# Preventing the Deterioration of Cognitive Functions in the Elderly

*A Resource Book for Planning and Implementing Programs for Improving the Mental and Life Conditions Of the Elderly Population at Risk*

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# Introduction

This book is designed to help those interested in planning and implementing programs to improve the cognitive functions of the elder population, to prevent deterioration and loss, and to improve the qualities of their lives. It presents the rationale—why to do it, describes the needs of the elderly populations to which the program should be addressed, the scientific support for the efficacy of the approach, and the methodology (strategies) to bring programs into actuality. The material is organized to provide both technical information and structural suggestions for creating awareness, selecting populations and venues for implementation, and the planning of activities—what should be taught, how to create learning environments, how to schedule and plan sessions, how to train and support program providers, how to integrate aspects of the program into care giving environments, and how to organize the needed financial resources. We envision that you will use different parts of this book at different times and for different purposes.

The program that is proposed rests on the application of the Feuerstein Instrumental Enrichment (FIE) program, and the provision of mediated learning experience (MLE) as the mechanism for interaction. Both will be described in this book, as they are central to the approach of cognitive intervention and modifiability to respond to the needs of the elder population.

**Rationale:** At the outset, one must ask why do we focus and define the program and methods as we do? There are a number of reasons that will be addressed in this resource book. Of course there are the demographics—the large number of older individuals in the population, with a variety of needs to be met. Then there is the growing knowledge about the value of cognitive development to both improve thinking and general functioning, and the capacity of the brain to be changed by exposure to stimulating experiences. The interventions proposed here represent a functional interface, connecting the potential for prevention of the deteriorative effects of aging with the emerging technology. One can conclude that the time is right for an integration of purpose and potential.

The revolution in the brain sciences has created a number of new understandings of the potential for ameliorating conditions for diverse populations, including the elderly, experiencing normal developmental changes as well as significant and observable cognitive deterioration. A first point of focus is the connection between what is known about the potential for altering the structure and function of the brain in response to conditions of external stimulation (what has come to be called *neural plasticity*), and the theory and practice of structural cognitive modifiability (SCM) as developed by Professor Reuven Feuerstein (Feuerstein, Feuerstein, Falik, and Rand, 2006; Feuerstein, Feuerstein, and Falik, 2010). The theory of SCM—that was formulated well before the clear evidence for neural plasticity was available—provides an engine for the kind of stimulation that promotes neural plasticity. The existence of neural plasticity has direct implications for a number of potential and needed interventions, with a diverse range of populations. For the elder population, the relevance is critical.

# The Needs of the Elder Population

What are the needs to which cognitive modifiability and neural plasticity can be directed? There are two foci: the more "normalized" experiences of those individuals whose life situations take them away from the intellectually stimulating demands of life, into a "retirement" from the requirement that problems be solved, the need for planning and selecting stimulating choices, and coping with the "stresses" of life. For these individuals, there are the inevitable consequences of physical aging, experienced as forgetfulness, losses of temporal and spatial acuity, perhaps leading to more significant mental and physical losses that may be exaggerated by the conditions of aging. We will describe this more fully below. The second focus is on those who experience specific physical and mental losses due to the aging process, including those due to specific deteriorative conditions (such as Parkinson's, Alzheimer's, and dementia). In both cases, there are early stage signs that can be considered risk factors. However, it is no longer necessary to consider these risks immutable, or unresponsive to interventions that change the conditions that they occur within.

Thus arises the positive and proactive potential to respond: programmatic responses to the conditions and potentials described above. In this instance, the Feuerstein Instrumental Enrichment (FIE) program is proposed, adapted and conveyed to the elderly—herein referred to as the Feuerstein Instrumental Enrichment Program for the Elderly (FIE-E).

Before describing responses and programs for prevention of deterioration in the elderly, it is useful to review the needs of the elder population to which they are directed. The elderly population at risk can be defined in three ways:

(1) **Gradual Mental Deterioration of Aging**: Those who show forgetfulness, loss of memory, lack of sustained focus, limited temporal and spatial orientation—noticed by self and others. This can be considered a "natural" process of aging, usually has a degree of awareness of their condition and some anxiety regarding associated with it, and is often accepted with a kind of complacency—"after all, one gets old, what can one do about it?" Self confidence recedes, options in the world begin to be viewed through a pessimistic prism, and in this condition one looks back at what one could do before physical and mental acuities declined.

(2) **Lack of Exposure to Mentally Stimulating Activities/Demands**: However, once made aware of potentials to respond positively, to engage in activities that promote increased engagement and comfort with the world in which they live, it is not difficult to stimulate motivation and interest in taking actions that can improve their condition or avoid the development of deleterious effects. There are many such elderly individuals making these choices. This level of risk is not pathological in its initial phases, but can become so if the processes of gradual loss and disengagement are experienced over time or in response to limited or

restricted environmental conditions. The risk is isolation, discouragement, and eventual withdrawal into more severe conditions of deterioration.

