

# The Theory of Structural Cognitive Modifiability and Mediated Learning Experience\*

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In the following pages we will outline the critical elements of a theory of intelligence. In reviewing the various theories that have been proposed in the past, we find that many of them deal only partially with those components we consider to be the most important. Let us consider these components.

First, most essential of the components of a theory of intelligence is that its subject be well defined. The answer to the question, "What is intelligence?" will certainly affect the theory's course of development in terms of its organization, its content, and its meaning.

Second, the theory must deal with the origin of the object of concern, "How does intelligence come into being?"

A third issue to be addressed in a theory of intelligence is concerned with the conditions that prevent this particular object from coming into being. Thus the question develops, "What will make the existence of intelligence differ widely in the modalities of its appearance and in its qualitative and quantitative dimensions?"

A fourth question of concern to a theory of intelligence is, "What is the nature of intelligence in terms of its stability/modifiability?"

A fifth element of the theory is the meaning of intelligence in the total of human behavior.

A sixth component addresses the diversification of intelligence and outlines the determinants of this diversification.

A seventh issue that must be addressed is the most appropriate methodology by which to operationalize some of the mental constructs that are used as building blocks in the construction of the theory of intelligence.

Finally, an eighth concern: if we opt for an interactional approach to intelligence, and declare intelligence to be a process rather than a reified object (with the process defined as a constant progression toward higher levels of adaptation), then we must ask, "What is it that enhances the occurrence of such processes, and, to the contrary, what are the conditions whose presence or absence are barriers to the processes of adaptation?"

We will attempt to describe the theory of Structural Cognitive Modifiability by responding selectively to several of the various questions posed. We consider it neither possible nor appropriate to enter into a detailed discussion of all the factors, but we hope that in addressing a significant group, an initial outline of a theory of intelligence will emerge. Other theories of intelligence will be discussed and confronted, but only to the extent necessary in order to better present and delimit the borders of the theory we propose.

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## DEFINITION OF TERMS

As we suggested, the definition of intelligence is a very important component of its theory. We will not attempt to review the various definitions familiar to the reader from the literature. However, we would like to remind the reader of the recent judicious attempts in which the term is not only considered globally, but as a conglomerate of diverse factors that may appear differentially in individuals, as well as in various groups.

The triarchic concept of intelligence proposed and elaborated by Robert Sternberg (1985), Howard Gardner's hypothesis of the multiple forms of intelligence (1983), and the factorial description of intelligence by a number of other authors—all address the way the basic definition is manifested differentially in individuals and groups. They also discuss how these diverse manifestations are linked to specific situations. Thus, in his beautiful metaphorical representation of mental life as a governmental system, Sternberg's basic definition refers to intelligence as the faculty by which the organism adapts to novel situations. The concept of novel or more complex situations is a *sine qua non*, since it is inherent in a concept of adaptation. The triarchic theory of intelligence describes the diverse and specific modalities and the personal styles of individuals whose cognitive structure – with its cognitive, emotional, and experiential determinants – is oriented toward preferential modalities of adaptation. Thus, the common underlying concept in the definition of intelligence in Sternberg's theory is the process of *adaptation*. Various authors have conceptualized the process in certain modalities, grouping and categorizing manifestations of intelligence in relation to certain situations and life conditions (Sternberg and Detterman 1986).

At this point in our search for a definition of intelligence in order to construct a theory, we contend that *intelligence should be defined as a process broad enough to embrace a large variety of phenomena that have in common the dynamics and mechanics of adaptation*. It is adaptability that is inherent in both problem solving, which reflects purely cognitive elements, and creativity, which is engendered by strong motivational elements. It may even be necessary to redefine the concept of adaptability to render it broad enough to define intelligence. Philosophically and morally, adaptability is usually described as overtly serving an organism's positive goal for survival, the survival of others, and the preservation of certain states of mind. In our broadening of the concept, however, we may reject the positive nature of adaptation as its sole criterion. If so, nothing – neither biologically based needs nor emotional, moral, or philosophical orientations – may preclude the application of the concept of adaptability, once we admit the possibility of including in the forces of adaptation those behaviors leading to outcomes incompatible with the usual goals of adaptation, such as survival. Negative outcomes may, under specific conditions, capacities, and behavior, actually reflect adaptation.

It is, therefore, adaptation in its most generic term that we advocate: the changes that the organism undergoes in response to the appearance of a novel situation that requires such changes in the organism. It is a *dynamic process* that represents a more-or-less consciously, more-or-less volitionally, engendered process of change from one state to another. It is this adaptability of the organism (the individual or the group) that we refer to as *modifiability*. That this modifiability may differ from individual to individual, from state to state, from situation to situation, is a phenomenon that is too often observed to need further elaboration.

For example, differences are observed between normal and autistic children in their

heart rate change following then\* adaptation to a new situation. Following exposure to a particular set of stimuli that has produced changes in state of alertness, galvanic skin response (GSR), respiratory system and heartbeat, habituation in a normal child is manifested by a decrease and regularization of these neurovegetative phenomena. The autistic child shows neither these changes nor habituation when presented with such stimuli. In some cases, there is not even the expected arousal. In other words, the rate of change may vary greatly even in such elementary phenomena, and even more in molar conditions of exposure to situations requiring adaptation. The origin of this differential rate of adaptability and diversity in the process of change must therefore be questioned.

## **ORIGIN OF DIVERSITY IN RATE OF ADAPTABILITY**

One way we identify individuals with a wide array of deficient functions is by their slow and limited modifiability, or even its absence. Rather than describing a person as a member of a category labeled "retarded" or "high-level gifted," etc., we prefer to describe these individual differences in terms of the process or the dynamics of change: the rate and quality of change; the nature, frequency, and intensity of the stimuli required to produce the given change as a structural characteristic of an individual. (Structural, because it relates to a nuclear determinant responsible for variations in the highly diverse universe of behaviors.)

Modifiability need not be similar in all areas. This characteristic of the process of change may display variations. It is this very nature of the individual's modifiability that is responsible for the manifestation of deficiencies, as well as for the rapid modifiability that is evidenced through higher levels of functioning. It no longer sounds contradictory, once we sharply distinguish between manifest level of functioning and the latent behavior revealed in the process of change.

The definition of intelligence as a process rather than a reified, immutable, fixed entity thus carries with it some dramatic differences in the way behaviors are perceived. In describing the dynamics of this process, we must take into account other elements responsible for the adaptability in the individual's behavior. These components, whether they be emotional or cognitive, will have to be revealed. The role they play in the nature and process of change will have to be analyzed, understood, and eventually given a particular weight.

If we accept this definition of intelligence as a process rather than as a reified object, with all that entails both theoretically and empirically, we must investigate the notion of the origin of intelligence as having an adaptive meaning. How does this interpretation influence the individual? Through its propensity to integrate into previously formed schemata the learning derived from new experiences, previous schemata are modified so as to make them adaptable to the new situation that has been produced through the new experience. In a sense, the Piagetian concept of assimilation and accommodation is highly consonant with the view of intelligence as a process and as a nonreified entity (Piaget 1970). The plasticity of the schemata that permits assimilation to end by changing the schemata, which is accommodating to the new stimuli, information, and experience, represents a dynamic view of intelligence as a process.

If this view is accepted, what then is the origin of the flexibility, the plasticity and modifiability of those schemata that are changed by experience so as to adapt to new experiences? It is agreed that instinct – with its inborn schemata – does not show this

kind of flexibility. On the contrary, instinct and reflex behavior are defined as unidirectional and nonmodifiable entities. In its confrontation with experience, instinctive behavior does not modify its inborn course of functioning. Nor is the perceptual process, as described by Piaget, flexible enough to deserve the term intelligence. In contradistinction to intelligence, in our view, perceptual processes can be modified only through a cognitive approach, with "the cognitive crutches" helping "the limping perception" to adapt to new situations.

We know that modifiability is a process that differentiates meaningfully among human beings and thereby reflects the different degree of their manifest adaptation. Many of the difficulties people have in academic areas, in particular, and in life in general, for instance, are due to a limited, poor, or nonexistent capacity to benefit from formal or informal learning situations. When we speak of learning disabilities – which may be circumscribed to one particular area or one particular mode of functioning – we are describing the incapacity of an individual to benefit or become modified through exposure to certain experiences that are effected with other people. What is it that makes one organism more or less able to benefit from experience? May we call these people more or less intelligent? What actually forms a barrier to plasticity, flexibility, and modifiability? The answer is very difficult because of the manifold sources and origins of these differences. In terms of a theory, however, we suggest that differences are due not only to the nature of the organism, which they certainly are, but also to a typical human mode of interacting with the world, which affects precisely this quality of the human experience.

If we compare animal intelligence to human intelligence, we see that the degree of modifiability ascribed to and observed in humanoid forms of life is extremely limited. Even in the case of the anthropoid, the area and extent of change that can be anticipated is minimal. In their natural life, when animals respond and eventually even adapt, their adaptation has a very limited range. Rather than changing themselves, animals often change environments. They learn to look for elements that correspond to the schemata at their disposal and make the best use of them. This is in contradistinction to humans, whose environment includes a motivating mediator intent on making them learn a specific behavior. Under these circumstances, their learning capacity becomes meaningfully increased; it reaches levels of functioning not easily found when they are left to themselves and are directly confronted with situations and stimuli. It is the quality of interaction with a motivating, intentioned mediator that animals lack, despite the repertoire of schemata of their natural life.

Given the above distinction, we may compare the two modalities by which the human organism is modified with the single modality of change of an animal. The one pervasive modality, the direct exposure to stimuli, is indeed a source of change for both humans and animals. It ensures a certain mode of adaptation, limited both in its scope and in its nature, which we refer to as "one-to-one correspondence." A situation appears; there is some change in behavior in order to adapt to the particularity of the situation. With this, the adaptation process is finished. Another situation will be required for the same adaptation to result. Direct exposure is certainly responsible for many of the types of changes produced in humans. However, it is the second modality of interaction between the human and the environment, the Mediated Learning Experience (MLE), that is responsible for a more meaningful and generalized type of change that actually assumes a structural nature. It does not require a repetition of the same sequence of steps by which adaptation took place initially.

