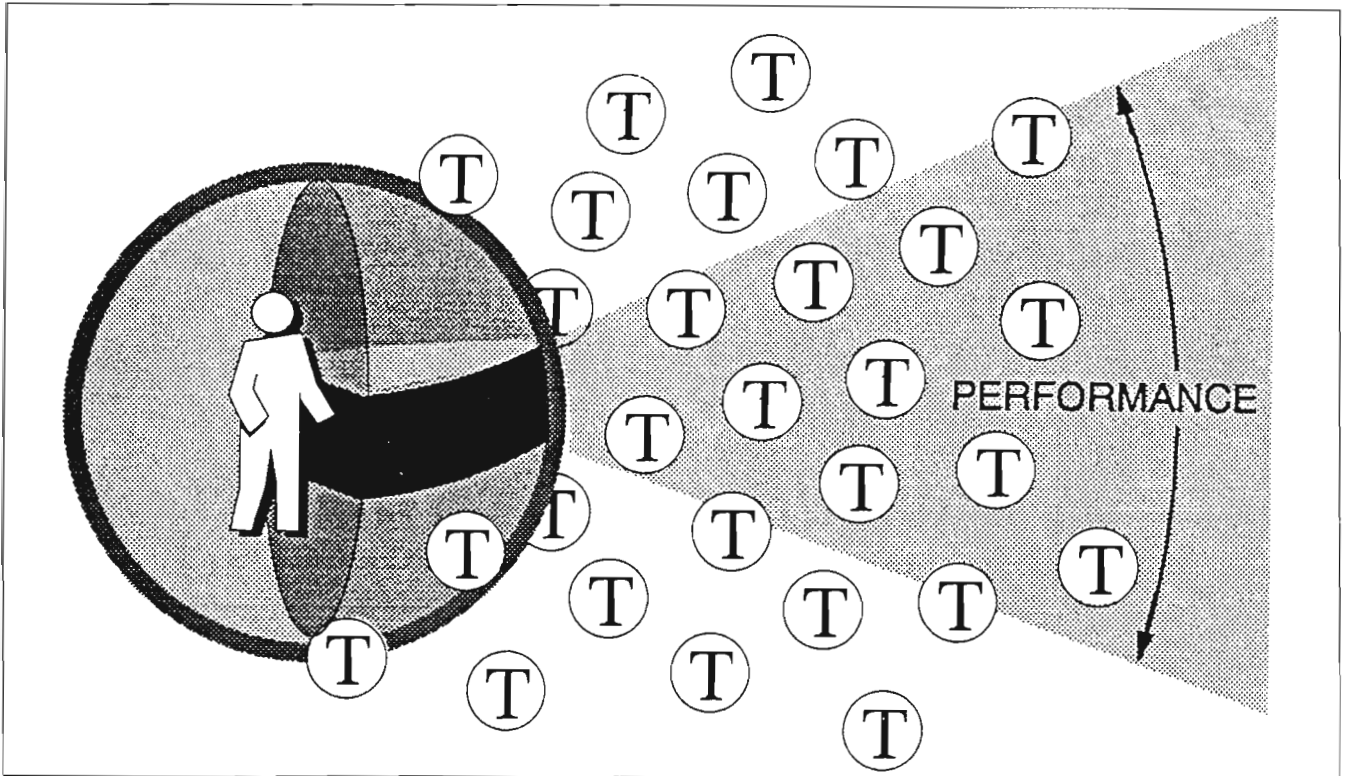
Figure 2. Schemata of a typical person within the Ecology of Human Performance framework. Persons use their skills and abilities to look through the context at the tasks they need or want to do. They derive meaning from this process. Performance range is the configuration of tasks that the persons execute.
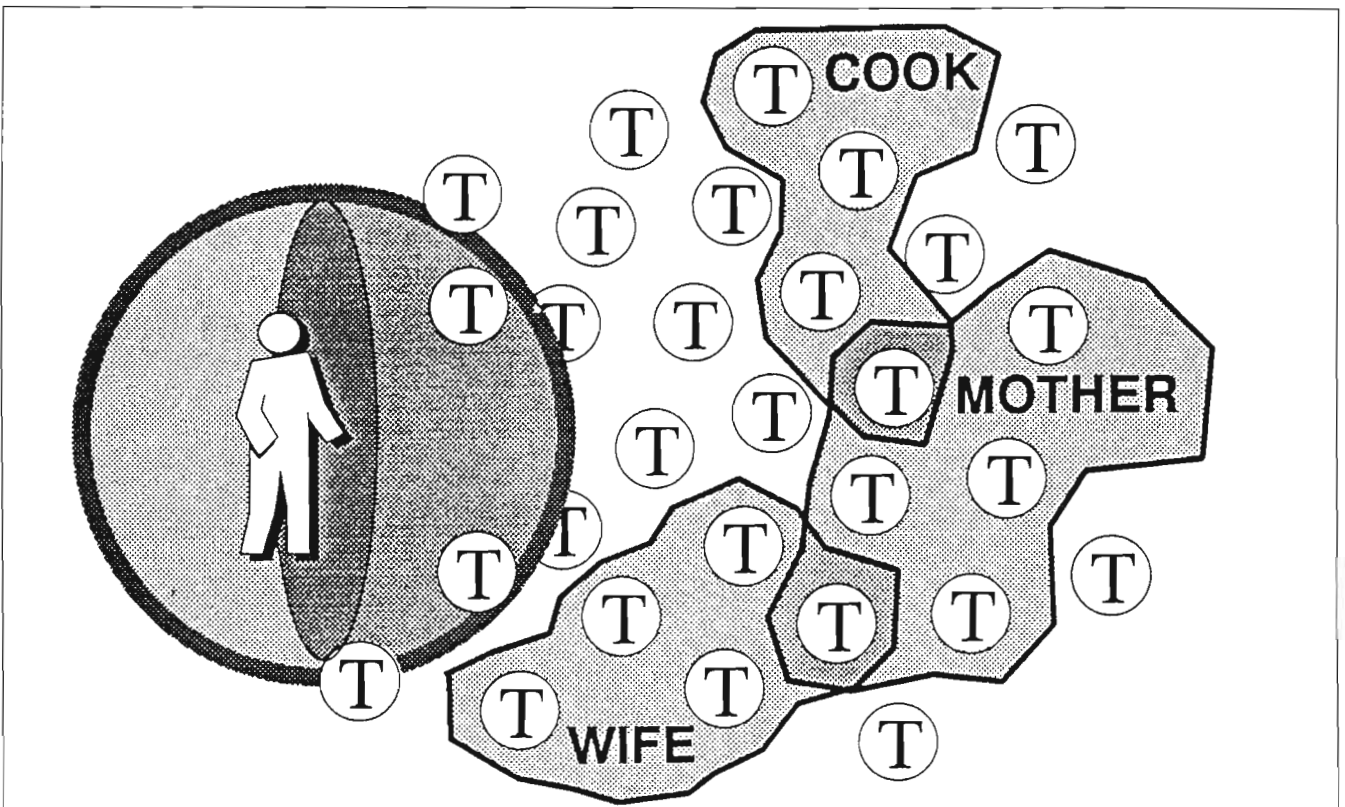