(3) **Natural Consequences of Life Changes:** These can be considered the unintended consequences of changes in life conditions. Here we identify those of advanced age whose career or life activity has shifted away from the demands of employment and compelling decision-making activities, either by choice or unavoidable circumstance. For either reason, these individuals are no longer engaged in the need for energetic planning ahead, selecting intellectually demanding activities, coping with the demands and stresses of life as they were accustomed to, and they experience a lack of need (and interest) to invest energy and engagement with the stimulating world they were previously invested in.

There are many examples of this condition: the need to budget time and money, make comparative decisions about purchasing material items or selecting vacation venues, planning how to use limited time to accomplish needed goals--all of these and many others no longer have the primacy in life structure, and reduce the need to make decisions, think about consequences, keep the mental condition "honed and ready." This condition is often subject to self-awareness and the concern of other--think of the many "retirees" who feel as though they have too much time on their hands, quickly tire of the supposed dream routines of retirement. We have met many who complain that "there are only so many golf games I can play, or so much hunting a man can do in his life" and who envy the activities and decisions that other younger individuals must make. Many who enter protected environments, such as residential facilities for the elderly, in order to have physically comfortable living situations, encounter these conditions as a consequence of their sequestered existence.

**How to Meet These Needs:** The innovative thrust of this approach to meeting needs such as described above is through the stimulation and activation of *cognitive functions*. The FIE-E program is based on a theory and more than 50 years of positive experience helping individuals overcome deficits and enhance functioning through the development of representational thinking and mental imaging. That is, when thinking, planning, strategizing, and creative problem solving are emphasized in activities, done systematically and applied through the application of mediated learning experience, a change process occurs-- *cognitive modifiability*. There is both an extensive research base supporting this process, and the evidence coming from the new neurosciences, evidencing the neural plasticity of the brain that further justify this approach. Using this framework, the needs of the elderly population can be met through several strategic activities, that are often recognized as being needed but often not systematically mobilized. Among them are:

- Enhancing the mental quality of life of the elderly individual, by

- Preventing or overcoming effects of mental deterioration.

- Enriching the verbal interaction of the elderly client through creating conditions of verbal interaction centered about "cognitive" processes.

- Extending the range of awareness (time and space) of the client through mental activities that broaden consciousness, initiative, and independence.

- Recovering lost functions by identifying elements of focus from observations or formal assessments (diagnoses).

- Overall improvement in the quality of life through increased stimulation,

- Engagement in tasks and interactions that are interesting, challenging, and considered worthwhile.

## Promoting Cognitive Modifiability in the Elderly

How to accomplish these outcomes? A number of critical elements have been identified in the neurophysiological research that have been shown to promote neural plasticity (Kliem and Jones, 2008), and have direct implications for positive efforts to develop programs to improve the quality of thinking, awareness, and social responsiveness in the elder population.

The provision of mediated learning experience (MLE), through exposure to the Feuerstein Instrumental Enrichment (FIE) program, adapted and presented with special regard for the needs of the elderly (that we will differentiate as FIE-E) is proposed as a relevant response to improving cognitive functions. Later in this publication we will describe the FIE-E program in terms of how it addresses these elements through its structure of activities and methodology of presentation, and provide a linkage that demonstrates the effectiveness of the FIE approach to meeting the needs of the elderly population—for prevention of deterioration, deceleration of the experience of loss, and ultimately the restoration of lost functions.

**Elements that Promote of Neural Plasticity:** There are many aspects of cognitive functioning that can be mobilized to help the elderly person maintain and overcome the normal and pathological effects of aging. The research in neural plasticity has identified ten elements that have been shown to produce cognitive modifiability of behavioral and neural processes. We have added two of our own based on clinical observation and empirical data. When these are reflected in interventions, they provide stimulation for the recipient that is both intriguing and enticing (of attention and further engagement—on the part of the elderly). Each of these are presented in a systematic, intensive, and mediated way, and have been shown are to promote and support the changes in neural functioning related to behavior changes. They have direct implications for interventions for

the elderly:

- ❖ *Activation*: requiring active perceptual and motor participation

- ❖ *Specificity*: interventions are related to specific cortical functions

- ❖ *Repetition*: activities must be repeated, for assimilation; but also varied to provide stimulate the capacity for adaptation to new situations for transformations)

- ❖ *Intensity*: exposure must be intensive, over longer periods and extended duration to become established in the neural structure

- ❖ *Novelty*: activities must be new and challenging; tasks that are over-familiar do not stimulate the changes creating neural plasticity