Thus, MLE is an interaction during which the human organism is subject to the intervention of a mediator. Learners can benefit not only from the direct exposure to a particular stimulus, but they can also forge in themselves a repertoire of dispositions, propensities, orientations, attitudes, and techniques that enable them to modify themselves in relation to other stimuli. Our hypothesis, then, is that MLE is the determinant responsible for the development of the flexibility of the schemata which ensures that the stimuli that impinge on us will affect us in a meaningful way. MLE produces the plasticity and flexibility of adaptation that we call intelligence.

## ONTOGENY OF FLEXIBILITY

The ontogeny of this unique and specifically human characteristic cannot simply be explained by the individual's maturational process. Individual differences in the rate of learning can be observed at an early age. Piaget himself described differences in the onset of eye-hand coordination among his own three children. He does not ascribe these differences to variations in the children's rate of maturation, but rather to the various amount of exercises that had been offered to each. We would refer to this as the frequency and intensity of MLE interactions.

Through mediated intervention, the author has succeeded in making his eight-week-old Down's Syndrome grandchild repeat clearly the lip movements related to "bu" and "ba," with appropriate facial kinesis. What is more important, however, is the change in the infant's rate of learning in response to mediation observed over time. Eliciting a behavior lacking from the baby's repertoire had previously taken about 200 repetitions; now only ten repeated exposures are necessary to elicit a new behavior. The change produced by MLE has not only been in the realm of learned content, but in the learning structure, in the propensity for learning, and in the growing capacity of the organism (the infant in this particular case) to benefit from exposure to learning situations.

When we compare the amount and nature of exposure needed by the baby's eighteen-month-old sister, the same change has been produced in the little girl with far less investment. We therefore recognize that variations in the investment necessary to produce the plasticity and modifiability of individuals, reflected in the differential rate of their learning process, are grounded in variations in the organism's innate conditions. These variations may have a neurochemical, neurophysiological origin that, indeed, may vary from individual to individual. But must these variations be considered as inevitably leading to gross differences between the level of functioning of individuals? Is it not possible to conceive of variations in intervention that may overcome initial differences partially, but meaningfully? <sup>φ</sup>

Another reason that changes in the rate of learning-intelligence should not be attributed to maturation is that the rate of development is not uniform even when *toute chose est égal d'ailleurs*, when all conditions seem to be equal for all individuals. In dealing with the maturation-environment interaction, Piaget has given little, if any, consideration to the great differences among individuals in the development of those cognitive processes that he considered to be the universal outcome of the maturation-environment interaction. How many of those who attain the age of formal operations also attain the operations themselves? The author has confronted Piaget with data that

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<sup>φ</sup> See recent research of R. A. Leemann on brain formation and thinking.

prove that groups of North African children and young adults functioned on the level of five to six year olds in Geneva in operational areas, despite their normal development and level of functioning in most other areas. The North African population had clearly not attained the level of operational thinking, despite their age and their rich opportunity to interact directly with stimuli, the Piagetian formula of development of intelligence/content. The Piagetian concept of Stimulus-Organism-Response (S-O-R) does not really explain differential development, as presented in Sternberg's triarchic theory or in the multifaceted approach of Gardner and others (Sternberg 1985; Gardner 1983).

In an article on the first humans that appeared in U.S. News and World Report, William F. Allman concludes:

*Thus, merely having a larger brain may not have been enough to produce the maturation rate seen in modern humans. That came only later, perhaps when parents had more time to care for children because of an abundance of food, possibly due to the development of regular hunting for large game. (p. 58)*

It therefore seems to us that the simple maturational or even interactional hypothesis of S-O-R is unable to explain the plasticity of the human organism. We recognize the importance of the Baldwin-Piagetian concept of assimilation, accommodation, and equilibration in describing the dynamics of change in human sensorimotor, concrete, and later formal operations. Our question is, what makes the schemata flexible enough to allow this process to occur and what is it that precludes this process from taking place in certain individuals? The human's modifiability under a variety of conditions, its functioning through hierarchically higher modalities of operation, and its considerable diversification in its interactions under diverse situations must be explained. Our theoretically derived stance is that what makes both the innate and acquired schemata plastic and modifiable is the second modality of human-environment interaction, namely MLE.

## **MLE INTERACTIONS**

MLE is defined as a quality of human-environment interaction that results from the changes introduced in this interaction by a human mediator who interposes him/herself between the receiving organism and the sources of stimuli. The mediator selects, organizes, and schedules the stimuli, changing their amplitude, frequency and saliency; and turns them into powerful determinants of behavior instead of randomized stimuli whose occurrence, registration, and effects may be purely probabilistic. Animated by an intention to make a chosen stimulus available to the mediatee, the mediator is not content with its random presentation but will rather meaningfully change the three components of the mediated interaction: the receiving organism (the mediatee), the stimulus, and the mediator him/herself. Thus, when the author attempted to mediate the facial kinetics related to the sounds "bu," "ba," he amplified his lip movements so they became visible to the fleeting sight of the infant, repeated the sounds numerous times, modulated his voice so as to make it less monotonous, ensured that the infant focused on him as a model by adapting his position to the position of the baby or by holding the baby in the position most conducive for the registration of changes in the mediator's behavior. Thus the mediator's intention to make a particular stimuli available to the mediatee meaningfully changes the stimulus from a fleeting, randomized, almost

imperceptible occurrence to a powerful, inescapable encounter that will be registered, integrated, and mastered by the learner.

As previously described, however, the major and unique effect of MLE is not the acquisition of the mediated specific stimulus. This may also happen under specified optimal conditions of direct and nonmediated accidental exposure to the same stimulus. The unique effect of MLE is the creation in the mediatees (whether they be infants, children, adolescents, or adults) of a disposition, an attitudinal propensity to benefit from the direct exposure to stimuli. Ways are created to focus not only on the stimulus, but also on the relationships of proximity-distance, of temporal and spatial order, of the constancy-transformation complex, and on a variety of higher-order perceptions and elaborations of the stimuli. Thus, there is an increasing expansion of the schemata from their pure sensorimotor or perceptual nature to their abstract level of formal mental operations. This transition, described by Piaget, cannot be considered simply as the epiphenomenon of our direct exposure to stimuli, nor even of our active interaction with them. It requires the active interposition of the mediator whose intentions are marked by a goal that transcends by far the immediacy of the interaction. Without the dimensions of intentionality and transcendence, the acquired stimuli would have little meaning beyond what they represent. They would remain an episode with limited links to a larger category of events. It is the MLE that ultimately ensures that direct exposure to stimuli, the more universal modality of our interaction with the surrounding world, will become a source of change of structural nature. The repertoire of the individual's mental activity will thus be enriched with new structures of behaviors that were previously nonexistent in his/her active or even passive repertoire.

In the last proposition, we refer to the Vygotskian theory that conceives of the impact of social mediation as facilitating the passage from the current level of functioning to the level included in the "zone of proximal development" (Vygotsky 1934/1986; see also Minick, 1987). Vygotsky implies that facilitation is related to a latent type of functioning that may eventually be reached without the intervention that has facilitated and antedated its appearance. Our contention, however, is that new cognitive structures are produced in the individual that would never come into being were it not for MLE and its role in their appearance. Indeed, more individuals in our world do not reach higher-order thinking skills than those who do. The reader is referred to the large literature on MLE for further elaboration of this subject. For the purposes of this chapter, however, and to discuss the origin of the construct of intelligence, which we have defined as the plasticity and flexibility that lead to the ever-expansion of schemata, we will briefly describe some of the characteristics of MLE.

## **CHARACTERISTICS OF MLE**

The quality of the MLE interaction that is responsible for the formation and development of modifiability is ensured by the three parameters: intentionality, transcendence, and meaning. These are universally pervasive and omnipresent qualities in all human mediated interactions. They are common for all cultures, irrespective of their level of technology, or level and modality of communication. The three parameters have animated mothers and fathers since the onset of humanity, probably even preceding it since they are actually responsible for its development. MLE is the modality of interaction, irrespective of its content or the language in which it is carried

out. Intentionality, transcendence, and the mediation of meaning ensure the formation of the flexible schemata and the ensuing modifiability that is the common trait of humanity. The other parameters of MLE are situationally determined or belong to the cultural norms of the group or the family. They may or may not be present in any MLE interaction. They are responsible for the diversification of humans, both as cultural groups and as individuals in the group. In this way, we may speak of two aspects of human intelligence. The common and unique trait is the human modifiability and plasticity that lead us to the postulate that modifiability is accessible to all human beings, irrespective of the exogenous or endogenous etiology of their condition, their age, and the severity of their condition. The other aspect of humanity is obviously its considerable capacity to diversify itself in some critical aspects of its mental behavior, cognitive style, and modality of interaction. For example, the extent to which a culture develops an autonomous regulation of behavior differs widely in accordance with the conditions in which this culture lives and its view of the adaptive meaning of regulation of behavior, which may differ from culture to culture. Similarly, there is a great difference in the amount and strength of the feeling of competence a given culture or an intentioned mother mediates to the child. There are cultures that do not promote or encourage a feeling of individual competence. In Jewish culture', the origin of competence is ascribed to G-d, from whom the group or other figures of the family may derive their competence. A typical manifestation of this attitude is a kind of reverse plagiarism. Jewish literature is replete with writings of Jewish scholars who attribute their own writings to an illustrious image, preferably someone venerated in past ages and, of course, dead. Another example is sharing behavior, which is neither a universal practice, nor is necessarily mediated either by parents or by the cultural agents responsible for the transmission of the values of the culture. Intercultural diversity is paralleled, too, by an intracultural diversification due to personalized styles and preferences, which may play important roles in the formation of styles.

As previously stated, direct exposure to stimuli and MLE represent the two modalities of human-environment interactions that explain differential cognitive development. It is MLE, however, that should be considered the factor responsible for the individual's propensity to benefit from direct exposure, since it is through MLE that both the major components of learning and the modes of generalizing what is learned are established.

