A Model of Human Occupation, Part 2. Ontogenesis from the Perspective of Temporal Adaptation

This is the second in a series of four papers that discuss and present a model of human occupation. The first paper presented the structure and content of the model. This paper conceptualizes change according to the model. It introduces the systems concept of hierarchy into the model as a foundation for explaining its ontogenesis. Two facets of change are proposed. The first facet is a series of stages through which occupation is processed. The second is a description of ontogenesis through the life span from the perspective of temporal adaptation.

An earlier article introduced the first part of a model of occupation, its structure, and content (1). This paper adds to the model a description of how occupation evolves through the life span and an explanation of the process of change. Hierarchy, a systems concept, is introduced into the model to describe the process of ontogenesis or change.

Hierarchy in Ontogenesis
A central problem in the study of ontogenesis is how a system changes from one state of affairs to another over time. Hierarchy refers to laws that explain how a system is organized along a continuum of increasing complexity over time. Change in an open system is a continual reorganization of the system that results from the system's action. Thus, by choosing to act and by acting, the system affects its own change. Hierarchy provides an explanation of how that change builds upon and reorganizes the products of previous experience and results in increasing complexity.

Two factors influence hierarchical change in an open system—the system's own internal tendencies and the demands that the environment places on the system. These two factors come together in the throughput-output-input-feedback cycle of the open system. The central problem of change in occupation is to explain how a system with a global tendency toward exploring and mastering its environment is transformed into a socially functioning, productive, and self-satisfying entity. The hierarchical change of occupation proceeds from this undifferentiated, innate tendency toward exploration and mastery to individual competence in occupational roles. The steps and processes in this hierarchy of change are the topics of this paper.

The proposed structure and content of the model are represented in three subsystems, volition, habituation, and performance (1). As Figure 1 demonstrates, the volition subsystem contains the structural components whose function is to choose or enact output. Change in the entire system is initiated at this level where conscious decisions for action are made. The system's action that results from these choices is what organizes change in the system. In the infant the volition subsystem is undifferentiated. The output, which is enacted by the subsystem at this time, is curious exploration. This output generates internalized canons or rules that mirror the conditions and constraints of external reality and thus organize action into flexible strategies for dealing with the environment, namely skills (4). Skills are eventually organized into larger routines.
that are habits, and those, in turn, are organized into roles. The organization of rules into skills, habits, and roles is the basic hierarchy through which occupation is processed (5). The volition subsystem enacts the action that yields skills, habits, and roles. These are the components of the lower-level subsystems. As Figure 1 demonstrates, the habituation subsystem is composed of habits and internalized roles, and the production subsystem is composed of skills. Thus, the volition subsystem is responsible for organizing the content of the lower subsystems.

Since the volition subsystem governs change in the other subsystems, an examination of ontogenesis or change must begin with it. The volition subsystem is differentiated along a series of hierarchical steps, each representing more complex challenges. This hierarchical differentiation of the volition subsystem has been conceptualized by Reilly as a transformation from curious exploration to competency to achievement (4). The continuum from exploration to achievement represents an increase in levels of excitement or challenge that are necessary to sufficiently arouse the organism as it becomes more competent and capable. These three levels of motivation in the volition subsystem parallel the organizational levels of skills, habits, and roles in the two lower subsystems (see Figure 2).

Exploration, competency, and achievement, the hierarchical levels of organization of motives, govern the organization of change in the lower subsystems. This means that the motive of exploration is optimal for generating skills, the motive of competency for organizing habits, and the motive of achievement for acquiring competent role behavior. Since the volition subsystem enacts the action of the system that processes change, its choices determine what the change will be. By examining each of the three hierarchical levels of the volition subsystem and the action they serve to enact, this process can be explained. Exploration is the lowest level of enactment and is best described as...
doing something for its own sake, for the pleasure involved in the doing (4). Exploratory behavior is associated primarily with the free play of childhood and ongoing action throughout the life span when the system is confronted with new or novel situations and explores the environment for information. Novelty always implies the unknown; it begins with the unknown world which the infant explores through play and extends to the unknowns an individual faces as he/she moves through a succession of roles. The exploratory motive yields exploratory action that yields the skills that become tools for survival.