- ❖ *Persistence*: different forms of plasticity occur at different time and pace, thus requiring continued and repeated efforts over time to secure effects

- ❖ *Salience*: the stimulation must be meaningful and relevant for the learner

- ❖ *Optimal Timing*: while the individual is modifiable at all ages, certain stimulation is more optimal at certain ages and developmental levels, and thus stimulation must recognize and calibrate interventions accordingly

- ❖ *Spread of Effect*: changes in functions from one intervention will affect other areas not initially targeted, leading to a transference of learning and behavioral responding

- ❖ *Selection*: activities must be selected to stimulate existing and needed cognitive functions, and adapted to observed changes in behavior

- ❖ *Consciousness/Awareness:** the learner must be aware of the effect of functions on behavioral outcomes, and this awareness serves to reinforce other changes in functioning. It also creates engagement, and a willingness to accept frustration and the need for increased effort in response to stimuli and situations.

- ❖ *Multi-Sensory Stimulation:** the tasks should require perceiving and responding to stimuli from many different, but intersecting, modalities. Seeing, hearing, feeling, and doing creating a participation with the input information that leads to structural integration and generalization.

(* Added by us—not in the Keim and Jones research summary)

# Ways in Which the FIE-E Program Stimulates Neural Plasticity

**Structural Elements of the FIE Program:** The main goal of the program is to enhance the modifiability of the human organism, achieved through (1) correcting deficient cognitive functions, (2) acquiring the basic concepts, labels, and operations of thinking, (3) producing intrinsic motivation through habit formation, (4) creating of task-intrinsic motivation, (5) producing reflective, insightful, introspective learning, and (6) transforming the learner from a passive recipient of experience to an active producer of new learning experiences. Structurally, these goals are achieved through the incorporation of a number of content and process elements, which can be related to the neural plasticity elements described above:

*1. Diversity of functions*: FIE presents a mosaic of mental tasks and grapho-motor activities to enhance mental functions. Tasks and activities are selected to present a variety of cognitive functions involved in the mental act. The use of multi-modalities responds to criteria for neural stimulation within the context of activity-based neural plasticity. Moreover, the explicit focus on developing cognitive processes (concepts and strategies) in relation to well-defined mental operations addresses the specificity effect and creates potential for the *spread of effect* (transference).

*2. The selection of activities/tasks that are not related to specific content, but offer potential for generalization and relationship to diverse content:* The mental tasks and grapho-motor activities are comprised of content that is general, requiring minimal specific information, and allow for generalization. By orienting the content in this way, the focus of learning is on more generalized concepts and problem-solving strategies that can then be flexibly and innovatively applied to a wide range of current and anticipated experiences. Selection of tasks is an important aspect of the program's structure, as it both focuses on specific cognitive and neural functions (the *selection effect*) and projects to realistic applications and experiences in the learner's world (the *spread of effect, consciousness/awareness*).

*3. Identifying principles and concepts around which activities are oriented and embodied in diverse types of tasks:* The identification of a learning principle or concept makes the learning cognitive. Each task that is presented and mastered is related to what principle, concept, or vocabulary term has been identified— and serves as a basis for generalization and bridging (see below). The learning principle or concept is then made meaningful in the tasks selected for the instruments, and presented to the learner in different modalities (the *salience* effect), that then serve to offer opportunities to infer relationships from elicited principles or rules. From a focus on the learning principle, the learner analyzes what was learned, why it was learned, and how it can be applied according to the principle identified, creating a *spread of effect*.

*4. Repetition (of principles and rules) with variations in aspects of the task while maintaining the principle or rule across variations:* Repetition in FIE has two objectives: repetition for crystallization of functions, to build automatization of responses, and repetition for transformation, to create flexibility in applying the principle or rule to other instances of similar mental tasks, operations, or grapho-motor activities. This has been identified in the neurological research as critical for structural change and the maintenance of changes creating neural plasticity (the *repetition* effect). The holding constant of rules and concepts across repetitions is another important quality contributing to cognitive processes, stimulating transference and projecting meaning to increasingly divergent experiences (*spread of effect and salience*).

*5. Presentation of tasks organized in a functional/developmental hierarchy increasing from simple to complex and from concrete to abstract:*
The learner is exposed to tasks that vary in their complexity and abstraction, building to higher demands for understanding of structures, accuracy of responses, and ultimate generalization from the underlying principles embedded in the task. This progression contributes to *activation, specificity, repetition, and persistence,* all of which have been identified as crucial elements in the production and maintaining of neural plasticity.