The theory of MLE that explains both the universality and diversity of human behavior should be contrasted with the behavioristic view of cognitive development (Stimulus-Response), and the Piagetian genetic theory (Stimulus- Organism-Response), which introduces the organism as a determinant. By the biological age-related level of its maturation and its active interaction with both the stimulus and response, the presence of the organism alters the nature of both the stimulus and response. The Piagetian model conceives of development as proceeding in a series of successive well-ordered stages. Each stage follows the other, capitalizing on the presence of the earlier stage to build a repertoire of functions that will compose the stage that will come next. It is analogous to the development of a monocotyledon plant whose leaves grow directly from its rootlets and appear successively in a well-determined order to form the stem. There is neither an enlargement nor branching of the physiologically determined stem. Instead, the leaves repeat themselves rhythmically and monotonously along the axis of the plant. The growth of the plant is highly predictable with little, if any, diversification in its critical aspects.



Direct exposure to stimuli as the only source of development of cognitive processes may be considered analogous to the development of the monocotyledon. Development is ordered along a hierarchical axis and follows the succession of growth imposed by this axis. It is thus universal, predictable, and totally independent of any culturally determined differences. There is neither a place for meaningful changes in the individual's level of functioning, nor is there a possibility of diversification or of structural modifiability.

The dicotyledon plant, on the other hand, is marked by a very different structure of growth. Its central root leads to a central stem; both the root and the stem develop powerful branches that form strong contacts with their environment and are highly affected by the natural conditions of the stimuli they encounter. For example, to a large extent the nature of the soil in which the roots develop determines many of the plant's structural qualities. It is impossible to predict the nature, quantity, and quality of growth of the dicotyledon simply by looking at its current growth pattern; one must also take into account its plasticity and modifiability in response to the variations of its growth environment. The branching of its roots is isomorphic and there is great diversity in the directions in which its branches grow. Contact with an undefined number of environmental conditions makes diversification and structural modifiability highly probable. On a metaphorical level, one is reminded of the process of arborization of the central nervous system, which is held responsible for the higher mental processes by increasing the contacts between the nerve cells, the formation of the cell assemblies, permitting interactions, exchanges, and combinations of information, and the subsequent changes in the mental processes toward hierarchically higher, more elaborate forms of abstract and conceptual thinking (Hebb 1949; Hunt 1961).

Notwithstanding the limitations of the analogy, the similarities are striking. The rich, powerful, and diverse influence of MLE on the cognitive, emotional, and personal development of the individual is the basis of modifiability, unpredictability, and the diversification of cognitive structure styles and need systems. The Garrett hypothesis, which postulated the progressive differentiation of intelligence with age, may be explained as a function of MLE that, through the transmission of culture over the years, offers the growing child a large variety of modes of thinking, of principles for organizing incoming data, of ways of educating relationships and using past experience to anticipate, plan, and shape the future (Garrett, Bryan, and Perl 1935).

Thus MLE fulfills two major roles. The first, its explanatory role, has been amply discussed in this chapter. Its second role is to serve as a guideline for shaping interactions that will produce the modifiability and flexibility so crucial to human adaptation and ultimately to survival.

MLE as a theory and applied system is more important today than ever before, not only because adaptability is required more, but also because of the current decrease of MLE as the pervasive modality of inter- and intragenerational interactions. There is now more attention to mass media than to personal address. Education and socialization have become delegated to professional agents; whose emotional attachment to a particular child is of a more general nature and, unfortunately, often lacks the quality of the interactions between parents and children.

Many other socioeconomic, familial, and cultural conditions are at work in reducing the amount and quality of parental mediated interactions: the over-reliance on the fragile structure of the nuclear family; the decrease in the numbers of enlarged families; the considerable increase in the number of single parents and working mothers; the growing

pathology among parents that makes them disinterested in their children's quality of life presently and in the future. The millions of abandoned children in the world provide powerful testimony to what happens when parents and society are no longer animated by the need to shape their progeny by transmitting to them the past and the cultural values that have shaped them. The need to increase MLE in the normal population is no less than the need to provide MLE to a population whose endogenous conditions require a particular form of interaction to achieve its goal. MLE, because of its emphasis on the "how" of the interaction, irrespective of its "what" or the "language" it is expressed in, is particularly appropriate as a guideline for parents, teachers, and caregivers of all ethnocultural, socioeconomic, educational, and occupational levels.

## **EFFECTS OF MLE AND ITS ABSENCE**

The hypothesis of the dual source of the development of intelligence now leads to the next question with which a theory of intelligence must deal: What are the effects of MLE and how will the lack of MLE affect an individual? The answer is not simple. Yet one can formulate the relationship between MLE and other modalities of learning: the more appropriate the MLE (in relating to the needs of the individual, which vary in terms of age as well as in particular neurophysiological and emotional conditions), the greater will be that individual's capacity to become modified through direct, autonomous exposure to stimuli. Inversely, the less MLE, the less modifiable the individual will be. This is true even for people who, by virtue of their psychophysical constitutions, are good and rapid learners. Without appropriate MLE, they may be deprived of some of the characteristics of human learning responsible for adaptability to new situations. This is the case, for instance, of gifted underachievers. They are certainly endowed with rapid perceptual and mental processing; however, devoid of MLE, they may be limited to certain types of incidental learning that are of little help in situations that demand systematic, laborious, selective, goal-oriented learning. The child at developmental risk cannot make much of the world of impinging stimuli without having prerequisites of learning established through MLE.

A few of the effects of MLE include imitative behavior, focusing, systematic search for relevant data, reevocation and retrieval of stored information, comparative behavior, and the use of one or more sources of information. In the mediation of the use of analogical thinking to transfer relationships from one set of data to another, similar in certain aspects, are the functions necessary for the generalization of acquired knowledge, principles, and relationships by transferring them to the other parts of the universe of content and operations. These operations, mediated to the individual through diverse contents, in a variety of languages and modalities of communication, render individuals modifiable by producing in them those prerequisite propensities, orientations, and attitudes that will enable them to generate new information.

Our response to the question of the determinant of intelligence (defined as plasticity) can be summarized by pointing to MLE, along with certain other characteristics of human beings and of individuals. A lack of MLE is manifested by the quasi-total absence, poor or reduced propensity for learning, and, ipso facto, of modifiability. Indeed one of the most commonly observed characteristics of those deprived of MLE for either exogenous or endogenous reasons, is a lack of modifiability in response to direct interactions with experienced stimuli and events.

## **PROXIMAL AND DISTAL DETERMINANTS OF COGNITIVE DEVELOPMENT**

Differential cognitive development may be attributed to two distinct etiologies: a distal or proximal factor. Maturation, organicity, emotional and educational levels of parents and/or children, etc., are considered distal factors, since they neither necessarily nor unavoidably result in differential cognitive development. It is the second etiological factor, the proximal determinant, that we consider to be directly and inevitably responsible for both differential cognitive development and the degree of the modifiability typical for an individual. Distal determinants act as triggers for secondary processes referred to as the proximal determinants. The proximal determinant of utmost importance is the mediated learning experience. This conception of MLE as the proximal determinant of cognitive development, irrespective of any distal etiology, is illustrated in Figure 1.

Endogenous or exogenous distal factors may account for the lack of MLE. This lack may stem from internal factors set by an individual's endogenous condition, such as a genetic or chromosomal aberration, a centrally determined hyperactivity, sensory deprivation, or other types of deficiencies. Thus, for example, because of the child's hyperactive and hyperkinetic mode of interacting with the world or his/her hypoactive lowered sensitivity to general characteristics of the stimuli, or some specific critical elements, the child with an attention deficit may have great difficulties in attending to the mediator's efforts in selecting the stimulus and making the child focus on it.

Indeed, if the differences between retrospective and prospective research are considered, one becomes aware immediately that factors that had previously been considered determinants of human cognitive development based on retrospective research data proved to have limited meaning once the same phenomena were studied prospectively (see Sameroff and Chandler 1975). Thus, when looking retrospectively at the history of the child's dysfunction, one usually finds either a genetic or organic etiology at a pre-, para-, or postnatal level (i.e., the mother's condition during pregnancy; the process of the infant's delivery; or some postnatal adverse condition of physical, nutritional, emotional, or educational nature), which is described as being responsible, either in part or in toto, for the child's dysfunctioning. However, when the development of children who have undergone identical birth conditions is studied, one finds a very limited correlation with specific dysfunctions. The very interesting work of Pnina Klein (Klein and Feuerstein 1985) shows that the predictability of very low birth weight for future dysfunction is extremely limited when one takes into account educational and environmental factors, and more specifically, the presence or absence of MLE.

Reading disabilities, for example, may be triggered by a particular distal determinant, such as minimal brain dysfunction (MBD), delayed development, perceptual inaccuracy of sensorial origin, lack of focusing, or any number of other factors. However, when we ask ourselves if all individuals suffering from similar conditions become dyslexic, the answer will be no. One person may remain unable to read, while another can learn to read with relative ease, despite his/her condition.

The author remembers, at the age of eight, that he was asked to coach in reading a fifteen-year-old reputedly "mentally retarded" adolescent. All previous attempts to help

the boy read had failed and the specialized adult teachers had declared him to be totally unable to acquire reading or any other symbolic substitute of reality. His language was extremely poor and ungrammatical. The boy's father had half jokingly declared, "I'm not going to die unless my son is able to read the prayers at my death like a good Jewish boy." Indeed, animated by this powerful need, both the eight-year-old teacher and his student worked very hard to find ways to overcome the older boy's difficulties, resulting in his acquisition of reading skills. The adolescent's success affected the quality of his life. He developed subsequently much more normally and, despite lack of formal schooling, as an adult has become fully integrated into society. (He is now 75!) Motivation generated by a culturally determined need system and the resulting proximal MLE succeeded in bypassing and overcoming the barriers that were produced by some distal determinants.