Competency is the next and more complex level of motivation (4). Exploration gives way to practice according to models or standards of normal behavior. Behavior organized at this level builds upon earlier skills that are integrated according to social norms or expectations and the system's own internal standards. Through the system's output, motivated by competency, these skills are organized into larger routines, namely habits.

At the third level, the achievement motive energizes behavior. Here, role requirements are a central organizing force. The individual seeks to achieve a role or position in the social group. The group, in return, requires the performance of certain tasks according to standards in order to occupy the position. When the system internalizes the role demands, they become automatic guides to behavior that organize habits into larger routines, the routines of role behavior.

When the system has successfully internalized roles as guides to action, it has completed the process of change from undifferentiated global tendencies toward exploration and mastery, to fulfillment of the environment's demands. This hierarchical process is repeated over and over each time a person enters into novel aspects of the environment or encounters new roles or role requirements. Importantly, this is also a critical process for adaptation to disability. The novelty may be the process of exploring and mastering the world with an altered body or perception. The hierarchical change from exploration to competency to achievement not only characterizes ongoing change, but is represented in gross changes during the life span. That is, during different phases of the life-continuum, exploration, competency, or achievement will be the major motivational mode of the volition subsystem.

The Ontogenesis of Occupation during the Life-Continuum

The next part of the model illustrates the ontogenesis of occupation from the conceptual focus of temporal adaptation. Temporality is a universal property of occupation (6) and thus a useful perspective for occupational therapy.

While the model is based on generally accepted realities or requirements of Western life, it may not characterize the life changes of deviant or disabled persons. Continuing research in occupational therapy will be needed to elaborate and clarify the nature of occupation in the lives of persons who must make an alternative adaptation to life.

Before examining the ontogenesis of occupation in the life span, a definition of occupation is needed. Occupation is the purposeful use of time by humans to fulfill their own internal urges toward exploring and mastering their environment that at the same time fulfills the requirements of the social group to which they belong and personal needs for self-maintenance. The social organization of the human species is such that occupation mainly includes actions that exist on a continuum of play and work. Within play, Man organizes his behavior and initiates change in the self and society (4). Within work, Man is productive for himself and maintains himself through self-care. Within work, Man is also productive for the social group and maintains the group through his labor. Thus, play energizes change; work maintains the individual and the social group. Both exist in a harmony or balance that is characterized in the use of time divided between work and play on a daily, weekly, yearly, and life-long basis.

The ontogenesis of occupation occurs through a life-long series of experiences shaped by internal choices and external social demands and expectations. Throughout ontogenesis, there is a changing critical balance between play and work (7). Since both play and work originate from the same global tendency toward exploration and mastery, they interrelate throughout the life span. Figure 3 depicts this relationship. The diagram divides the life span into the four major life stages: childhood, adolescence, adulthood, and old age. Figure 3 graphs the general configuration of daily life over the four life stages. It demonstrates changes made in organizing daily time use as the person progresses through these life stages. Figure 3 also describes the yields of work and play during each stage or level of organization of human occupation. The Figure briefly describes the major features of work and play at each level, and demonstrates how the organization at each level prepares the system to move to the next level. Finally, it depicts the interrelationship or balance of work
and play at each of the four levels of organization. It incorporates the levels of exploration, competency, and achievement to describe the major motivational energy at each life stage. Each of these features will be discussed, according to the four life stages, in the sections that follow.