*6. Identification of deficient and fragile/emergent cognitive functions as targets to which instructional and mediational interventions are directed:*
The program carefully identifies and differentiates (engaging the *specificity effect*) the cognitive functions that are potentially targeted for mediation within each unit and lesson of each instrument. As cognitive functions are built and/or strengthened, the exposure to tasks and the nature and focus of mediation is altered to reflect the changes and move the learner to higher levels of functioning. The program *selects* activities, presents them to the learner in a systematic and *persistent* (with *repetition* as we have described it above) manner, with continuous modifications based on observations, analysis of difficulties, and responses to mastery.

*7. Provision of mediated learning experience as a way to organize and act upon the information and data that is gathered:* The structure of instruments and the instructional interactions within the lessons are designed to expose the learner to mediated learning experience (MLE). The MLE within the instructional format of FIE includes systematically applied elements and is responsive to changes in the learner's functioning, and directed toward both the maintenance and elaboration of functions.

*8. Development of insightful, reflective thinking, and awareness of the processes and strategies of learning:* The ultimate goal of the FIE program is that the learner "thinks about" and acts upon what has been learned to apply to a diverse and generalized range of experience, beyond the immediate learning that occurs within the program. These qualities of the learning process insure a flexible and adaptive response to the demands of learning and life situations. This element, and the following, relates to the *transference, salience, and selection* effects that have been identified as necessary to produce and sustain neural

plasticity.

*9. Bridging from principles, concepts, vocabulary to specific and diverse content in academic, social, and vocational domains:* The activities of the program are mediated to related to specific aspects of diverse experiences. This element is structured into both the selection of activities and the way in which the lesson is presented *to the learner.* This ensures a *spread of effect* through the process of transference.

*10. What is learned is translated into activities directed related to the learned element — into problem-solving and elaborations involving diverse modalities of response, areas of content, etc.:* The learner is mediated to act upon what is learned and generate new behaviors and functions that go beyond the immediate and direct experience of the program, moving toward new, different, and more demanding experiences. The neurological research identifies this as a critical aspect of the producing and sustaining of neural plasticity.

## The Application of Mediated Learning Experience

Mediated learning experience (MLE) gives the activities of the FIE-E program very special goals and the means to achieve them. The goals are determined by the needs of the elder population, and are achieved by exposure to the activities (that we will describe in the next section). The application of MLE is guided by a series of parameters, or guidelines for presenting stimuli to the individual (activities, tasks, etc.), directing attention, developing awareness, reinforcing feelings of competence, encouraging engagement, planning ways of approaching or solving problems, and many others.

Our goal here is to provide a functional description of MLE so that the reader will envision how the FIE-E program is applied to the elderly, and its relationship to the activities and goals of the program. It has been well described in a number of publications (cf. Feuerstein, Feuerstein, Falik, and Rand, 2002, 2006; Feuerstein, Feuerstein, and Falik, 2010; Feuerstein and Lewin-Benham, 2012). We will briefly outline its main provisions, with specific reference to applications for the elder population (although it has been applied to a wide diversity of ages, needs, and venues).

Mediated learning experience (MLE) occurs when the provider (teacher, parent, or other intentioned and committed *mediator* poses him or herself between the individual (in this case the elder participant, or *mediatee*) and acts to influence the direct experience of that individual. The interposition serves to transform the stimuli according to the needs of the mediatee and the goals of the mediator – to make them more salient for the learner, to direct and focus attention, to broaden the meaning of the experience in time or space. The goals of MLE are to focus attention on relevant and important stimuli in the mediatee's environment, teach skills, reinforce new ways of responding, and the like. MLE creates three transformations– (1) the stimuli are changed in ways that make them more meaningful and interesting for the learner, (2) the learner is changed, acquiring

alertness, readiness, and a disposition to receive the changed stimuli, becoming more able to experience new ways of perceiving and responding, and (3) for the mediator who orients him/herself to the needs of the mediatee.

Twelve parameters of MLE have been identified to orient and organize interventions to bring about changes and/or to enhance the learning experience. These *parameters* guide the mediator to formulate interactions related to the observed and assessed needs of the learner. MLE is determined by the application (infusion) of three parameters (elsewhere we have termed them "universal") that make the experience *mediational*. When these are present and activated, other potential opportunities for mediation occur, and we have identified nine others that we term "situational"(although many more could be identified). Here we will describe the parameters briefly, and include some sample dialogues that illustrate how they are conveyed to the elderly participant in the program.

The first three parameters create the conditions for mediation and oriented toward general development, the comfort and focus of the learner, and creating cognitive structuring of what is learned. They are the foundational characteristics of MLE, determining whether the interaction is mediational.