The power of the proximal determinants, i.e., MLE in the acquisition of reading ability, is illustrated by the children from Yemen. The author personally met hundreds of Yemenite children and adolescents as they arrived in Israel from Yemen in the mid-1940s. Having met children from other cultures – Rumanian, Polish, Hungarian, Indian, Iraqi, and North African – he observed that one outstanding characteristic that distinguished the Yemenites from other groups was the total literacy in both reading and speech that was typical of the entire population from very young ages. Considering the technical difficulties this group had in obtaining books to read, how did this pervasive literacy happen? The Yemenite children had learned to read in all directions: left to right, upside down, right to left, and even diagonally because a whole group would read simultaneously from one book placed in the center, and each individual had to read from wherever he/she was. Their high motivation and the powerful mediation from early ages of the meaning attached to reading as a sociocultural activity made that activity as pervasive a phenomenon as breathing, and a phenomenon achieved under the most adverse distal conditions. The transcendent component of the mediation of reading manifested itself in a very high level of verbal fluency, a richness of vocabulary, and creativity in a variety of areas. The Rorschach protocols of Yemenite children were also shown to be rich and creative.

It is worthwhile to note that, years later, educators were shocked at the appearance of cases of illiteracy in certain Yemenite children. The lack of reading ability was clearly related to the sociocultural disintegration and disorganization of the group due to its confrontation with the dominant Israeli culture. The *mori*, a Yemenite religious teacher whose son was totally illiterate, complained to the author about his loss of authority over the boy. He pointed to the disintegration of their cultural heritage as the cause of his son's deficiency.

Juliebo (1985) discusses the cultural meaning of reading difficulties. The distal determinant, whether endogenic (genetic or organic), exogenic (environmental or educational), or emotional, is certainly responsible for certain of the individual's characteristics, but its contribution is neither direct nor unavoidable. It is only when an inadequate proximal determinant is triggered and activated that the projected problem is produced and the deleterious effects become visible. If, however, the distal determinant does not trigger the proximal determinant, by instituting an intervention program based on MLE, irrespective of whether the distal determinant was of endogenic or exogenic nature, then the outcome can be very different. Despite the presence of the triggering distal factor, if MLE is instituted, the outcome will be very different from that which is ordinarily expected.

MLE is thus perceived as a proximal factor for the evolvement of human modifiability and enables us to explain the capacity of human beings to adapt to extreme changes in their linguistic, professional, and vocational areas of functioning and need system environments. It explains, as well, the development of higher mental processes whose presence cannot be accounted for by the sole exposure to stimuli and the interaction with them. MLE is the proximal determinant, the human ability to radically change cultural and personality styles in accordance with the demands of the new environments. Ever more astonishing is the fact that this propensity to undergo extreme changes in critical aspects of social, linguistic, and professional areas of functioning is not necessarily accompanied by a loss of self-identity, except in pathological cases.

It is this flexibility in the human psychic apparatus that is expressed in the individual's capacity to depart sharply from some characteristic critical functions, and yet to find him/herself to be identical and continuous despite the changes that have occurred. Both human modifiability and structural change include flexibility as an important component. Structural change implies the principle of transformation, which, according to Piaget, is the process by which the structure undergoes change but still preserves its nature. Flexibility can be defined as the continuity and constancy of the structure, in this case of the individual across a variety of changes that affect him/her. This contrasts strongly with what happens when a piece of iron is led by making meaningful changes in its shape; a discontinuity in its existence is created by the produced change. This change in the iron's shape can eventually be cancelled by manipulation and the metal reshaped to its former contours. By doing so, however, the existence of the previous shape has been discontinued and a new existence started.

Changes produced in the human being, no matter how dramatic and extreme they may be, are marked by the flexibility that characterizes the person's mental condition and allows the perception, of both self and other, of an amazing sense of identity that withstands all the vicissitudes of any changes that have occurred. The continuity and constancy of the self includes the awareness and consciousness of the produced changes across stages of development – levels of functioning and competence, and ethical, civil, and occupational conditions. They are unique features of the human's mental, emotional, and personality apparatus. They have their roots in the propensity of the human being to relate to the past as a reality that is as strongly experienced, and as vividly lived, as the immediate moment. Goethe, in his introduction to *Faust*, says, "Ihr naht Euere wieder Schwankende gestalten." ("You approach me again with your shaky images.") Goethe points to the fact that these images, despite their shakiness because they belong to the past, are more vividly experienced today than when they actually happened.

Membership in a group whose culture has been transmitted to the individual by mediators considerably enlarges the existential spheres. Mediation includes the transmission of the past and this serves as the cognitive, affective, and emotional engagement toward the future, MLE, responsible for the modifiability of the human being, is thus also responsible for the flexibility that makes individuals, as well as groups, preserve their identity across their modified states. The future of both the individual and the ethnic group is strongly contingent upon the inclusion of their past into their existential sphere. Bergson (1956) has compared the relationship between the experienced past and the represented projected future to the action of shooting an arrow into the air by pulling back on the bowstring. The further back the bow is pulled, the further forward is the arrow projected. In other words, the greater the depth of the

experienced past as part of the self, the further is the projection of the representational future, and the emotional orientation toward shaping this future, to continue long after one's own biological existence has come to an end. MLE thus plays a very important role in the shaping of human adaptability and of ensuring its continuity. This is done not only by enhancing individual cognitive processes, but also by creating the cognitive, emotional, and intentional conditions for the continuity of culture produced by the propensity of individuals to expand their identity – beyond their immediately experienced selves – into the past that has preceded them and the future that follows them. The emotional needs created by this past and future orientation have their origin, of course, in the biosocial nature of human existence. However, the social components have proven to be stronger than the biological factors alone, which are not able to explain the most critical characteristics of human existence.

The unique flexibility of the human cannot be explained without recourse to the mode of interaction ensured by cultural transmission on the group level and MLE on the individual level. The concept of cultural deprivation, as related to MLE, now becomes clear. Cultural deprivation due to a lack of MLE is manifested as a limited, reduced, or even total lack of modifiability in either a general or a specific area of required adaptation. Indeed, such a formulation of the very diverse phenomena of disability helps us to perceive these difficulties as structural rather than as due to some discrete distal etiology. This permits us to shape intervention processes accordingly. An attempt to remediate a particular dysfunction that is linked to a lack of modifiability requires us to increase the modifiability of the individual.

If this hypothesis, relating the origins of human intelligence defined as modifiability and flexibility to the process of MLE, is accepted, then one can derive from it the answers to two other questions posed. First, what is the role played by the cognitive phenomenon in the total of human behavior and adaptation? Second, how is the diversification in human behavior explained and what is the role that diversity plays in the continuity of human existence?

## **ROLE OF COGNITION IN ADAPTABILITY**

The role of cognition in human adaptability has been and is still partially controversial. Modern psychology has departed from the early schools and has adopted either a dynamic or a behaviorist approach. In the dynamic approach, emotional, affective, and personality variables are considered to play the more important role in shaping the individual's behavior. The behaviorists, on the other hand, give little, if any, weight to the mental constructs that describe cognitive processes. They look only to the overt and immediately observable behavior. Only seldom do they refer to constructs such as intelligence or affectivity as engendering behavior.

During the period of the dominant impact of the psychoanalytic dynamic school, Piaget was among the first to declare cognition an important determinant of behavior. He also stressed the strong interdependence between cognition and affect by considering the two as obligatory components of each observable behavior, with cognition representing the structural aspects and affect representing the energetic factors. Cognitive-structural elements respond to questions of the what, where, when, whom, how, and how much of our actions; emotional factors respond to questions of why, what of, and what for given behavior. There is no behavior in which the two

components do not converge in its production. Even in the most elementary behavior, such as instinctive behavior that is mostly determined by the inherited repertoire of inflexible, unidirectional successions of actions, certain cognitive components will be present. Sexual choices of animals are based on perceptual, sensorial, and other cognitive discriminants. We may even presume that comparative behavior determines the choice of the mate when alternative choices exist.

Affectivity, representing the energetic factor, both generates and is generated by cognitive processes. Thus, motivation and attitudes cannot be considered in isolation from such cognitive factors as knowledge, operations, anticipation of outcomes, and adoption of strategies for achieving particular goals. The choice of one's goals and aims is strongly contingent, upon cognitive functions and mental acts by which one singles them out of a number of possible alternatives, using comparison in order to ascribe priorities to one as opposed to another. This view of cognition as generating affective, emotional, and motivational elements may be contrasted with the view of dynamic depth psychology that conceives of the development of cognitive processes as secondary to the affective, emotional primary core. In the very succinct representation of affectivity in his work, Piaget describes affectivity as closely following the changes in the individual's cognitive structure along the developmental stages and the successive appearance of formal mental operations.

We prefer to view the relationship between the two as the two sides of a transparent coin, with the shape being meaningfully affected by the changes that are undergone on each side of the coin. Today, the cognitive determinants of our behavior are considered more important than ever. The need to adapt, i.e., to change, one's behavior, in order to make it correspond to changes in the situation with which one is confronted, is nowadays so strong that we may consider "modifiability," defining the concept of intelligence, as the most vital condition for survival. Cognitive modifiability, in this sense, should be considered the prime goal not only of education in the initial stages of the human organism, but it must also be implanted where it is missing or increased when the need to change and become modified is exacerbated by the individual's existential condition.

A student, exhausted in preparing himself for an entrance exam, said, "Now that I no longer have this goal, I have nothing to do. I wish I could go to sleep until I have a new goal to put me to work again." The difficulty in adapting himself to the new situation of aimlessness orients this individual to escape into sleep. The same is true for millions of people who retire at relatively early ages and find it extremely difficult to adapt to the new role retirement imposes on them. Changes in role, in techniques, and in instrumentation all require an openness, a propensity to learn and become modified by it. It is this openness to learn and become meaningfully modified in formally organized, as well as situationally determined, encounters that is missing in many individuals and may be considered a lack of intelligence or a lack of capacity. Indeed, modifiability is lacking due to a variety of endogenous or exogenous factors that have triggered a reduced MLE; however, these should be considered states of the organism and its cognitive structure rather than immutable, hard-wired traits. The former are modifiable; the latter, fixed and immutable. Scheffler (1985) points to the modifiability of the potential in all three dimensions of this construct.

