A Model of Human Occupation, Part 3, Benign and Vicious Cycles

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Earlier papers in this series conceptualized occupation as an open system phenomenon, with change the central theme. This paper presents an explanation of adaptive and maladaptive changes in the concept of benign and vicious cycles. Hypothetical case material is used to illustrate how the model could be applied to an explanation of change in occupational behavior. The paper also outlines how the concept of benign and vicious cycles, as conceptualized in the present model, can guide clinical intervention.

Two earlier papers in this series presented the structure, content, and ontogenesis of the model of human occupation (1, 2). The subject of this third paper, benign and vicious cycles, is a critical concept for understanding the process of human adaptation. The paper also begins a delineation of the relationship between human occupation and adaptation to life in general.

The Nature of Cycles in Open Systems

The model of human occupation conceptualizes the human being as an open system (1). According to the model, the basic process that underlies change is a cycle. The cycle is a series of component processes that occur when the system interacts with its environment. These processes are output, feedback, input, and throughput (3). Output consists of both information (e.g., an expectation or intention and action.) Feedback is information that informs the system of both the process and consequences of its output (3). (For instance, proprioception is information about one’s present movement, and a letter grade is information about one’s past performance in school.) These forms of feedback serve to guide ongoing action and to modify the internal makeup of the system. Input is information that enters the system because of some action in the environment. (Parent’s “baby talk” and a classroom lecture are both examples of input.) Like feedback, input can change the system. It is a basic property of the open system to change and reorganize itself on the basis of incoming information (4). This allows the system to adapt to conditions in the environment. Throughput refers to the processing of incoming information. In this dynamic process the system not only organizes its existing structures for performance, but reorganizes itself toward demands of the environment for new output (4). Thus, throughput rearranges the internal makeup of the system (its structure) and, by so doing, makes possible changes in the system’s future output (function). In this way, the input, throughput, output, and feedback cycle links the ongoing organization and reorganization of the system to the demands of the external environment. The cycle refers to the process whereby information enters, changes the system, results in new output, and brings new information to the system via feedback. Just as the atom is a basic building block of physical systems, the open system cycle is a basic building block of the organization of living systems. Since it is the system’s own action or output that generates new information for change, the open system is said to be self-transforming (4).

The self-transformation of an open system is always directional. That is, the system changes along some continuum of characteristics. Adaptive change is hierarchical: the system changes in the direction of increased complexity and differentiation, allowing more flexible action in interacting with the environment (5). The directional change of a system has been referred to by Smith as a trajectory (6). This trajectory of change is influenced by two critical factors—the internal characteristics of the system that influence its output, and interaction with the environment of the system. Innate characteristics and experientially learned characteristics join with environmental conditions to exert their relative influences when the system interacts with the environment.

The innate characteristic of the system that energizes human occupation is the urge toward exploration and mastery of the environment (1). Learned characteristics are those preferences and abilities that result from experience. These have a guiding effect on the trajectory as the system interacts with its environment on an ongoing basis. The following example of an early occupational experience in a hypothetical child’s play should illustrate this process:
Johnny has in recent weeks been playing in his father’s woodwork- ing shop while his father works there. He has explored tools and materials and gained a sense of their properties and purposes. His father serves to encourage his exploratory efforts, demonstrates some techniques, and serves as a role model. Johnny’s satisfying experience with woodworking has generated an interest in the occupation. He decides with his father’s help to undertake the constructive project of making a birdhouse.

As Johnny begins to play and execute the birdhouse with his father’s assistance, he generates feedback. In this case, the feedback is information of his success with the project, and the satisfaction that goes with achieving a goal. Johnny’s success, of course, is made possible by the earlier exploratory play that familiarized him with many of the tools and processes involved in the craft. His earlier playful practice also allowed him to gain skill and proficiency in using the tools and working with the materials. Now, the earlier learned skills are reorganized under a more complex undertaking of constructing a product.

This example is characteristic of countless experiences that constitute childhood occupation. Their cumulative effect usually results in a skilled and self-confident adult who can enter the world of work.