*Intentionality and Reciprocity*: the mediator conveys a purpose and direction to the interaction, communicating what will happen, what will be done, and how it will be experienced. The interactions of the mediator are directed toward focusing attention and enriching the mediatee's environment. *"You are here to improve your memory. I will show you how to do it. You will see it working. We will do it through solving some unusual and enjoyable problems. You will be able to tell your children and friends about what you are learning and how you are learning it."*

*Transcendence*: this parameter relates to broader reasons and outcomes, conveying why the interaction is occurring, where it is going, and seeking extensions in time and space (*"...this is where we have been, this is where we are going, this is why we are going there. These problems you are solving will help you improve other things that are starting to get difficult for you...")*. The interaction directs the "here and now" experience toward the future, and looks back to the past. This parameter also encourages the learner to predict what will happen, relate to experiences that have occurred, and enriches the learner's "distance" from direct experience (*"I am showing you that you can discover your capacities...")* The mediator encourages generalizations and conceptualizations from the learner's experience.

*The Mediation of Meaning*: Meaning brings relevance and importance to the encounter. For both mediatee and mediator, this parameter infuses values, validates feelings, and provides the reasons for the interaction. This parameter brings the *"why do we do it"* into the encounter. The mediation of meaning creates a need—implicitly at first—to participate in the process, to feel a need for engagement, and leads to investment in trying new things, approaching difficult tasks, and taking "risks." *"This was an important part of your life, you did well with it, you developed many skills, ..."*

When the core conditions of MLE are established, the focus of mediation shifts to include *situational criteria*. As the mediator observes and assesses specific situations to which the mediatees repond there is the potential to direct mediation to specific tasks and activities that further the goals and objectives that have been identified and planned (often closely related to the structure and goals of the FIE-E program). The situational criteria that are selectively mediated are:

*Regulation and control of behavior:* This parameter is directed toward helping the learner to control behavior through focusing attention and responses, reducing impulsivity, and monitoring efficient and accurate responding. The elder learner often feels that they cannot control their motor or other actions, and when they do this within the context of the activities of the program, and then project it outward to activities in life, it is very encouraging and structures further learning.

*Feelings of competence:* This involves giving the learner feedback on those skills and achievements that have been experienced, and are within the learner's repertoire. *"What you just did shows that you can do it! You still have many important skills! Look at how rapidly, innovatively, etc. you just did that!"* We emphasize the "feeling" of competence, as a very important "non-intellective" factor in experience--often how we feel about ourselves is at variance with our actual skills and accomplishments. One of the most needed experiences for the elderly is overcoming the anxiety and feeling of vulnerability due to not being able to do what once was possible. *"What am I that I cannot do ___ anymore?"* Or, *"If I cannot do it, what value is it?"* Activities of the program can instill a renewed feeling of competence, especially if it is explicitly mediated.

*Sharing behavior:* Sharing means involving another individual in an experienced event, eliciting cooperation and empathy, formulating communications that invoke listening, attending, and doing activities that bring individuals together. The value of a group learning environment, or even having an individual mediator who is attuned to this parameter, creates conditions where relevance and meaning are experienced, being heard, understood, and engaged in a mutually experienced activity. *"You have explained well how you solved that problem, I really understand it, and want to try to do it as you did."* This is both a verbal and non-verbal experience.

*Individuation/psychological differentiation:* for the elder learner, the valuing of the individual's uniqueness, special qualities—even if they are different from "mainstream" performance or attitudes and values becomes of extreme importance. This is particularly true in today's fast moving world where the skills of the past are often devalued in the context of new technologies. Many older learners can rightfully claim valued status through their mastery of strategies or insights that the "younger generations" do not have, and cannot use well. *"I may not respond rapidly, but I am accurate, understand well, and have ways of solving the problems that work well for me. You show that you do not do as well as I in this way of working."* Even if one is lower functioning, they may be able to do things well compared to others who cannot do them.

*Goal seeking, planning, achieving and monitoring:* this parameter projects the learner into a representation of the future, and serves to organize and focus actions. This serves to mobilize engagement and create optimism with the demands of the environment that may have been avoided or seen as not relevant or achievable. *"Oh, this encourages me to try to do _____, can you get me some materials so I can work on _____? Let me look at what I have done. Is it good enough, or should I work longer on it and perhaps try it a different way?"*

*Challenge, novelty, and complexity:* mediation here helps the learner to approach, confront, and experience that which is unfamiliar, potentially stressful, or initially outside a sense of competence and comfort (*I cannot possibly do that, go there, etc., but if you will help me, show me some ways to do it, I think I can try!"*). Mediation within this parameter conveys an optimistic, comforting, and active approach with insight into what has been successfully encountered, how it was experienced, and its implications for further and future experience, making the individual again able to enjoy novelty. That which was foreign and threatening is less so as it is approached, worked with, solved, etc.—all in the context of mediation.