**Childhood.** The human species has evolved the longest period of immaturity among animals (8). As a feature of social organization, the child is largely left alone during this period to play. Play is the central activity of the immature individual and organizes behavior for effective transactions with the environment. This effectiveness is dependent on the play action through which reality is explored for the rules of competent behavior (4). The skill-building and rule-generating activities of play prepare the child for the student role and the adult world of work. As the child effectively interacts with objects, events, and people, a sense of self as competent and a growing repertoire of skills develop. In play, the child explores the world for personally pleasing activities and, thus, develops interests. In addition to this playful learning, the family and other institutions socialize the child according to what behaviors are valued, and they provide models for organizing behavior. Thus, in play the volition subsystem is differentiated and organized.

In play, the child assimilates vast stores of information and imitates adult models. The child is, importantly, assimilating information and values from the family concerning occupation. The child must eventually learn appropriate times to put aside play and use his time to complete work. Parents and others increasingly pressure older children to set goals and to discipline themselves for more productive use of their time. Through such activities as chores, the child learns about organizing time for productivity within the family, and later, within the larger social group. Thus in play early habit structures are developed.

School attendance provides other experiences in which the child must organize productive behavior, gain a sense of competency, and build habits necessary for maintaining the more formal role of student. The child learns how to organize time and action toward fulfillment of role responsibilities. These habits and role behaviors are essential for later productivity since one must meet the demands of time in order to adapt to the adult world of work (9).

As shown in Figure 3, curious play during childhood contributes toward organization of action into skills as the child explores reality. There is very little work, initially. Later, chores and school comprise the major productive requirements of childhood. Play supports the emerging worker role through skill and habit development and exploration of adult roles in imaginary play.

**Adolescence.** The primary energizing force of adolescence is the urge to develop competence in adult roles (10). The adolescent struggles to organize past experience with the current demands of society and peers and the pressure of aspired goals (11). The adolescent must organize past skills with demands for new roles into a more complex habit structure (12).

The adolescent faces increased responsibilities and must shift from external control and dependence on parents to internal control and mature interdependence with others (10). In adopting the self-determining adult role, he or she develops a hierarchical set of values that guide his or her life plan. Interests are narrowed down into a smaller field and add to the stabilization of a life pattern. These values and interests contribute to the ongoing commitment process of occupational choice.

As shown in Figure 3, adolescent play is characterized by devotion of time to personal hobbies, group games, and social events. Hobbies develop a sense of competence and realistic assessment of personal skills, especially skills with objects. Skills are integrated into habits of craftsmanship where personal standards of excellence are important. Games and social events are the arenas in which skills are integrated into habits of sportsmanship such as cooperation and competition. These learnings support organization of the system toward the worker role. Work is practiced as school is continued and chores become more routine and demanding; part-time work may also be undertaken. The most critical component of work is occupational choice in which a commitment toward a worker role is being processed.

Occupational choice is the major transition of occupational behavior that bridges the continuum from childhood play to adult work (13). It occurs over a period of years, preceding and following adolescence, during which the individual generates internal values and interests and responds to expectations to prepare for and enter into the world of work. As the adolescent develops the ability for abstract thinking, he becomes increasingly aware of his placement in time (10). The adolescent is primarily future-oriented and plans for the approaching adult role. During the occupational choice process, the person develops a grow-
Figure 3 The balance and interrelationship of work and play during the life span

Levels of Organization of the Occupational Behavior Career

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<th>CHILDHOOD</th>
<th>ADOLESCENCE</th>
<th>ADULTHOOD</th>
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| Waking Hours Occupied
By Work & Play       | Time spent in play | Time spent in work |
| Play Yields        | Reality is explored via curiosity for rules of competent action | Competent behavior is learned and experienced in games, personal hobbies, and social events | Relaxation and recreation support the worker role. Exploration of novel situations allows new roles to be taken on | Play allows the exploration of past achievements and the unknown future, and maintenance of competence through leisure pursuit of interests |
| Relationship of
Play & Work         | Exploration: Skills for productivity are acquired and work roles explored through imitation and imagination | Competency: Personal and interpersonal competency are developed in a matrix of cooperation yielding habits of sportsmanship & craftsmanship | Achievement: Play supports the worker roles by providing an arena of retreat and rejuvenation. Exploration in novel situations allows the ongoing development of new competency for work | Exploration: Retirement leisure signals that the productive obligation to society has been fulfilled. Past work has earned for the person the right to leisure. Leisure replaces work as the major source of life satisfaction |
| Work Yields        | Productive behaviors are practiced through chores and in school | The work role is practiced and the commitment process of occupational choice takes place | There is entry into worker roles with the requirement of establishing and maintaining a productive and self-satisfying career | Retirement brings reduced expectations for productivity and personal capacities for productive action are waning |

...ing awareness of the self and of outer reality.