The model of human occupation presents a means of conceptualizing this process in systems terms. The major portion of the model consists of the cycle already described. In addition, the model specifies internal components of the open system (1). These include three subsystems—volition, habitation, and production. The structure of the volition subsystem consists of values, personal causation, and interests. The function of this subsystem is to enact the system’s output. The habitation subsystem consists of internalized roles and habits; it functions to maintain the system’s output into patterns and routines. The production subsystem consists of skills, and its function is to produce output. These are the subsystems that allow output and that are changed during the throughput process as information enters the system via input and feedback.

By using the model of human occupation depicted in Figure 1, the example of Johnny’s play can be examined. The volition subsystem contains the basic tendency of the organism to explore and master the environment. It functions to enact exploratory action. This subsystem initiates the cycles represented in Johnny’s play. The output, early exploration, results in the development of an interest that, in turn, influences further output. At the same time, the exploratory action yields feedback (information) that is processed in throughput to reorganize the system. This reorganization includes the development of the interest in woodworking, a strengthening of personal causation (belief in the efficacy of action), and the development of woodworking skills. This process prepares the system for the next round of action, which involves more complex constructive action. The changes in the system that take place as a result of earlier exploratory action make possible success in the construction of the birdhouse. The construction activity will also serve to reorganize the system in the direction of increased interest, skill, and self-confidence, resulting in a continued investment and useful habits in the occupation of woodworking.

The cycle of interaction of the system with its environment thus propels the system in a trajectory of change. No cycle, or trajectory is as simple or as isolated as the hypothetical example just reviewed. Many occupations are engaged in simultaneously with varying degrees of success. Occupation always involves a mixture of risk, failure, and success. What is important is the balance between success and failure. The direction in which the scale is tipped is the direction of the trajectory. The balance between successes and failures is a direct result of the match between the system’s capacities and the requirements of the environment.

Changing a system requires not only altering the system, but also altering the balance between the system and its environment. Two important concepts for engineering any change process are, first, that no system can be evaluated or understood in isolation from its particular environment, and second, an environmental change is the surest way to effect permanent organized change in an open system. The object of any planned change process is to influence the system’s trajectory. The judgments required in making change can be found in the concept of benign and vicious cycles. These cycles provide a means of evaluating the quality and results of a given trajectory and allow an analysis of its features to guide planning for change.

Benign and Vicious Cycles
Cycles of interaction between the system and its environment result in a trajectory of change that can either support or threaten the adaptation of the system (6). A benign cycle is one that results in a trajectory that supports adaptation. Adaptation requires the system to satisfy
its own internal urge to explore and master, as well as fulfill the demands of the environment (7). A vicious cycle does none of these things.

Smith describes the benign cycle as follows:

If the person comes to believe in his own efficacy—to have generalized feelings of competence—he is likely to see and to seek out opportunities and to try. His sense of efficacy gets confirmation from his successes, and he has the security to learn from his failures. In this process of active engagement with the world, he acquires the knowledge and skills that make subsequent successes more likely. (6, p 12)

The vicious cycle has opposite characteristics:

Conversely, the person who is launched with a belief in his own incompetence sees threats instead of opportunities, holds back and doesn’t try, misses out on acquiring the skills required for success, is therefore likely to fail when he does venture to try, and produces confirmation for his negative belief. (6, p 13)

As these two passages demonstrate, benign and vicious cycles involve both internal beliefs and external objective successes and failures. Internal convictions leading to success and failure in engaging the environment are only half of the adaptive process. The second and equally important component of adaptation is the internal pleasure or displeasure associated with success and failure. Thus, any view of adaptation includes meeting environmental requirements and yielding personal satisfaction. Thus, a benign cycle benefits both the system and the environment. If either system or the environment is not satisfied, the system is in a vicious cycle. The following section will give examples of both types of cycles and demonstrate how the model can serve to explain them.