As these situational parameters are mediated, mediation can be directed toward changes in beliefs and attitudes, about self and others. This offers the potential to change how one feels about oneself and how one relates to others in his/her community. We have identified three such parameters:

An *awareness of the capacity to change* as the learner observes and accepts the potential for change, and integrates already experienced changes into an altered self-concept. *"When I solved that problem, and did it so well when I didn't think I could do it, I realized that I can change, and don't have to just accept the limits I thought I had no control over..."*

Closely related is the mediation of *the search for optimistic alternatives.* This parameter orients the individual to *choose* to be optimistic and positive regarding potential actions or events, looking for and creating optimistic conditions (that were probably available all the time, but not perceived or thought possible). This encourages a wider spectrum of choices, and renewed energy and engagement at a time when the natural tendency is to withdraw and accept limits.

When such options appear to be available, the individual is open to the mediation of *feelings of belonging,* bringing the learner into the larger community of others – family, neighborhood, culture – to interact and contribute. This becomes one of the major interactional goals of exposure to the FIE-E program in group learning environments.

## Mediated Learning Experience Interactions of Relevance for the Elderly

Elsewhere we have identified a large number of interactions that are structured from the criteria and objectives of MLE (see Feuerstein, Rand, and Feuerstein, 2006, Appendix A). Among them are quite a few that have special relevance for those experiencing effects of the processes of aging. The interactions that can be planned and implemented should blend the MLE criteria and the activities encompassed in the exposure to the FIE-E program. We shall describe some of them to convey the flavor and potential of such interactions, with the intention that the program developer will be sensitive to this potential and work to structure the program to emphasize these possibilities.

Many of the mediated interactions are common to all efforts to promote cognitive modifiability—focusing, selecting stimuli, scheduling of exposure, encouraging imitation, providing repetition, and the like—and of course must be an integral part of the MLE for the elderly.

Of special relevance, directed toward building cognitive functions in the elderly are those interactions that focus on short-term and long-term memory, transmission of the past, and anticipation of the future. Where there is evidence of impairment or fragility, mediation of spatial and temporal dimensions of experience should be emphasized. Critical reasoning, making inferences using both inductive and deductive processes, can be used to enhance awareness and skillful interpretation of problems to be solved (going beyond the immediate experience into generalizations—transference). A major emphasis for the elderly population is mediation directed toward the transmission of culture and values, that serves as a connecting and confirming experience. Affective components of MLE relate to the perception of feelings and the acceptance of conditions of self and others at the advanced stage of life. In this sense, MLE is not a content. It is a way to choose that to do to turn content into a mediational experience that turns the learner both *inward*, toward a sense of self and potential, and *outward* toward enhanced engagements with the environment.

## Activities in the FIE Program That Illustrate How This Occurs

In this section we describe activities of the FIE-E program, showing how the activities of the program and the ways of mediating them develop the cognitive and social/emotional potentials of those who are exposed to it. We have selected several examples from each instrument, showing a progression of tasks and a range of the cognitive functions and meditational requirements that promote neural plasticity.

*Organization of Dots (OD)*
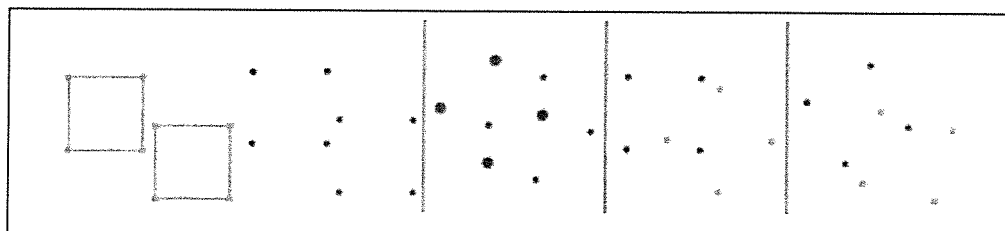
This example comes from an early page. It requires that the learner use hypothetical thinking and logical evidence to solve the problem—finding the model shapes in their amorphous presentation in the frame. Cues are initially provided, and the learner is mediated to use them systematically. The shapes are familiar, and on later frames of this page the cues are gradually withdrawn the shapes become more rotated and overlapped, making their perceptual discrimination more difficult, necessitating systematic searching according to internalized criteria. The cognitive functions addressed are systematic searching and size and shape constancy (at the input level), recognizing the problem, using relevant cues, using planning behavior (at the elaboration level), and precise drawing of lines to accurately project virtual relationships (at the output level).
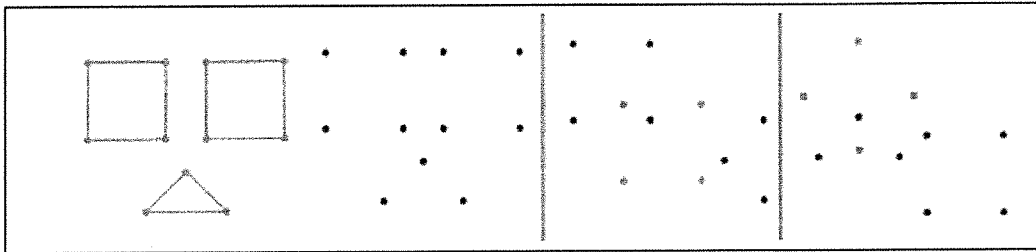