## FACTORS DETERMINING DIVERSITY OF MODIFIABILITY

What are the factors that determine the diversity of human modifiability, both in terms of level of functioning and in variations in the nature of the functioning, differences in cognitive styles, and personality? The issue of the level of functioning has been discussed at some length as the outcome of an individual's level of modifiability. The benefits derived by the individual from mediated experiences manifest themselves in adaptive behavior. The view of intelligence as a dynamic process-oriented concept whose major characteristics are the modifiability and the constant changes that the structure of the mind undergoes has two implications: flexibility and diversification. The MLE hypothesis, as it is operationalized in its twelve parameters, considers these two factors as the differential outcome of the various parameters. The first three: mediation of intentionality and reciprocity, mediation of transcendence, and mediation of meaning are the universal criteria of MLE. An interaction that is not shaped by these three parameters cannot claim the quality of the interaction we attribute to MLE,

Intentionality turns the stimuli impinging on the organism from a random probabilistic appearance into an organized, directional succession, with characteristics lent to it by the mediator's culturally determined intentions. The mediator's intention modifies the stimulus in order to ensure its registration by the mediatee. Thus the *intensity*, the *frequency*, and the *modality* of its appearance are regulated by the mediator's intention. The effects of this intention are not limited to the stimulus or even to being registered. The intention changes the mediatee's state of mind, level of vigilance and alertness, and even what Herbartian pedagogy refers to as the "learner's apperceptive state" (which can be equated with the process of sensitization to certain stimuli by relating them to a schemata established by the mediator). This change in the mediatee's mental state, provoked by the mediator, turns the interaction into a source of structural schemata whose active components will affect the individual's mode of dealing with a variety of stimuli. The mediator's intention, which animates her/his interactive behavior, also changes her/him in some critical aspects (see Beck [1965] for Herbart).

The second parameter that has a universal role is the mediation of transcendence. The mediator does not limit the length and breadth of the interaction to those parts of the situation that have originally initiated the interaction. Rather he/she widens the scope of the interaction to areas that are consonant with more remote goals. By way of illustration, if the child points to an orange and asks what it is, a nonmediated answer will be limited to the simple labeling of the object in question. A mediated transcendent interaction will offer a categorical classifying definition: "It's the fruit of a plant, a tree. There are many fruits similar to the orange: a lemon, a mandarin, etc. They are all juicy. Some are sweet, some sour; some are big, others small. They are all citrus." In transcending the immediacy of the required interaction, the mediator establishes a way in which the mediatee can relate objects and events to broader systems, categories, and classes. Creating the search for similarities and differences, systems of operations are established that will act as a way by which the individual can register the information reaching him/her by direct exposure to the stimuli. The transcending principle of MLE is not only responsible for the widening of the cognitive factors, but also for the constant enlargement of the need systems that act as energetic determinants of continuous change and development via intrinsic motivation.

Transcendence is seldom, if at all, observed among animals. Thus, the cat, teaching



her kittens to do their little job in the garden, is evidently animated by an intention. It is reflected in the mother cat's waiting until all the kittens can see her act as model. But this animal's intention is limited to a particular and discrete behavior with very little, if any, spillover to other activities. Of necessity, it rests within the limits of the organism's primary instinctual needs. The transcendent nature of MLE is the most humanizing of the parameters that reflect the quality of the MLE interaction.

The third parameter universally necessary in all MLE interactions is the mediation of meaning. This parameter reflects the need systems of the mediators as a determinant of their intention and their perception of the goals for the future that they set for themselves and their progeny or their mediatees. The mediation of meaning provides the energetic, dynamic source of power that will ensure that the mediational interaction will be experienced by the mediatee. On a more general level, the mediation of meaning becomes the generator of the emotional, motivational, attitudinal, and value-oriented behaviors of the individual.

Intentionality and transcendence present the mediatee with the structure of mental behavior. To a large extent they provide answers to the questions of what to see, where to look, how much to invest in perceiving a particular stimulus or event, how to organize the succession of events so as to lead to a particular goal, how to integrate all the parts of the event into the whole that will permit the solution of the problem at hand. The mediated meaning will generate the answers to the why and what for of these mental or motor acts.

To summarize, the first three parameters are responsible for what we consider the unique features of human existence, its modifiability and flexibility. They are the most stable and universal qualities, and as such are common to all human existence, irrespective of cultural, socioeconomic, or educational levels of functioning. Modifiability is accessible to all individuals or groups whose level of functioning is extremely damaged because of their cultural difference, cultural deprivation (lack of MLE), or impairments due to endogenous or exogenous factors. Modifiability is considered possible even at advanced ages. The mediation of intentionality, transcendence, and meaning may have to be varied in terms of intensity, frequency, content, and language in order to overcome the particular barriers and resistances created by the condition, age, and particular characteristics of the individual. However, the 'hypothesis of MLE as the proximal determinant of differential cognitive development points to the ways of increasing individuals' modifiability, irrespective of their condition.

The diversification of cultural cognitive styles and emotional behavior can be ascribed to the eight or more parameters that have been described elsewhere. They include the mediation of a feeling of competence; mediation of regulation and control of behavior; mediation of sharing behavior; mediation of individuation and psychological differentiation; mediation of goal-seeking, goal-setting, planning, and goal-achieving behavior; mediation for challenge: the search for novelty and complexity; mediation of the awareness of change; and mediation of an optimistic approach. These parameters are not to be considered exhaustive but rather as a first selection of qualities of interaction that may, but need not, appear in each interaction in order to turn it into an MLE. The presence of any of these parameters is situationally determined and varies greatly according to societal, environmental, and cultural factors.

The mediation of psychological differentiation is not possible in each mediator-mediatee interaction. A teacher who is interested in a solidification of a learned activity

through its repetition cannot encourage learners to act differently from the models they are supposed to repeat or to express their differentiated personalities. Thus, mediation of psychological differentiation and individuation is not a necessary quality of MLE. Furthermore, there are cultures that do not consider individuation as a desirable objective for their members and do little to encourage the process. An enlarged family in a tribal setting, for example, does not give first priority to the process of individuation.

Ecological, historical, and cultural factors will all determine the extent to which the various parameters of MLE will be mediated, transmitted, and reinforced. It is this differential mediation that determines the diversification that is characteristic of the human. Although the animal realm also undergoes processes of diversification, it is totally contingent on the changes in the ecosystem of the animal; the human is much less dependent on the ecosystem. Cultural transmission plays a much more important role in determining the nature of an individual's cognitive style, personality, emotional responses to constraints, or even to the options presented by the physical environment. The human being's alloplastic defense has changed many of the environmental conditions to make them suitable to his/her needs and states of mind. Thus, for example, when the process of individuation became a cultural imposition, segregation from the enlarged family made it necessary to overcome the issue of distances by the proliferation of individual cars.

Another MLE parameter that varies greatly from situation to situation, from person to person, and even more, from culture to culture, is the mediated regulation of behavior. This parameter deals with the individual's orientation toward the use of cognitive as well as metacognitive means to initiate or delay responses: to control and inhibit behavior, and to accelerate certain responses according to criteria established through cognition. The regulation of behavior is extremely important in occidental culture where the technologically advanced society requires a highly controlled and regulated mode of behavior. This can be contrasted with the lesser demands for regulation and control in the more natural and rustic life that encourages spontaneous uninhibited, often impulsive behaviors.

In describing the various cognitive styles, Sternberg considers them to be largely the outcome of social, cultural, and environmental factors. Thus, judicial, legislative, and executive styles, which describe variations among individuals in the preferential modes of the use of their intelligence, are not only considered the outcome of inherited trends, but to a much larger extent, the result of culture, gender, age, parenting style, and schooling. To consider these variations as socialized *ipso facto* is to view them as modifiable at least to some degree; indeed, one of Sternberg's hopes is to be able to teach students to use various styles "flexibly" as an optimal mode of adaptation (Sternberg, 1997a; 1997b).

## **DIVERSIFICATION AS MLE GOAL**

As mentioned previously, the second outcome of MLE, after the promotion of flexibility and modifiability, is diversification. The diversification of human states, orientations, motivations, and those described by the eight parameters of MLE represent modes of adaptation of the individual to his/her sociocultural environment. The modes give the individual the feeling of identity as part of the group to which he/she belongs.

Modifiability, flexibility, differentiation, and diversification cannot be explained solely by direct and unmediated exposure to stimuli, no matter how rich nor how diverse the stimuli, and no matter how actively the individual interacts with them. In order to benefit from such exposures, one must be sensitized by the process of mediation. Those who have not been exposed to MLE, for various possible reasons, may not benefit meaningfully from their exposure to stimuli. In Piagetian terminology, their schemata are not flexible enough to permit them to be affected by the assimilation of new stimuli. Thus, the process of accommodation does not automatically follow; the individual is then not modified by an encounter with these stimuli. The same is true for the diversification and differentiation of the individual. The development of differential cognitive and personality styles is strongly dependent on the prior mediational experience of the individual.

## **ETHNIC GROUP ANALYSIS**

The effects of MLE on the modifiability and flexibility of the individual are best illustrated by relating the level of modifiability of certain ethnic groups to the mediational and transmissional processes typical of the particular culture.

Our encounter with the Yemenite children who arrived in Israel in the Magic Carpet operation of 1945-1948 first made us aware that a very low level of functioning could coexist in individuals with a very rich culture that differentiated between these individuals and other groups and provided them with a well-defined identity. One of the characteristics of such a group is its high level of modifiability. Indeed, the Yemenites proved they were able to learn and modify their functioning meaningfully. On the other hand, during the long years of our work in Youth Aliyah, we were confronted with children from other ethnic groups who had great difficulty in changing their levels of functioning. The differences between these two types of ethnic groups were not in their manifest levels of functioning (which were equally low), but rather in their levels of modifiability. The ease and pervasiveness of change that one group displayed contrasted sharply with the difficulties of the other group in adapting to the new culture and its requirements.