Figure 3. Illustration of roles in the Ecology of Human Performance framework. Life roles are a constellation of tasks. Persons have many roles; some tasks fall into more than one role. These role configurations are unique for each person.

ports performance. This person may have the same possible cues and supports available in the context as that of the person in Figure 2, but the performance range is narrower because this person does not notice all the cues and supports. When a person has a more limited set of skills and abilities, then the person may either derive less meaning from the context or may not have the personal resources to support performance (see Figure 4). This person may not have the necessary physical capacities (e.g., a person who is blind may not be able to drive), may not pick up the cues the context provides (e.g., a child may fail to recognize that another child is trying the engage him or her in play), or may not know how to take advantage of contextual features (e.g., a person may stand in a full-service lane at the grocery store with only four items when an express lane is available). Each condition may result in a more limited performance range. The tasks that are possible are limited because the person is not able to use the resources that might be available to support performance in the context.

For example, if a person is learning to ski, all of the contextual features are available to support skiing but the person initially lacks the skills to perform the skiing behaviors and so has a more limited performance range. An adult with developmental disabilities may need transportation to work. The bus system is available in the context; all the features are there to allow persons to use the bus

to get to work, but the person may not have the skills necessary to use those features to an advantage, so the performance range is limited. A child may have attentional deficits and limited social skills. Although the context for this child has the same cues that it has for every other child at school, the child who has poor social skill development may not be sensitive to these cues. When the teacher frowns, this child may not understand its meaning, may not notice, or may misinterpret the frown and thus may behave in a way that is viewed as inappropriate for the context of the school day. Consequently, the performance range is limited by the inability to take advantage of the cues or by the irrelevance of the cues to the person. When a person has limited skills and abilities, these limitations can be compounded by inability to use contextual features to an advantage in support of performance.