The above task is from the same page, and requires the learner to differentiate size, and deal with an increased number of elements (dots). As an early page in the instrument and the program (OD is usually the first instrument presented, and the learner is newly exposed to mediated learning experience), it is used to generalize to larger functions, such as data gathering, systematic scanning, using comparative behavior, counting, and the like.

For elderly and/or brain-injured individuals, an early experience is the initiation of processes to fulfill the seemingly simple task (that are actually more complex that they first appear). The mediator suggests some strategies: counting the angles, showing that each dot is an angle, how the shapes are the same in spite of their rotations. Feedback is given on successful responses directed toward mediating a feeling of mastery and accomplishment, and creating readiness to do more difficult problems, and advance toward other pages and tasks.
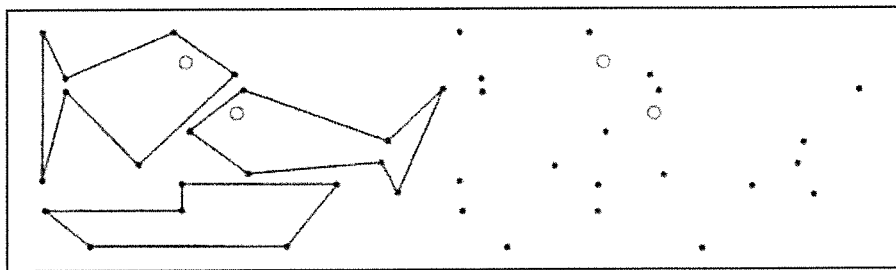


The above task occurs later in the program, after the learner has acquired many strategies for searching, comparing, using cues, and dealing with both familiar and unfamiliar shapes. Here the learner must develop strategies contrary to what has been learned previously—the overt cues do not differentiate among the figures. The learner must develop some internal cues, and then use processes of

synthesis to arrive at solutions. The emphasis is on elaboration functions (interiorization, hypothesis testing, widening the mental field), and careful output (using comparative behavior to assure accuracy in production of the results). The successful solving of these problems requires flexible thinking, selecting alternative strategies, and overcoming considerable perceptual confusion, particularly on the more densely presented arrays of dots and changes in orientation from the model on the remainder of the page. A particular problem on this task is that the figures are not simply rotated in space, but the "fishes" oscillate in space, changing their directional orientation.
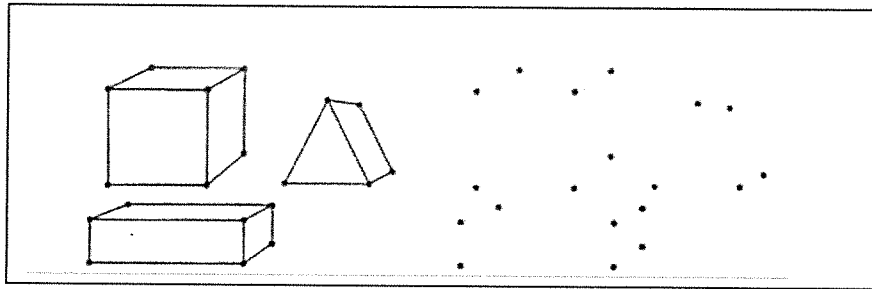


This example represents the tasks of the last few lessons in the OD instrument. The shapes are three-dimensional, and as they are overlapped and rotated, their perceptual qualities change. The learner must have a well internalized mental picture of the shape, before it is recognized in its rotated position, in order to reproduce it from the available dots. This involves the projection of relationships in complex figures. Mediation for restraint of impulsivity, systematic searching, and challenge and complexity is required. Successful completion of the tasks such as these requires goal-setting, goal-planning, and goal-achieving behavior. Tasks such as this mediate the feeling of efficacy—the competence to overcome perceptual difficulties.
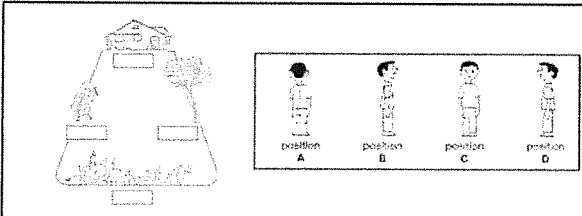
As the visual stimuli become much more complex, the learner is helped to recognize them under different conditions by using systematically applied mental processes—counting, recognizing angles, consideration of lines from different positions in space—what can be termed using cognitive supports to overcome distortions of perspective.