Occupational choice occurs in three periods: fantasy, tentative, and realistic (13). The fantasy period occurs during pre-adolescent latency, at which time the individual chooses occupations attractive for the moment from the perspective of the pleasure they yield. This is a crucial step in which the child tries on the idea of fulfilling an adult role and at the same time experiences positive emotion.

In the tentative period of adolescence, the choice is made in terms of more stable subjective factors, interest, values, and a sense of personal capacities. In the realistic period of early adulthood, the individual incorporates reality factors into the role being prepared for or exercised. The choice is a compromise between personal desires and the opportunities and limitations in the environment.

The process of occupational choice is not entirely age-specific nor irreversible, and the cycle may recur (14). The occupational choice process is culminated when the individual successfully enters the adult world of work in some productive role. Work need not be paid labor, but can be any socially organized adult productive role.

Adulthood. The adult period of life is characterized by the drive for achievement; the tendency toward effectiveness is borne out in the context of achieving within family and community roles (see Figure 3). Adulthood is generally organized around procreative and/or productive roles. The adult, whatever his or her personal values and interests, is in a period of life when social expectations require useful contributions to the social group, its processes, and its continuation. The adult must achieve a sense of efficacy and the concomitant habits and skills for work role performance. Society’s expectations and the individu-
al's valued goals are blended into an "internal sense of social timing that acts as a prod to progress through the social events of the lifeline" (15). This internalized social clock sets the sequential progress and pace of change through adult life.

While adulthood appears to be characterized by a long period of stability, it is also a period of change. Whether becoming a spouse or parent, or entering a new job, adult life is organized around a process of entering, maintaining, and re-entering a sequence of social roles. Therefore, although adulthood is characterized by achievement, it also requires reorganization of the system along the hierarchical continuum from exploration to achievement. This process has been characterized as "anticipatory socialization," which involves a person's exploring new norms and expectations that will be associated with a new role about to be assumed (15).

Work is broadly defined here as any consistently organized pattern of an individual's productive contribution toward the maintenance of self, family, or some other social group. Not all theories or studies of work behavior have such an open-ended view of work, but their conclusions concerning its meaning and organization will largely generalize to this broader definition of productive behavior.

Work has been the dominant feature of the human struggle for personal and group survival and the building of culture. Therefore, work has traditionally been valued highly by society (19). It is a central factor in the daily life of most adults (16), and the work role serves as a major organizing component of the internal throughput of the system. Work has a stabilizing effect on the daily life pattern (16). It requires adherence to strict temporal requirements and usually binds the worker to the clock (9).

Work not only tends to stabilize the life style of the adult, but is a principal factor in self-identity. Individuals come to perceive themselves in terms of their contributions to the labors that sustain society as they internalize productive roles (17). Work is the arena where most adults validate themselves and is a major component of self-esteem (9). Work is also potentially a major source of personal satisfaction if the adult is able to usefully employ and expand his or her interests and abilities (18).

Play, which served in the longitudinal sense to prepare the person for work, now serves the purpose of supporting the work routine (14). This change in the nature and role of play in adulthood is reflected in the term recreation, which is generally used to describe adult play. Play recreates or regenerates energy to support the worker role (4). Playful exploration is still an important means for change in the adult. Man's nature as a playing creature never subsides and play remains a central feature of adult occupation. Throughout adulthood, work satisfaction is linked to the ability to balance work and play.