Sometimes, there is a more limited contextual environment available to the person, but the person possesses typical skills and abilities (see Figure 5). For example, a gourmet cook may have extensive cooking skills, but in a kitchen with only a toaster oven, that cook has limited ability to demonstrate those skills and abilities. A skillful downhill skier has a difficult time demonstrating those skills in the tropics; the person must travel to a more contextually relevant location.
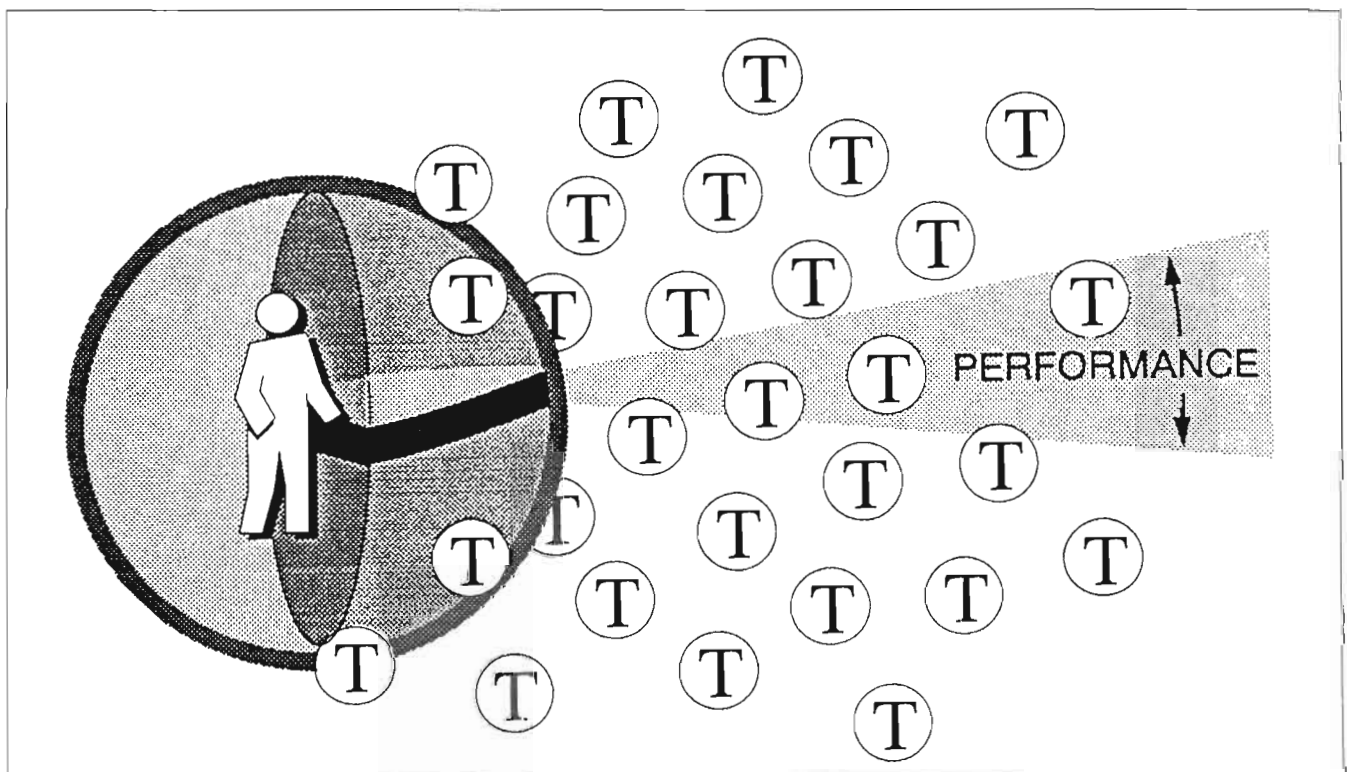
Persons with disabilities sometimes have limited