In an attempt to explain the striking difference in modifiability between groups who were otherwise similar in their low manifest cognitive, academic, technological, and occupational level of functioning, we looked into the cultural antecedents of the two groups. This allowed us first to hypothesize that the level of modifiability is directly related to the differential level of cultural transmission in each of these cultures. Only after many years of study have we been able to conclude that a sharp distinction must be made between cultural difference and cultural deprivation as the source of difficulties in the adaptation of the individual to a new culture.

When immigrating into a new and different dominant culture, the culturally different individual may prove to be a fast learner of those parameters of functioning that are the most critical for adaptation to the dominant society. Despite the fact that they are culturally different and devoid of certain linguistic, conceptual, and technological skills, there are immigrants from developing countries who show an amazing propensity to modify their level of functioning by using their areas of strength and adapting them to the requirements of the strange and often hostile dominant culture. In many cases, this propensity to learn and become modified through this learning makes them achieve high

levels of functioning and efficiency despite their low level of language mastery and limited orientation in other crucial areas. Thus, cultural difference not only does not hamper adaptation, as was previously assumed by sociologists referring to the culturally different as the traditional society, but such difference may actually prove to be an enhancing factor of adaptation.

Cultural difference must be contrasted with the phenomenon of cultural deprivation. In this context, cultural deprivation is defined as the alienation of groups, or of individuals, from their own culture. An individual who has not been exposed to MLE or could not benefit from it is marked by low modifiability and a limited propensity to benefit from direct exposure to stimuli and events. Even when culturally deprived persons are better equipped linguistically and with other skills required by the new dominant culture, their adaptation is far inferior to that of the culturally different. Often, the culturally deprived are born within the dominant culture, living side by side with the socializing and educational agents of this majority culture. Yet they are totally unaffected either by this proximity or by the attempts to orient them to adaptation.

A good illustration is the story of R whose parents were highly cultured people involved in the arts. Their excellent financial status enabled them to travel and to provide a very rich and highly stimulating environment for their children. None of their children, however, was able to benefit from this rich world of informal learning opportunities. Furthermore, they were even less prepared to make use of their school experiences. One of them, R, was declared mentally defective – a diagnosis that was disproved by our dynamic assessment. Other children of the family were considered learning disabled, differing among themselves only in the degree of severity.

The author was able to trace this condition to a family constellation that obstructed the parent-child mediational interaction to the extent that it left the children alone in the exciting world in which they lived. They were unable to utilize their family experiences beyond the immediate gratification they were provided. Thus, at the age of fifteen, when R was asked to say something about the many countries he had visited, not only was he unable to name the countries, but he could not even remember, except for some rudimentary recollection, where he had been or with whom. This was his condition despite a good memory as revealed by dynamic testing. Further, R could not distinguish one place from another and could not relate places to times of visit. It became clear, and the parents confirmed, that these cognitive parameters were never discussed with the children before, during, or after the visits. This was also true for many other experiences that left no traces in R's repertoire. At the age of fifteen, for example, R could not relate ice, water, and steam as the three conditions of matter (solid, liquid, and gas), and considered them as isolated, disparate substances. The author was so surprised by R's ignorance that he reacted insensitively," regretfully hurting the boy's feelings. This incident clearly shows how little we adults, teachers, and parents are aware of the gaps, not only in knowledge, but, even more, in the prerequisites of learning that are necessary to turn experiences into effective tools for further learning.

Years later, when interviewed by a journalist, R recalled this episode: "I had seen ice turning into water, and water into steam, and yet couldn't see them as products of the transformation process of one and the same matter." R unwittingly described the characteristic shared by many of the culturally deprived. That is, an episodic grasp of reality makes the individual passively experience the perceived stimuli without relating them to either what has preceded and, even less, to what is expected to follow. An episodic grasp of reality makes learning from experience, with its subsequent changes in

the individual's cognitive structure, almost impossible. Individuals or groups that have been offered MLE or received cultural transmission have been equipped with effective modes of perceiving and elaborating their perceptions. This permits them to learn to generalize by actively linking their various life experiences through comparing, coding, and decoding them, by summing up the times of their occurrence, by relating them to the time and space of their occurrence, etc. Out of this linking process, concepts, categories, classes, series, codes, symbols, causal relationships, ideological relationships, and other hierarchically higher levels of functioning are derived. Their origins cannot be traced back to the sole and direct interaction between the organism and sources of stimuli. Rather, all these modes of mental acts have their origin in socially determined, human-based mediational interactions. In the posthumously published writings of Vygotsky (1997; Vygotsky and Luria, 1993, see also Wertsch 1985; Kozulin, 1991), the social process is seen as crucial to the development of human mental activities.

No matter how extreme the difference between culturally different individuals and the cultural environment in which they live, they will be able to learn the new culture and adapt to it by capitalizing on the attitudes, dispositions, modes of focusing and search they have acquired through MLE. In their study of cognitive profiles of different ethnic groups, Lesser, Fifer, and Clark (1965) bring indirect evidence of the difference between the culturally different and the culturally deprived. Members of the culturally different group have profiles that commonly identify a high percentage of the group's population. This relatively strong identity is also marked by a higher level of cognitive functioning. In contrast, the culturally deprived group has a very limited number of people with identical profiles. By the same token, they have a very low level of functioning. The Yemenites, for example, who have developed a very strong identity as a culturally different group, have proven to have had a tremendous influence on Israeli cultural development. Their contributions to music, dance, fashion, and culinary arts have been eagerly accepted by the more advanced and more veteran members of the dominant culture. This Israeli example proves that the dominant culture has accommodated itself to the Yemenites by its assimilation of these cultural values. The integration of culturally different individuals is, of course, strongly contingent upon opportunities they are offered to respond to the strong need to adapt and the pull exerted on them by an advantaged model of the culturally dominant group.

Opportunities for educational and occupational mobility are necessary for cultural accommodation. Whenever they exist, the culturally different group will take advantage of them. This is not always the case with culturally deprived individuals. Devoid of the prerequisites of learning, due to the lack of MLE and cultural transmission, the culturally deprived person often is unable to identify the new goals that life in the more advantaged and higher functioning environment offers. Furthermore, the culturally deprived person is not inclined to identify with these goals. A host of cognitive deficiencies are responsible for this person's limited capacity to benefit from the opportunities to learn, to change, to increase the repertoire of adaptive behaviors and to apply them to situations, such as those produced by immigration, or by radical changes in occupational, social, and even moral lifestyles. Such cognitive deficiencies include the lack of future, anticipatory, planning behavior; the lack of need for logical evidence; a limited capacity to define problems and inner and outer sources of disequilibrium; the lack of comparative behavior that would permit the distinction between the familiar and unfamiliar, the known and the unknown, and the advantages and disadvantages of

certain behaviors; the lack of a capacity to create systems of priorities consonant with more meaningful needs; the lack of use of several sources of information; the inadequate control over one's behavior, making impulsivity the most modal behavior of the individual; a limited representation leading to reliance on the immediately perceived, and the lack of orientation toward using the past and future as sources of guidance for present behavior; a cognitively determined egocentricity; and other deficiencies (see a List of Deficient Cognitive Functions in the Appendix).

As long as culturally deprived individuals continue to live in a familiar environment that they have mastered by over-learning (and by being born into), they may not show signs of disadaptation. The real problem for the culturally deprived starts when the environment requires more than very limited adaptation, when they cannot survive without change. It is then that the deficient functions, resulting from a lack of MLE, have their negative impact and create conflicts whose solutions may not be adequate. Drastic changes in environment through migration or the need to shift from an overlearned, routine, mechanically mastered activity may bring with them states of extreme disadaptation because of the incapacity of individuals, devoid of the prerequisites of learning, to acquire the necessary new skills for their adaptation.

These situations are well known for both children and adults in recent historic occurrences of large-scale migration. In many countries with high technological and educational levels, new immigrants appear unable to cope, and therefore react in ways that have become detrimental both to themselves and to the absorbing society. The author was confronted with the problems of such an ethnic group that came to Israel. (For obvious reasons, the author will disclose neither the name of the group nor its country of origin.) When placed in instructional, educational, and social situations shaped by the dominant culture, the difficulties manifested by the group were so great that strong negative stereotypes emerged regarding the normalcy of the members of this group in terms of their IQ, intelligence, and the integrity of their central nervous systems. In the prognosis for their adaptation and the possible effects of education, some members of the dominant society asked: "Are these people educable?"

A group of psychologists examined 300 children belonging to this group with the Bender-Gestalt test. On the basis of the very low test results, the professionals seriously considered the possibility of minimal brain damage or a certain degree of immaturity of the central nervous system in the children. The author was able to reject this notion by pointing out that an investment in the nature of a mediational interaction on the part of the examiner succeeded to a large degree in wiping out the traces of the hypothesized "minimal brain damage" in many of the cases discussed. Nevertheless, the difficulties manifested by the group were pervasive and affected the children's personalities and emotional states. Extreme levels of anxiety were observed on a behavioral level, as well as subclinically as indicated by Rorschach and other types of observations. A deeper analysis of the deficiencies revealed the cognitive origin of this anxiety that rendered these individuals totally helpless in the confrontation with the new reality. The children could not perceive the character of this new environment, or see what in it was common or different from what was already known. They were rendered unable to anticipate or predict the outcome of their behavior and were, therefore, in a state of cognitive "blindness." Many of the inadaptable reactions that characterized the members of this particular group were attributable to their state of cultural deprivation.

This ethnic group became alienated from its own cultural patrimony. Historical reasons were responsible for the social disorganization and the disruption of traditional

social processes. Societal agents, who had previously been charged with fulfilling the role of social and cultural mediators were no longer effective. Internal migration, the loss of the extended family's support, and the limited capacity of the nuclear family to supply mediational needs, interrupted the processes of mediation and cultural transmission necessary for cognitive and emotional development of the children.

It took time and a meaningful investment from both the planners of integration and the leaders emerging from the group itself to reorient the group toward its past, its cultural mores and values. After this occurred, a very meaningful change became apparent in individual members of the group. Today in Israel, this group has become one of the most active agents in leading a revival and revitalization process of its own ethnic culture. Pride in their ethnicity has positively affected the ability of individuals to integrate into the dominant culture as members of their own culture. The current impact of this group on Israeli society surpasses even that of the Yemenites.