In later adulthood, another exploratory phase in the hierarchical organization of occupation begins: the preparation for old age and retirement. In this life stage a process, not unlike the occupational choice process, takes place (19). The individual begins in mid-life observing and interacting with successfully retired individuals who serve as role models. Later, there is a period of developing interests and skills that can be used upon retirement. There are realistic exploratory encounters with environmental tasks at retirement, and the choice process culminates with successful entry into the retired role. This choice process, however, is not always a smooth one, especially where forced retirement or early disability enforces the transition. Whatever the mechanism, most individuals who survive to old age must make the change to a retired role.

Old Age and Retirement. Old age has been popularly thought of in terms of disengagement of the individual from mainstream life, from society's value and meaning, and eventually from life itself (20). Rather than disengagement, cross-cultural research suggests a more universal transition from a mode of active mastery to passive mastery of life and a turning toward the magical or supernatural (20). Old age need not result in disengagement of the individual from society. If society provides a valued role for the elderly, old age can be a period of intense social participation and a form of social rebirth (20).

This social rebirth takes the form of organizing a long history of life experiences into a new level. Rather than experiencing disintegration of the occupational role, the retired person can move toward the integration of life experiences. Therefore, retirement and old age are conceptualized as a natural phase of life with its proper life roles. The transition from intensive productivity to leisure can be a positive and rewarding experience or it can become a social disability, depending on the individual, his or her history of experience, and the external circumstances during old age. The successful system continues to enhance its nature and to play out its tendencies. The basic drive toward curiosity and effectance continues through adulthood to old age. What takes place is a metamorphosis that builds...
on the stages of life already accomplished. The older person explores his past and the unknown future in this life stage. Although personal capacities are waning, one's substantial personal history can be drawn upon as a source of self-satisfaction in the transition from active to passive mastery. In addition, the maintenance of activity (usually leisure activity) is crucial for achieving a balance in daily life during retirement and old age.

This is a period in which the older adult must recognize and accept both decreasing capacity for productivity and a changing set of expectations from society. Productivity is now focused more on self-maintenance and family participation than on contribution to society at large. Successful retirement revolves around the ability to transfer to a daily life pattern in which leisure replaces work as a primary source of satisfaction (19). Like the play of childhood, the leisure of old age signals decreased expectations for performance and is focused on gains and satisfaction to the individual rather than to the group. Successful retirement requires not only an attitude of acceptance of this changing role, but also a supportive environment that values the role of old age. Like work, leisure requires its own special set of skills and the reorganization of the pace and use of time. The ability to find a sense of competence in activities and interests beyond former work roles makes the critical difference between despair and hope in old age (19).

Discussion
This article continues the description of a model of human occupation. The unfolding of occupational behavior over the life span was discussed according to the perspective of temporal adaptation. The two major elements are the concept of hierarchy in ontogenesis and the characterization of work and play over the four life stages. Hierarchy provides a schema for understanding increasingly complex motivation for and organization of behavior during the life span. This schema is a backdrop for the understanding of and problem solving about the disorganized occupational behavior of patients or clients. Since all open systems change hierarchically, the changes that are desired in occupational therapy must also proceed according to hierarchical principles. The occupational therapy clinic should be designed to provide a hierarchical set of challenges that correspond to the exploration, competency, and achievement hierarchy of motivation.

The presentation of the ontogenesis of occupation should serve as a schema for understanding normal changes in the life span. This preliminary description focused on the usual ontogenesis of work and play, that which is anticipated or expected in American culture. Empirical research will be needed to explicate the many particulars of an occupational life-span theory, especially with reference to disabled persons. However, the present description should provide general guidelines for identifying problems of occupational dysfunction—namely, instances when disability is associated with gross deviations from this usual occupational sequence.

The generation of clinical intervention from the model is a complex task requiring a thorough understanding of the model. The next step in explaining this model, benign and vicious cycles, will bring the model closer to a clinical focus. A final article will discuss in more detail the application of this model in assessment and intervention.

REFERENCES