Figure 4. Schemata of a person with limited skills and abilities within the Ecology of Human Performance framework. Although context is still useful, the person has fewer skills and abilities with which to look through context and derive meaning. This lack limits the person's performance range.
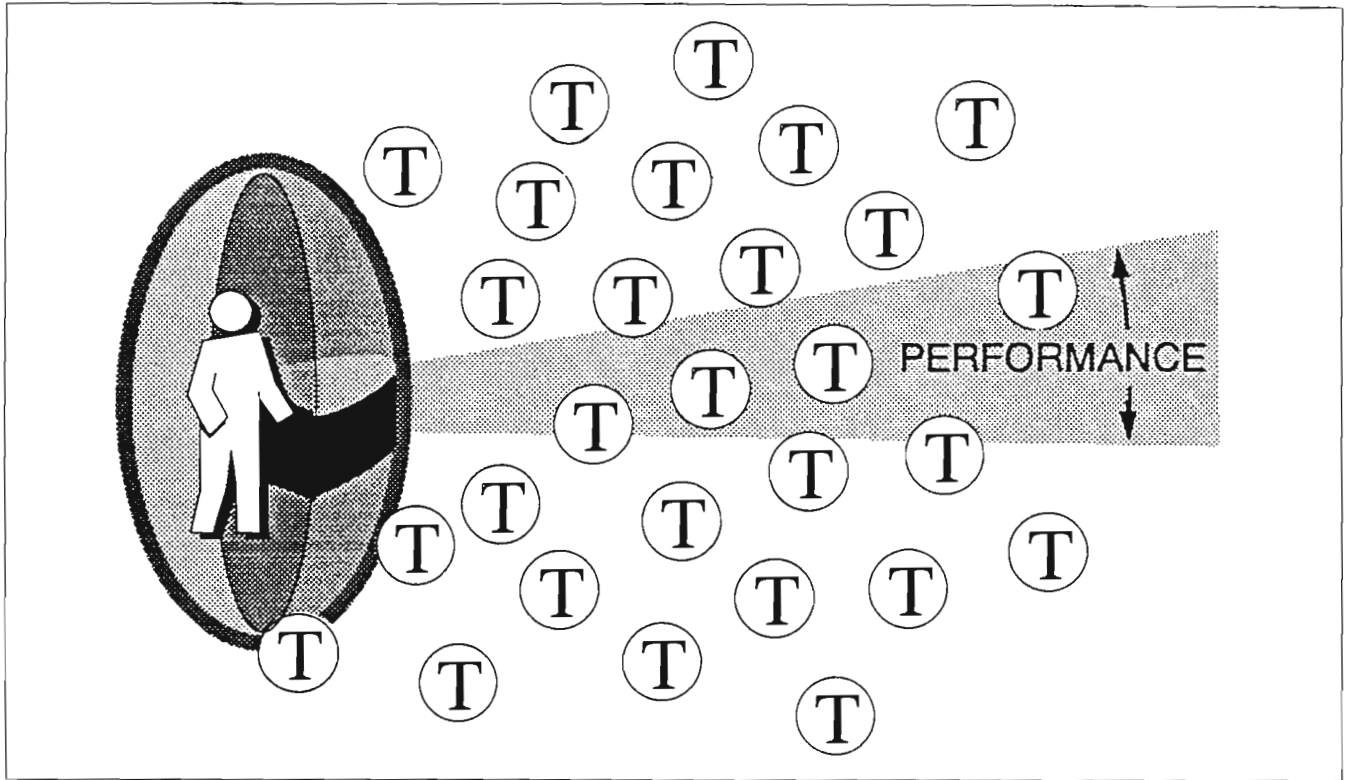
Figure 5. Schemata of a limited context within the Ecology of Human Performance framework. The person has adequate skills and abilities, but the context does not provide resources needed to perform. In this situation, performance range is limited.

skills and abilities and are also in an impoverished context (e.g., a person with severe mental illness who is also homeless). They do not have a context that provides them with the salient cues and the objects or events that are relevant to them to support performance. Performance of daily life tasks, work, or leisure activities in this situation becomes even more complex.

Therapeutic Intervention Within the EHP

Occupational therapy is most effective when it is imbedded in real life. If occupational therapists evaluate individual performance without considering the context of the performance, there is a great risk of interpreting the behavior inappropriately. Misinterpretation can lead to inappropriate choices about therapeutic intervention. For example, consider an occupational therapist working with a young woman and her daughter, who was physically ready to feed herself. The woman resisted the occupational therapist's repeated suggestions to use more independent eating strategies. Upon completing a home visit, the occupational therapist discovered that the mother only knew how to interact with her daughter during mealtime. At other times, the child sat on the floor with toys, but with no direction or interaction. The home visit made it clear to the occupational therapist that the mother was reluctant to give up her only time of interaction with her

daughter. This new insight helped the occupational therapist redirect therapeutic efforts so that the mother and child could play together in a manner that was satisfying to both. By not considering context, this occupational therapist would have put this mother in the difficult situation of having to compromise her relationship with her daughter by following the therapist's suggestions. Additionally, by not considering context, the therapist would have taken the risk that the child would not make progress because the mother might not have followed her suggestions.