In this context, another example worthy of mention is the Native American, particularly the Navajo, with whom the author and many of his colleagues have had the opportunity of working. The preservation and enrichment of their culture and language are seen by native peoples as hinges upon which their survival and integrity exist. On the other hand, there are the policymakers and theoreticians who believe there is a diametric opposition between the American and Indian cultures. They hold that the "Indian ways," cultural values, tribal history, and language must be sacrificed to usher the Native American properly into contemporary American society.

In effect, the denial of value, the loss of orientation toward the nation's past, the rejection of its language and symbols constituted a real depletion of the internal identity and readiness of the Indian youth to identify. The degree of cultural deprivation observed on the reservation was certainly extreme. Some of the group's leaders, becoming aware of the role of MLE in the development of cognitive processes, perceived the extremely negative results of the lack of MLE in the cognitive, social, and emotional condition of the Navajo reservation's youth, in their low level of performance, in their trend to drop out of school, and in their lack of need for adaptation manifested in the proliferation of alcoholism, drug abuse, and juvenile suicide (known to be very high among these young people). A few of the Navajo nation's leaders have adopted the philosophy and theory of Structural Cognitive Modifiability in general, and MLE in particular, as a way to enhance the cognitive and affective condition of their children and, by the same token, they use the theory of MLE as the rationale for reviving the cultural patrimony of the Navajo nation (Emerson 1986; 1991).

MLE has been deemed the most effective theory and applied system to reorient both Navajo juveniles and adults, to offer a legitimization to reinstating the native language ("dena") as the language of instruction, to turn to history as a source of identity and, as some of them put it very clearly, "to become better Americans by being good Indians." Members of the Native American community face a variety of general problems that they hope to approach through an application of the theory of MLE. First is their desire for the community control of education with the right to reinstitute the Indian language in schools. Self-determination in schools involves decision-making authority over academics, instruction, student guidance and activities, parental involvement, and fiscal and administrative matters. General community development, as well as tribal economic development, will also be affected by MLE programs that, among other things, teach management, analyses, decision among alternatives, projection of relationships, goal setting, planning, and goal achieving. Emerson (1996) summarizes the Native American

belief that culture and cognition are linked: "By singing our own songs, we can increase our chances for better and more comfortable lives for our youth and ourselves in the present and future society".

Some of the systems derived from MLE and its philosophy – the Learning Potential Assessment Device (LPAD) and the Instrumental Enrichment (IE) programs – have been applied in the Navajo community (Emerson 1991). Reports on the effects of the implementation of dynamic assessment, intervention for cognitive development, and MLE, though scarce, are highly encouraging. The interest in the adaptation of the theory and practices of MLE has been extended to other Native American groups in the United States and the Northern Canadian Territories. A number of these tribes are using the theory of MLE as a basis for lobbying for the right to institute their languages in their respective schools and to control these schools and the general education of their children themselves as a way to ensure cultural transmission.

Another group that has shown the impact of MLE in the most extreme way are the Jewish Ethiopians who started immigrated from Africa to Israel in the mid-1980s. This group displays the greatest distance from the dominant Israeli culture in many areas. Until recently, only a very limited number of Ethiopian Jews, also called Beta-Israel, were literate. Many of them had neither prayer books nor books of commentary for Bible study. The group's level of technology was extremely rudimentary, with shepherding and elementary agriculture as the main occupations. Their housing, simple clay huts, was primitive, as was their use of utensils. Despite certain significant differences among them, this was true for the majority of the Ethiopian Jewish population.

The fact that the Ethiopian group's entire identity and affiliation to Judaism was based on their origins dating back 2500 years created an almost unbridgeable gap between them and the current dominant Israeli culture. Yet, they were all but culturally deprived. They were culturally different from the Israeli culture, as well as from the surrounding Ethiopian culture, by virtue of very rich articulation of rites, mores, and styles that had been acquired through an elaborate process of mediation and cultural transmission. Illiteracy had made it totally impossible for this cultural transmission to go through impersonal channels, such as reading, writing, radio, or television. All cultural transmission had to be oral-aural, from mouth to ear. This situation probably has had a highly beneficial effect, however. The Ethiopian priest ("the kess"), the religious head of the community, would speak in front of a gathering for hours under the worst climactic conditions. Those among us who have seen children and adults listening, focusing on a speaker for hours without moving, without any sign of impatience, are aware of the effects of such an exposure on the attentional processes of individuals. Those who study the observable behaviors of Ethiopian children and adolescents are amazed by the richness and particularities of their style, which could not have been developed without intensive mediation, through observation, and by verbal and nonverbal MLE involving intentionality, transcendence, and meaning.

The power of the early mediational interactions in this African ethnic group is evidenced by the variety of styles and behaviors that are characteristic of the total Ethiopian Jewish community. These differ greatly from both the culture with which they were previously surrounded in Ethiopia, and even more so from the groups of cultural difference in Israel. The results of extensive testing of the Ethiopian children with the LPAD in its group form provide us with fascinating preliminary information on Beta-Israel (see Kaniel, Tzuriel, Feuerstein, Ben Shachar, and Eitan 1991).



The group LPAD (consisting of the following tasks: Raven Progressive Matrices; LPAD Variations I and II; Organization of Dots; Complex Figure; Organizer; Numerical Progressions and Figural Progressions) was administered to the 316 adolescents, average age of 15.7. In the experimental group, 75 percent of the population were girls; 25 percent, boys. Each of the tasks, except for the Raven Progressive Matrices, was administered in three stages: premediation, mediation, and post-mediation. The Raven was administered pre- and post- without mediation. Ethiopian adolescents of similar demographic characteristics served as a control group and received the same tasks with essentially the same procedure, but with no mediation between exposures.

Results obtained on these Ethiopians were compared between the experimental and control groups, as well as with data gathered from studies with the same tasks with culturally deprived and regular Israeli adolescents. Results revealed that in all tasks, the experimental group benefited from the mediation given them in terms of learning and transfer as compared to the control group. The performance level of the experimental group was similar to that of regular Israeli groups that had been dynamically assessed. Finally, results indicate that mediation changed the curve of distribution for all participants. Since most of the subjects performed very well in the post-mediation phase, it seemed impossible to predict post-mediation performance from premediation scores. The correlation between the pre- and the post-test was low. The high level of modifiability evident in the results of the assessment left little doubt that the Ethiopian population was culturally different and not culturally deprived.

Indeed, the readiness and propensity to learn revealed by the Ethiopians' performance has become renowned in Israel; it is described by all persons who have worked with them. Educators claim they have seldom seen a group that has acquired literacy so rapidly despite its previous little, if any, exposure to symbols and signs. Despite the fact that the Ethiopian Jews immigrated after decades of oppression, and underwent harrowing trials and unbelievable suffering on their way to Israel – which some have equated with the experience of the Holocaust – they have shown considerable resilience and readiness in order to adapt to the requirements of the open Israeli society with its constantly changing technology. Their adaptation has not been a matter of merely narrowing a gap, but of making a major, difficult transition from a rural, traditional, closed society whose theme was survival, preservation of the status quo, and transmission of culture intact from one generation to the next.

The Ethiopians' social mobility, based mainly upon the acquisition of the repertoire of basic school skills, of information necessary for solving their problems, of modalities of functioning that respond to the requirements of the society in which they live, has made many of these extremely different children accede to levels of functioning that would have been totally inaccessible to them without the deep changes they underwent. However, the modifiability they displayed in learning to read and write, in acquiring the basic school skills and the operations of mathematics became a source of disappointment once difficulties were revealed in their adapting to higher mental processes, such as abstract thinking. What went wrong in the Ethiopian children's development?

Teachers, educators, and caregivers had wrongly assumed that the same rapidity and efficiency the Ethiopians had shown in the acquisition of basic school skills would continue with the same rhythm and ease in areas of conceptualized abstract thinking without requiring further intervention. This erroneous assumption did not consider the

need of the culturally different to receive mediation in areas that are not constructed by the process of unfolding or maturation, but rather are the product of specific mediation without which they could not be acquired. The genetic view of development and the idea that formal operations develop as a natural result of the combined effects of maturation and active interaction with stimuli and experience have adversely affected educators. It was considered totally unnecessary and superfluous to mediate to individuals the need for logical thinking, the need for comparative behavior, the use of multiple sources of information, representation, and the need for inferential thinking.

In the case of the Ethiopians, it was falsely expected that once they mastered basic school skills, they would be able to accede (without any additional intervention in hierarchically higher cognitive functions and operations) to the types of thinking necessary for higher academic studies. To the great distress of all involved, however, from a group of twenty Ethiopians who had been given a year's preparatory studies for university entrance, only one student was able to pass the entrance examination. The preparatory studies consisted of content knowledge. The failure of the university candidates made some of the policymakers involved in the education planning question their previous assumptions about the group members' intelligence and their potential for higher education.

The University Student Counseling Services, alerted to the problem, took upon itself a project of promoting cognitive abilities and facilitating the absorption processes of the Ethiopian students. Each student received the IE program twice a week, with additional enrichment specific to the demands of the university. As a result, of the fifteen students who finished the new preparatory program, nine were accepted to regular university studies. It was necessary for the others to receive additional intervention before they could be accepted. As the director of the Student Counseling Services stated, "We believe that one of the major factors in the matrix of their studies which resulted in the increase in the students' level of achievement was Instrumental Enrichment" (Kron 1986).

The culturally different, even though modifiable, need to become equipped with conceptual, relational, operational, and linguistic tools that are not currently in their repertoire in order to succeed in their adaptation to the dominant culture. Once such a systematic investment is made, however, structured cognitive modifiability, which is the result of early MLE, permits the individual to benefit rapidly.

## **SUMMARY AND CONCLUSION**

In conclusion, we would like to review what we previously presented in this chapter and briefly discuss some of its implications.