The Benign Cycle

Assuming that the balance of interactions between Johnny and his environment have been positive, he will progress through occupational development in a benign cycle. The following is a description of that benign cycle in this hypothetical case as he enters adulthood:

John’s original interest in woodworking has grown through adolescence into an occupational choice commitment. John continued his hobby of woodworking throughout his later childhood, becoming proficient in the techniques of the craft and increasing his ability to produce fine woodworking products.

While John was an above-average student in school, he was most outstanding in the high school shop classes. The shop instructor, who was himself a professional cabinetmaker, became an important role model for John. This allowed John to come to value the skills of woodworking so that he began to seriously consider cabinetmaking as a trade when he finished school. The shop instructor arranged for John to become a part-time apprentice with a local cabinetmaker during the summer of his junior year. This experience solidified his choice. Upon graduation from high school John became a full-time apprentice; within the year he was earning an income and moved out of his parents’ home into an apartment. After two years of successful work as a cabinetmaker, John was a satisfied young worker with dreams of one day returning to college to complete a degree in architecture and expand his constructive talents. In addition, John has a serious relationship with a girl friend, and they are contemplating marriage in the near future.

John’s occupational role now includes new forms of recreation. Since his childhood hobby has become a trade, he has developed new leisure interests. John has become involved in motorcycle racing and often spends evenings and weekends driving his motorcycle on country trails. He is an avid participant in other sports and attends social affairs and public entertainment with his girl friend. On the whole John’s occupational life is balanced and provides him with satisfaction.

John’s experience of the benign cycle can be conceptualized in the model of occupation. This conceptualization is portrayed in Figure 2. In John’s benign cycle, the system’s output or action consistently fills the demands presented by the physical and social environment. John successfully completed the student role and met social expectations (input) for entry into a worker role. At the same time, he is able to fulfill the interests and values he had developed. These two factors signal positive adaptation. His interest in woodworking sustained his output or action so that ongoing practice and feedback developed habits of craftsmanship and skills of a competent woodworker. These skills and habits were later consolidated into an internalized role when John chose woodworking as a vocation. In this way each of the three subsystems—volition, habituation, and production—interacted to converge on this occupational choice.

Since John performed consistently well in an area he valued, his
feedback was consistently positive. This, in turn, enhanced his sense of personal causation so that he could enter his worker role with confidence and even consider further education to pursue his interest and vocation at a higher level. These are the important internal dimensions of a benign cycle. The necessary prerequisites for this state are the balance between interests, values, and personal causation that enact behavior, and the role behaviors, habits, and skills that make possible fulfillment of the choices enacted at the higher level. When these prerequisites are met the internal system is in good order.

The other major portion of a benign cycle, fulfillment of external environmental demands, is also evidenced in John’s case. Social requirements for entry into a productive role have been met. John has also successfully completed high school, another socially valued accomplishment. Since both internal satisfaction and external demands are met, the system is adapting and thus is in a benign cycle. Evidence of continuation of the benign cycle is John’s valued goals for future role taking (marriage) and expansion of his present trade through obtaining a degree in architecture.

An important component of this benign cycle is the interrelationship of subsystems within the system. The volition subsystem contains the system’s preferences and aspirations and its values for engaging in occupation. The habituation subsystem organizes behavior into large routines that reflect choices made by the volition subsystem. The performance subsystem allows the performance of skilled action to fulfill those choices. The balance among these subsystems is necessary for fulfilling both internal satisfaction and external demands.

The Vicious Cycle

Vicious cycles may begin from birth, precipitated by some incurred disability. These cycles may also develop slowly as a result of interactions with the environment. Vicious cycles may begin with disorganized action (e.g., the child with sensorimotor difficulties) that fails to meet the demands of the physical environment. They may be precipitated by interactions with the social environment that produce demands beyond the capacity of the system to adapt. They may also be the result of demands being decreased to such a degree that the system is no longer challenged to perform, and the volition subsystem’s urge to mastery cannot find expression (e.g., a homemaker’s depression following the “empty nest” syndrome). Vicious cycles exist wherever the requirements of the system to fulfill the urge to explore and master the world cannot be fulfilled and/or where the environment’s demands are not met.