A naturalistic study by deVries & Delespaul (1989) examined context and the experiences of persons with schizophrenia. They concluded that knowledge of context provided a new clinical tool. In one example, a man with schizophrenia was having severe problems with hypertensive illness. Clinical investigation to determine the cause of his high blood pressure was puzzling. An analysis of this man's context revealed that he worked as a dishwasher and became extremely anxious when he had to sort silverware during the lunch rush. The clinician was able to use this contextual information to convince the employer to change the employee's work tasks. Consequently, the man's blood pressure decreased to near normal.

Relationships among the EHP framework and the variety of interventions available to the occupational

therapist are shown in Figure 6. Within this framework, therapeutic intervention is a collaboration among the person, the family, and the occupational therapist directed at meeting performance needs. Figure 6 displays five alternatives for therapeutic intervention; the Appendix contains definitions of each therapeutic intervention.

Establish or Restore

The first therapeutic intervention alternative is to establish or restore (remediate) the person's skills and abilities. In this category, the occupational therapist identifies the person's skills and the barriers to performance and designs interventions that improve the person's skills and abilities. The occupational therapist, person, and family might be concerned with reestablishing the person's role in the family, and so might work on coping skills or physical endurance to enable the person to perform tasks related to the family role. Restorative approaches are common options chosen by therapists, particularly within the medical model, which considers what is wrong with the person and sets a plan to correct the problem. This approach is adapted, especially with young children, to include establishing needed skills for function. For example, a therapist might work on the muscle tone of a child with Down syndrome so that the child can move about to play with friends. Adults use these approaches within their own lives when they learn a new skill or when they work to restore a lost function (e.g., increasing range of motion in a joint after removing a cast).

Even when the focus of intervention is on skill development, context is still important. For example, Abreu and Hinojosa (1992) suggested that predictable environments provide the feedback necessary to correct motor behaviors. Toglia (1992) explained that an understanding of the interactions of person, task, and environment is essential to effective cognitive rehabilitation strategies.

Alter

The second therapeutic intervention alternative is to alter the actual context in which persons perform. This intervention emphasizes selecting a context that enables the person to perform with current skills and abilities. The person can be placed in a different setting that more closely matches his or her current skills and abilities, rather than changing the present setting to accommodate the person's needs. The occupational therapist would consider the person's skills, abilities, and difficulties and find a context that was compatible with this performance profile. The important feature of the alter intervention is that the therapist does not set out to correct the person

ESTABLISH/ RESTORE   **ADAPT**   **ALTER**   **PREVENT**   **CREATE**
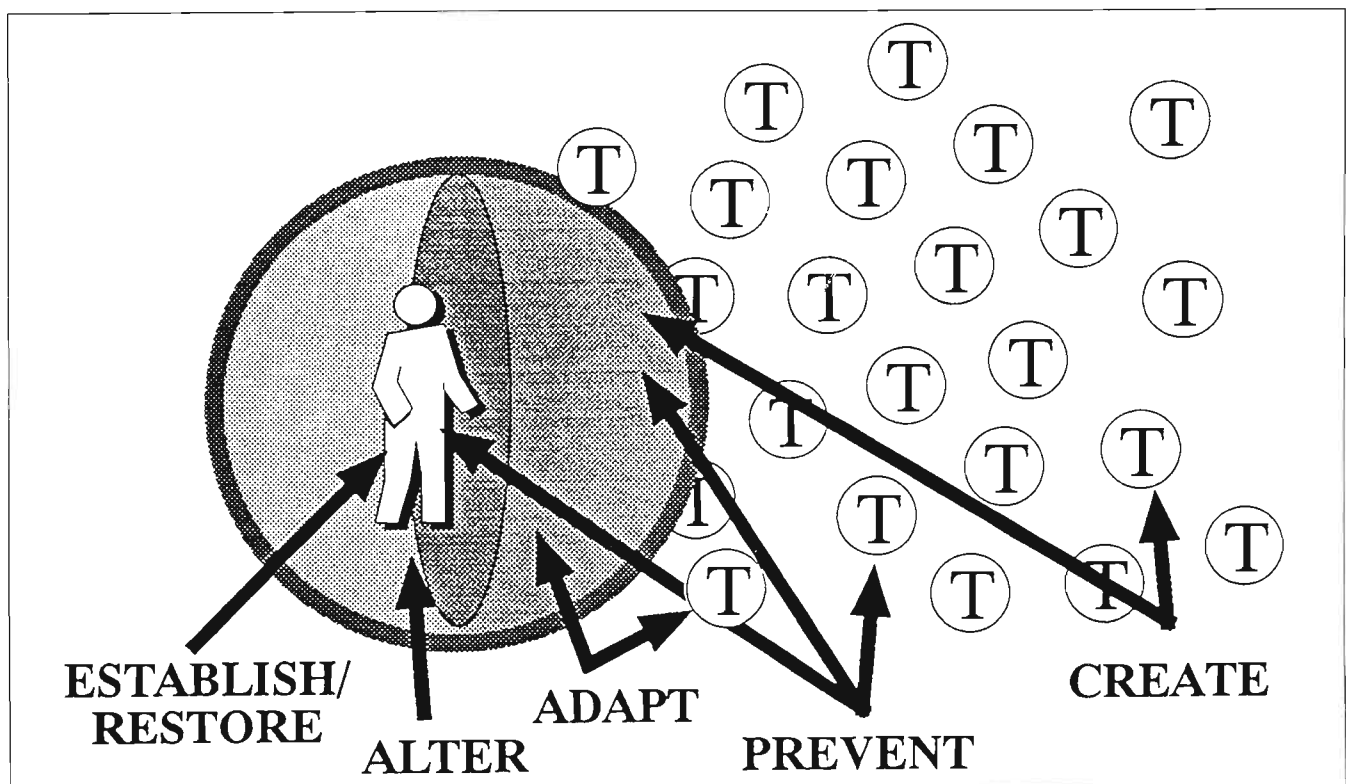
Figure 6. Illustration of therapeutic interventions within the Ecology of Human Performance framework. The arrows indicate the variables that are affected by each intervention.