First, we attempted to outline the elements with which a theory of intelligence should deal, and to describe some of the components with a certain amount of detail. In defining intelligence, we proposed to relate to intelligence as to a dynamic process rather than as to a reified entity and a set of disparate more or less defined factors. In this sense, intelligence becomes the process of adaptability itself. It includes a large variety of modalities of adaptation, whose orientation may be either positive or negative, depending upon the context and differential goals of the adaptation.

We then discussed at some length the origins of human modifiability as compared to the adaptability of other existences (e.g., animal) and described the concept of Mediated

learning Experiences (MLE) as fulfilling two different roles. The first is explicative; the second, heuristic. MLE is thus the pivotal element of our theory and forms the basis for the applied systems derived from the theory of Structural Cognitive Modifiability: the Learning Potential Assessment Device (LPAD), Instrumental Enrichment (IE), and the shaping of modifying environments. These three applied systems represent a succession of steps derived from the belief that the human being is indeed modifiable and that MLE plays a key role in the evolvement of the human being's flexibility and plasticity.

The LPAD basically relates to the question of modifiability and its evaluation. Our reasoning suggests that, if indeed modifiability does exist and is accessible to a great number of individuals, then one must be able to evaluate it. We do not seek to measure it. The LPAD is based on a test-mediation-test model. In the first stage, a baseline is established. In the second stage, intervention is focused and aims at producing specific or general changes. In the course of all three phases, the process of change, rather than its product, is evaluated and used to answer a number of questions concerning the particular individual:

- Is the individual as modifiable as the general postulate claims?
- Are differential levels of modifiability contingent on the individual's condition, the baseline, and a variety of other determinants, such as the amount of MLE to which the individual was exposed?
- What is the nature and extent of changes one can hope for?
- What is the nature and quantity of mediation necessary to produce long-term and permanent desired changes?

The LPAD is oriented toward establishing a profile of modifiability and determining the preferential modality by which this modifiability can be materialized. Indeed, it has proven to be a very useful tool in the attempt to change not only individuals, but systems as well.

As its major goal, the IE program seeks to increase the modifiability, plasticity, and flexibility where inadequate because of the lack of MLE of general or specific nature. (See Chapter Three in this Reader). It is important, however, to mention that this intervention program aims at developing the prerequisites of learning and correcting deficiencies in cognitive functions and operations. It provides a phase-specific substitute for insufficient or ineffective MLE. Its 300 hours of paper-pencil exercises are essentially non-content-specific and seek to transform the learner from a passive recipient of information to an active generator and projector of relationships. The material is taught three to five hours weekly over a two-to-three year period by teachers who have been specially trained as IE mediators. Positive results have been obtained in many of the 500 studies conducted across a broad range of populations and in a large variety of settings. The follow-up studies that have been carried out indicate that the modifiability that has occurred through this program is indeed structural in nature, as reflected in the permanence of the results and the divergent effects of the program manifesting itself in the continuation of its effects, after the cessation of the program.

Finally, the shaping of modifying environments is the third area derived from the theory of Structural Cognitive Modifiability and its pivotal element, MLE. This development of our program is rather recent and we are now striving to create a conceptual framework to outline the principles, rules, and nature of a modifying environment. It sets out to capitalize on the individual's unveiled modifiability, as evaluated by the LPAD and increased by the IE, in order to continue to modify the individual in the most adequate and desirable way.

It would be superfluous to say that not all environments can modify the individual; nor do all of them attempt or mean to do so. The successful unraveling of an individual's modifiability and its increase through the LPAD and IE may be without consequence or value if one does not ensure that the environment itself produces in the individual the need system that will make modifiability and its subsequent adaptability a survival social need. The search for means of ensuring the shaping of a modifying environment becomes extremely important.

As we have said elsewhere (Feuerstein and Hoffman 1982), MLE is the imposition of a culture that creates in the individual powers of adaptation in response to the needs present in the environment. Thus, it is MLE that is the interaction that ties together the three applied systems that are oriented toward the generation of human intelligence through the realization of the human propensity to change. Beyond this, we consider MLE to be a crucial determinant in human existence. The motive that is responsible for generating MLE as a modality of inter- and intra-generational interaction is clearly the need of human beings to see their existence continued beyond their limited biological life. This motive, often hidden, acts on the individual as well as the group level, where it appears as an explicit and clearly stated motive. Survival as an individual entity is paralleled by the survival of one's cultural identity. It is only through this motive that mediational interaction on the individual level and cultural transmission on the group level will find the means by which the mediation necessary for survival will be activated. This need generates concern for both the physical and spiritual nature of the human and guarantees the emotional, cognitive, and active involvement of the older generation in its progeny's future. This involvement projects itself from the depths of the past to the future of humanity. If, indeed, MLE has such an impact on both the life of individuals and on their emotional and moral engagement toward their progeny, then many changes may have to be produced in our way of organizing society, so as to create optimal conditions for mediational interactions. We may have to revise the idea of intergenerational discontinuity and counterculture in favor of a strong planned and controlled linkage between generations, particularly when life may tend to steer generations apart. In the modern world, there may have to be a different approach to instructional, educational, and social organization to create greater opportunities for intergenerational interaction and cultural transmission.

## REFERENCES

- Allman, W. F. 1989. The first humans. *U.S. News and World Report*, February 27, 52-59.
- Beck, R. H. 1965. *A social history of education*, Englewood Cliffs, N.J.: Prentice-Hall, 97-99.
- Bergson, H. 1956. *Matière et mémoire: Essai sur la relation du corps à l'esprit*, (1919). Paris: Press Universitaires de France. 54th ed.
- Detterman, D. K. and Sternberg, R. J. Eds. 1982. *How and how much can intelligence be increased?* Norwood, N.J.: Ablex.
- Eisenstadt, S. N. 1964. *The absorption of immigrants*. London: Routledge & Kegan Paul.
- Emerson, L. 1986, August. Feuerstein's MLE and American Indian education. Paper

presented at Mediated Learning Experience International Workshop. Jerusalem, Israel.  
Emerson, L. 1991. MLE and American Indian education. In R. Feuerstein, P. Klein, and A. Tannenbaum, Eds, *Mediated Learning Experience: Theoretical, psychosocial and learning implications*. Tel Aviv and London: Freund.

Feuerstein, R. and Hoffman, M. B. 1982. Intergenerational conflict of rights: Cultural imposition and self-realization. Viewpoints in Teaching and Learning, *Journal of the School of Education* 58, no. 1.

Gardner, H. 1983. *Frames of mind: The theory of multiple intelligences*. New York: Basic Books.

Garrett, H. E.; Bryan, A. I.; and Perl, R. E. 1935. The age factor in mental organization. *Archives of Psychology*, no. 176.

Hebb, D. O. 1949. *The organization of behavior*. New York: John Wiley & Sons.

Hunt, J. McV. 1961. *Intelligence and experience*. New York: Ronald Press.

Jensen, A. R. 1987. Psychometric g as a focus of concerted research effort. *Intelligence* 11, July-September: 193-98.

Juliebo, M. F. 1985. The literacy world of five young children. *Language Arts* 62, no. 8: 848-56.

Kaniel, S.; Tzurriel, D.; Feuerstein, R.; Ben Shachar, N.; and Eitan, T. 1991. Dynamic assessment: Learning and transfer abilities of Ethiopian immigrants to Israel. In R. Feuerstein, P. Klein, and A. Tannenbaum, Eds, *Mediated Learning Experience: Theoretical, psychosocial and learning implications*. Tel Aviv and London: Freund.

Klein, P., and Feuerstein, R. 1985. Environmental variables and cognitive development. Identification of the potent factors in adult-child interaction. In *The at-risk infant*, ed. Sh. Harel and N. J. Anastasiow. Baltimore & London: Paul Brookes Publishing Co.

Kozulin, A. (1990). *Vygotsky's psychology: A biography of ideas*. Cambridge, MA: Harvard University Press.

Kron, T. 1986. *Personal communication*, November 5.

Leemann, R. A. 1989. December 7. Aspekte das menschliche denken. *Neue Zurichser Zeitung*, p. 22.

Lesser, G. S.; Fifer, G.; and Clark, D. H. 1965. *Mental abilities of children of different social class and cultural groups*. Chicago: University of Chicago Press for the Society for Research in Child Development.

Minick, N. 1987. Implications of Vygotsky's theories for dynamic assessment. In *Dynamic assessment: An interactional approach to evaluating learning potential*, ed. C. S. Lidz, 116-38. New York and London: Guilford Press.

Piaget, J. 1970. In *Piaget's theory in Carmichael's Manual of child psychology*, ed. P. H. Mussen, 703-32. Vol. 1. New York: John Wiley.

Rosen, H. 1986. Series of articles on Ethiopian immigrants. Jerusalem: Hadassah Council in Israel.

Sameroff, A. J., and Chandler, M. J. 1975. Reproductive risk and the continuum of caretaking casualty. In *Review of child development research*, ed. F. D. Horowitz, 187-244. Chicago: University of Chicago Press.

Scheffler, I. 1985. *Of human potential: An essay in the philosophy of education*. Boston, London, Melbourne, and Henley: Routledge & Kegan Paul.

Sternberg, R. J. 1985. *Beyond IQ: A triarchic theory of human intelligence*. New York: Cambridge University Press.

Sternberg, R. (1997a). *Successful intelligence*. New York: Plume.

- Sternberg, R. (1997b). *Thinking styles*. New York: Cambridge University Press.
- Vygotsky, L. (1934/1986). *Thought and language*. (Rev. edition ). Cambridge, MA: MIT Press.
- Vygotsky, L. (1997). *The history of the development of higher mental functions*. New York: Plenum Press
- Vygotsky, L. and Luria, A. (1993). *Studies on the history of behavior*. Hillsdale, N.J.: Erlbaum.
- Wertsch, J. (1985). *L.S.Vygotsky and the social construction of mind*. Cambridge, MA: Harvard University Press.

## *Review Questions*

1. *What is the role of MLE in respect to human intelligence?*
2. *What is the relationship between MLE and the direct learning?*
3. *What is the role of MLE as a proximal factor of cognitive development?*
4. *List the universal criteria of MLE. Why are they defined as universal?*
5. *What is the difference between “cultural difference” and “cultural deprivation”?*