A vicious cycle may be illustrated in terms of the model by again returning to the hypothetical case:

One evening as John was engaged in his usual recreation of motocross cycle racing he took a spill from the bike and seriously fractured and dislocated a vertebra. The accident left John paralyzed below the pectoral region, quadriplegic.

After several weeks of initial shock and denial, John has become quite depressed. He sees all of his life plans destroyed. He feels helpless and out of control. He cannot derive satisfaction from his former work or leisure interests. His daily routine is foreign and revolves around the

Figure 1 A cycle in the open system
hospital schedule rather than reflecting his own roles and habits. John expects that he will always be an invalid and sees no reason to learn to care for himself. He fears that his girlfriend will no longer find him a desirable partner. In short, John finds nothing in the future to which he can attach his efforts and nothing in the present from which he can derive satisfaction.

The above events can be seen as a total disintegration of the system with a clear trajectory toward maladaptation. The model depicted in Figure 3 can demonstrate how the vicious cycle is beginning to take place. Importantly, the model will allow some delineation of the elements of this vicious cycle and will suggest some strategies for reversing it. Within the system the spinal cord injury and subsequent quadriplegia can be seen as a disruption of John's performance subsystem. Underlying neurological and anatomical functions are severely and permanently impaired. They are critically out of balance with the other subsystems and will require a major reorganization if adaptation is to take place. In the meantime, the organization of the system and its interaction with the environment are in jeopardy.

Since the performance subsystem is drastically altered, it limits and disrupts the habituation and volition subsystems. Habitual routines that called upon skilled action in the organization of patterns of behavior are no longer effectual. Temporal patterns are externally enforced in the hospital routine and have little or nothing to do with the control exerted by the habituation subsystem. Skills that were needed for role performance can no longer be called upon. Thus, role performance disintegrates. A new role of patient and disabled person emerges as old expectations are lifted. Thus input to the system in the form of demands for performance practically ceases.

Since the two subsystems associated with the production and maintenance of output are disrupted, the output of the system is interrupted or becomes minimal. As a consequence, feedback is drastically altered. Positive feedback on successful performance is replaced with feedback on failure. Those competencies that allowed a strong sense of personal causation are now mostly lost. The output of the system, John's daily patterns of work and play that had provided the positive feedback, is now severely limited. Input to the system largely

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Figure 3 The vicious cycle in a hypothetical case

**Vicious Trajectory of Failure**

**Input and Feedback**
- No or little opportunity for challenge on failure
- No challenge or expectation for performance in occupation
- No feedback on performance to adjust and maintain skills

**Output**
- Expectancy of Failure
- No Goals
- Inconsistent or Poor Performance
- Few or No Skills Used

**Volition**
- Personal Causation: Loss of confidence and sense of helplessness
- Valued Goals: Given up as unattainable
- Interests: Inconsistent with capacities

**Habituation**
- Internalized Roles: Given up as no longer viable
- Habits: Breakdown due to lack of output to maintain them

**Performance**
- Skills: Anatomical and neurological components disrupted. Degeneration of skills that are not exercised

**Environment**

Consists of information concerning the dim prospects for recovery, and the limitations and problems that John must face. Also, since expectations for performance have been removed, John has no environmental demands that can challenge his response and allow him to fulfill his urge to mastery. Thus, each cycle of interaction of the system with the environment is likely to result in further progress along a negative trajectory toward maladaptation.

**Implications of the Vicious Cycle for Change and Therapy**

Any changes in the system must begin with the volition subsystem. This system, which enacts output, is critical for initiating cycles that can result in restoration of a positive trajectory. The environmental conditions are also of critical importance. The implications for occupational therapy at this point are twofold. This first is that therapy should serve as an environment that can begin to present demands for performance and elicit the enactment of responses that can result in positive feedback. The occupational therapy clinic is an important source of input to the system and a critical environment in which benign cycles can develop.