or the environment; instead, the therapist is looking for the best match between the person and current contextual features available. Allen (1992) acknowledged the lack of direction for occupational therapists working with persons beyond the acute phase of illness who must live with functional limitations. Her frame of reference provides guidelines for making the best fit for persons with cognitive disabilities and available contexts.

Fairweather (1980) used the alter strategy in his Lodge Society, a community program for persons with severe mental illness. He was concerned that persons who were able to succeed in jobs at the hospital were unsuccessful at work in the community because of the intolerance for behavior that was viewed as deviant. One strategy was to create janitorial crews that worked at times and in settings where their contact with others was limited.

Another example involves a person who has low assertiveness ability and needs to buy a car. Although the therapist could work on assertiveness skill development or visit the car dealer to offer some adaptations to the process to facilitate the person's purchase, an alternative that uses the alter intervention option would be for the therapist to suggest that the person buy a car at a dealership that employs the no-haggling approach. Some manufacturers market their sales strategy as one that minimizes the need for assertiveness because there is one price for their cars and no negotiating is necessary. The therapist does not have to change the context and the person can succeed with current skills to purchase the car.

Adapt

The occupational therapist can also adapt the contextual features and task demands to support performance in context. When therapists adapt, they design a more supportive context for the person's performance. Therapists might enhance some contextual features to provide cues and reduce other features to minimize distractibility and make the task more possible for the person. When children are distractible, therapists suggest shorter assignments for their seat work in class. When an adult with severe disabilities needs to manage the home environment, the therapist might select an environmental control unit. Therapists adjust desk and table configurations to meet individual needs. They might change a desk's height to match the person's postural support needs or might find a lower table in the dining area for someone whose ethnic background suggests preference for a lower eating surface. Many persons use stick-on notes to help them remember things they need to do. Persons whose vision is failing may purchase hard-cover novels because they have larger print than paperbacks. Buning and Hanzlik (1993) reported a single-subject study in which the person's context was considered in technological adaptations. In this case, computer technologies were used so

that a doctoral student with severe visual impairments could complete her dissertation.

Prevent

The fourth therapeutic intervention option is to prevent the occurrence or evolution of maladaptive performance in context. Sometimes, therapists can predict that certain negative outcomes are likely unless intervention is provided. Therapists can create interventions to change the course of events by addressing person, context, and task variables to enable functional performance to emerge. This view is supported by Coulter (1992) who proposed that prevention efforts in mental retardation must take an ecological approach that focuses on the interaction between persons and their environment. Department managers employ a prevention approach when they provide an orientation for newly hired employees; managers do not wait until the employee faces a problem to instruct them in proper procedures. Runners who stretch before running are employing a prevention approach. Occupational therapists teach persons with spinal cord injuries how to adjust their position frequently to prevent contractures and decubitus ulcers. Therapists also provide lifting classes in industrial settings to prevent work injuries. Therapists can construct a map of community services for a person with severe mental illness who is moving to a new apartment area to prevent him or her from feeling socially isolated. Prevention approaches anticipate possible and likely problems and change the course of activities to increase positive outcomes. Prevention approaches are good options for persons with long-term conditions that lead to secondary problems; the temporal context is relevant to these person's outcomes.

Create

The fifth therapeutic intervention option is creating circumstances that promote more adaptable or complex performance in context. This therapeutic intervention does not assume that a disability is present or that a disability has the potential to interfere with performance. The person or family seeking assistance may see the problem from a functional performance standpoint, not from a disability standpoint. The therapist participates by providing expertise to enrich contextual and task experiences that will enhance performance. Circumstances that do not presume disability are constructed; this is what distinguishes the create intervention from the prevent intervention, which addresses precluding the occurrence of a problem that is likely to arise. Early intervention programs are common examples of community-based programs that have an enriching philosophy; therapists use their expertise to plan age-appropriate tasks that embellish the young children's development. Therapists might also participate in the development of living communities for elders that provide varied and

stimulating activities. These community settings do not presume their consumers have disabilities. They are designed to make the best possible use of environment to enhance living and development. For example, a large building complex may have many signs to lead visitors and workers to correct locations efficiently, not because there are presumed disabilities, but because signs make the environment easier for everyone. When adults play an icebreaker game at the beginning of a party they are creating an enriched environment for socialization.

Occupational therapists have many therapeutic choices with each person they serve, and at each point along the therapeutic relationship. Therapists often employ several intervention approaches either simultaneously or across time. Table 1 shows two examples of how an occupational therapist might deal with a person and family who need occupational therapy services from all of these approaches. When occupational therapists include context in the total perspective, it creates possibilities; when persons are viewed out of context, viable options are lost.

Directions for Future Work

The EHP proposes the relationships among the key variables of person, context, tasks, and performance. Within the domain of concern of occupational therapy, context is only relevant as it relates to human performance.

Mosey (1981) indicated that a frame of reference must describe postulates that allow application to practice and offer specific guidance for intervention. Scholars will therefore need to refine these constructs by assessing their adequacy and answering practice-oriented questions. Several lines of study provide important initial information that will refine current frames of reference that affect occupational therapy, develop new frames of reference, and create new assessment and intervention strategies.

Several questions emerge as fundamental to the investigation of basic relationships proposed in this framework. A primary question is: How do we capture contextual features objectively, and how do we then decide which features are salient for particular performance situations? We must also determine how a contextual feature becomes relevant for a particular person. There are many more contextual features available to persons in a particular context than are noticed or used by a person for successful performance. In particular performance situations, we need to determine which contextual features support or create barriers to performance. Are there particular contextual features that contribute to a person's resilience?

Occupational therapy assessment strategies also need to consider context. It will be important to determine whether standardized functional assessments are valid for capturing what is actually known about the per-

Table 1
Case Examples Applying the Ecology of Human Performance Framework

Area Addressed	Strategy Employed/Information
	CASE 1
Background	M is 15 months old; he has two older siblings and both of his parents living in his home. He has very low muscle tone and a developmental delay and his family wants him to play and socialize.
Establish/Restore	The therapist decides to work on M's eye contact and vocalizing as ways for the family to know that M is paying attention to them.
Alter	The therapist suggests that the family enroll M in a part-time day care program so he can have the stimulation of the other children playing as a way to learn play skills.
Adapt	The therapist talks to the family about moving the toys closer, having the siblings move closer when they play with M. The therapist works with the siblings to help them learn how to change their voice tone so that M can pay attention easier.
Prevent	The therapist decides to work on functional communication strategies to prevent M's frustration at socializing. The therapist works with the family to pick some simple gestures and sounds that everyone recognizes as communication signals from M, so he can get some basic needs met.
Create	The therapist and parents discuss the usefulness of getting together with other families from the church that have similar aged children for a family gathering. This will be a positive socialization experience for all members, and involved M in a typical socialization opportunity.
	CASE 2
Background	Ms. T is a 75-year-old who has had a right hemisphere stroke. She lives with her son and daughter-in-law and two grandchildren.
Establish/Restore	The therapist decides to work on functional range of motion for reaching and stepping.
Alter	The therapist and Ms. T discuss her need to socialize and Ms. T expresses concern over her usual socializing in the quilting club, which expects a certain level of performance. The therapist suggests Sunday school as a place to socialize that doesn't require the fine motor control.
Adapt	The therapist brings clamps to help her with her stitching so that she could still do some stitching. The therapist brings her a stocking darner and velcro to attach to key items in the bathroom when she expressed desire to dress and complete personal hygiene.
Prevent	The therapist helps Ms. T to establish a daily routine to prevent joint, muscle, and skin breakdowns.
Create	The therapist helps her plan regular times to play with her grandchildren as part of the family routine.

son's performance in the natural context. For example, does the dressing item on a standardized test rate the person the same way that a therapist would rate the

person if watching the person's morning dressing routine? This information will enable occupational therapists to construct initial data about persons so that planning can be individualized and relevant to their needs. It will also be important to create new, contextually relevant assessments in the future.