The second implication for therapy is that it is critical to recognize how the volition subsystem can begin to function. It was noted in an earlier paper that the volition system begins with a global undifferentiated urge for exploration and mastery. Change is processed through three levels of motivation in this subsystem—exploration, competency, and achievement. These three levels, in turn, yield corresponding and hierarchically organized skills, habits, and roles. All of these behaviors have been disrupted in the system and therapy must begin with the lowest level of motivation in the volition subsystem—exploration—and the lowest level of behavior organization—skills.

During the initial period of therapy, it will be important that John, with a body drastically altered, begin to explore his own action in the world. Here, the arts, crafts, games, and other activities of the clinic that provide low demands for performance and provide maximum stimulation of curiosity and exploration are critical. John must literally rediscover how to be in the world as a physical being. Since action is the
major means of providing this information to the system via feedback, it is critical that John be allowed to explore as wide a variety of activities as possible in the clinic. The environment must be presented to him as one in which he can explore actions and activities and relearn the effects he can now have on the world. Importantly, this stage of therapy will begin to yield new skills as John learns to use his remaining movement to accomplish tasks. As a result of this exploration, he should begin to generate new interests more consistent with his remaining physical capacities.

A final and important result should also be the restoration of a beginning sense of personal causation based on the exploration and discovery of what is still possible to do. This stage of therapy is crucial for reversing the vicious cycle. Ongoing assessment should carefully monitor any changes in the system, especially the volition subsystem. The therapist must be careful to manage the milieu of therapy so that exploration and curiosity are encouraged and fostered. Much like the child who must discover his being in the world through play, John must relearn his own being in the world in a playful and exploratory manner where the consequences and potential failures in action are kept at a minimum.

The next stages of therapy should continue to follow the hierarchy of change. Challenges should be increased to elicit a sense of competency. Here the therapist should take advantage of the natural urge toward mastery, John should begin to establish routines and gain competence in self-care, the first and critical element of work and productivity for self.

In the final stage, the therapist seeks to reintegrate the volition subsystem with the skills and habits of the lower subsystem. While environmental demands for performance may be altered, they should still exist. John’s potential for reentering a worker role should be assessed. Again, assessment begins with the volition subsystem, and focus should be on the retention of any valued goals that existed before the injury. In this case, John’s plans to return to school and become an architect are still consistent with his remaining capacities. Exploration of this possibility might be undertaken as part of occupational therapy. If John is able to re-establish a connection between his values and the skills and habits generated in therapy, one can then expect that a benign cycle is likely to follow, with progression to the achievement stage of the volition subsystem. The goal of this trajectory would be to re-establish the occupational role that included work, play, and self-care, and a balance between them.

This discussion demonstrates that normal sequences of development and organization should be tapped in the therapeutic process. Disability represents a disruption of a total system with biological, psychological, social, and cultural components. Reorganization of that system is a complex process requiring attention to several components within the system and to the system’s interaction with the environment.

Summary
This paper presents the third part of a model of human occupation, a conceptualization of change in the system that allows judgments to be made concerning the adaptive status of a patient or client. Adaptive and maladaptive changes are seen as a process of benign and vicious cycles. The cycle represents the basic process of interaction between the system and its environment that shapes change in the system.

Adaptation was defined as a process requiring both internal satisfaction to the system and fulfillment of the environment’s demands. Benign cycles allow both of these requirements to be met; vicious cycles fail to meet one or both. A hypothetical case was used to illustrate both benign and vicious cycles and to discuss the implications for treatment in the case of the vicious cycle. Occupational therapy is conceptualized as an environment in which the human system acts to restore, maintain, or achieve a benign cycle. Identifying the components of a vicious cycle allows more thorough clinical decision making because it points to factors in the vicious cycle that block the benign cycle.

A final and fourth paper in this series will further discuss the implications of the model of occupation for occupational therapy. It makes use of clinical cases from occupational therapy practice to illustrate application of the model.

REFERENCES

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