There are also questions that need to be answered about the proposed therapeutic interventions. For example, which interventions are the best choices for which performance problems? What is the effect of the proposed therapeutic interventions on performance outcomes? What is the difference in functional outcomes when therapeutic interventions occur in natural and contrived contexts? It is not likely that all the intervention options described here will be equally useful for all performance problems. Therefore, it will be important to test the relationships among particular performance problems and various intervention options.

The tendency to take ideas created through professional dialogue in the literature and regard them as certainty is tempting; in fact, in dialogue this is easy to do. Ideas must be tested, and it seems only fitting that ideas proposed about context be evaluated in that setting. As knowledge and understanding grow about the role of context in human performance, these initial proposals will need adaptation, a suitable outcome for a set of ideas about ecological relationships. ▲

Appendix
Ecology of Human Performance: Definitions

Person: An individual with a unique configuration of abilities, experiences, and sensorimotor, cognitive, and psychosocial skills.

A. Persons are unique and complex and therefore precise predictability about their performance is impossible.
B. The meaning a person attaches to task and contextual variables strongly influences performance.

Task: An objective set of behaviors necessary to accomplish a goal.

A. An infinate variety of tasks exists around every person.
B. Constellations of tasks form a person's roles.

Performance: Both the process and the result of the person interacting with context to engage in tasks.

A. The performance range is determined by the interaction between the person and the context.
B. Performance in natural contexts is different from performance in contrived contexts (ecological validity, Bronfenbrenner, 1979).

Context: (Adapted from The AOTA Uniform Terminology Definition [3rd edition] for context) is as follows:

Temporal Aspects (note: although temporal aspects are determined by the person, they become contextual due to the social and cultural meaning attached to the temporal features)
1. Chronological: person's age
2. Developmental: stage or phase of maturation.
3. Life cycle: place in important life phases, such as career cycle, parenting cycle, educational process.
4. Health status: place in continuum of disability, such as acuteness of injury, chronicity of disability, or terminal nature of illness.
5. Period: the measurable span of time during which a task exists or continues.

Environment
1. Physical: nonhuman aspects of context (includes the natural terrain, buildings, furniture, objects, tools, and devices).
2. Social: availability and expectations of important persons, such as spouses, friends and caregivers (also includes larger social groups that are influential in establishing norms, role expectations, and social routines).
3. Cultural: customs, beliefs, activity patterns, behavior standards, and expectations accepted by the society of which the person is a member (includes political aspects such as laws that shape access to resources and affirm personal rights; also includes opportunities for education, employment, and economic support).

Therapeutic intervention: A collaboration between the person/family and the occupational therapist directed at meeting performance needs.

Therapeutic interventions in occupational therapy are multifaceted and can be designed to accomplish any or all of the following.

Establish/restore a person's abilities to perform in context.
Therapeutic intervention can establish or restore person's abilities to perform in context. This emphasis is on identifying a person's skills and barriers to performance, and designing interventions that improve the person's skills and experiences.

Alter actual context in which people perform.
Therapeutic interventions can alter the context within which the person performs. This intervention emphasizes selecting a context that enables the person to perform with current skills and abilities. This can include placing the person in a different setting that more closely matches current skills and abilities, rather than changing the present setting to accommodate needs.

Adapt contextual features and task demands so they support performance in context.
Therapeutic interventions can adapt contextual features and task demands so they are more supportive to the person's performance. In this intervention, the therapist changes aspects of context and/or tasks so performance is more possible. This can include enhancing some features to provide cues, or reducing other features to reduce distractibility.

Prevent the occurrence or evolution of malpractice performance in context.
Therapeutic interventions can prevent the occurrence or evolution of barriers to performance in context. Sometimes, therapists can predict that certain negative outcomes are likely without intervention to change the course of events. Therapists can create intervention to change the course of events. Therapists can create interventions that address person, context, and task variables to change the course, thus enabling functional performance to emerge.

Create circumstances that promote more adaptable/complex performance in context.
Therapeutic interventions can create circumstances which promote more adaptable performance in context. This therapeutic intervention does not assume a disability is present or has the potential to interfere with performance. This therapeutic choice focuses on providing enriched contextual and task experiences that will enhance performance.

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