*Orientation in Space I (OS-I)*
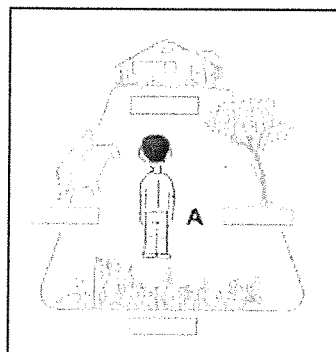
This is one of four pictures that appear on the page, each one having the boy facing a different direction. The task of the page, and the mediation that is given, is directed toward differentiating between stable (fixed: the house, bench, flowers, and tree) and relative positions (the orientation of the boy). The concepts are taught and then practiced on the page by writing where each fixed object is in relation to the boy (the house in front, etc.). This relatively simple task sets up more difficult and representational tasks later, using similar stimuli. The generalization that will be repeated and varied in subsequent tasks is that a change in position results in a change in relationship. This has immense implications and applications in real life, and the bridging to them is a critical objective of this task and others like it.

On this task the mediator also observes personal space and body orientation, noting whether directionality and sidedness (in relation to body) is fragile or deficient. If so, the time on task, and practice away from the page, is necessary. If this is the case, this task and others like it must be practiced and solidified before moving on to higher level tasks.



The task above shows the progression toward representational thinking, using the same stimuli, but requiring flexibility by shifting from one perspective to another. Several sources of information must be considered to reach conclusions. Personal body orientation may be a factor in determining the position of the fixed objects in relation to the boy. The task is accomplished using visual transport—visually (mentally) moving the boy in a particular position into the field and then determining the appropriate side the object is on. It also introduces a table as a graphic organizer. Here we show only the first three lines of the task. On subsequently presented tasks, there is variation when the learner must find the position when the object is given, and the object when the side and position is given—again contributing to mental flexibility.

Fill in what is missing so that each frame will contain an arrow,
a dot, and an indication to which side of the arrow is the dot.

| Front | _ _ _ _ _ _ _ _ _ | Right | Left |
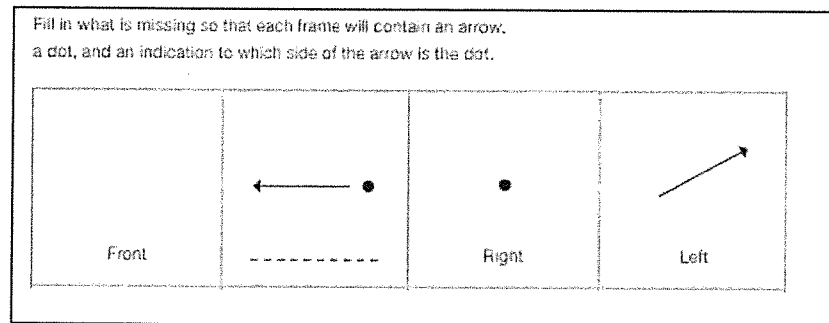
Toward the end of the instrument, the above task uses the same principles, but presents the problem in an abstract modality. This translates the verbal code into an operation, and furthers the representation of spatial orientation. For the learner, the task opens a consideration of using signs and symbols to convey information. The position of the dot in the frame presents some alternatives and restrictions, and the arrow can be drawn in different orientations and yet fulfill the instruction. For many learners, this opens the consideration of alternative responses to situations that have determined parameters.

## Comparisons (COMP)

7.

Common: _____
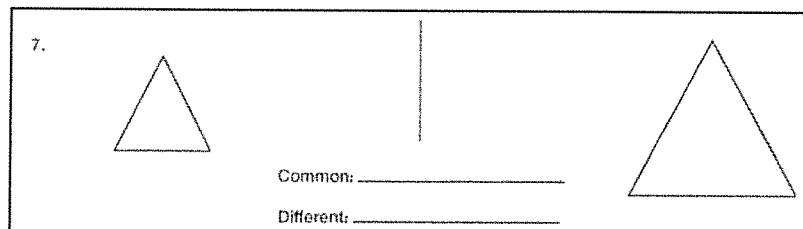
Different: _____

This activity comes after the learner has found and described similarities and differences between pairs of objects, presented pictorially and in words. For this task, the learner must examine the stimuli, collect relevant evidence, and summate their attributes. To constrain the response to "one word" requires the learner to search for the superordinate relationships—that is, find a term that accurately includes all aspects of the relationship. In this way, this seemingly simple task involves wide and deep comparisons that the learner must search for. It is ultimately highly representational.

Sample picture

direction  size  colour  form        direction  size  colour  form
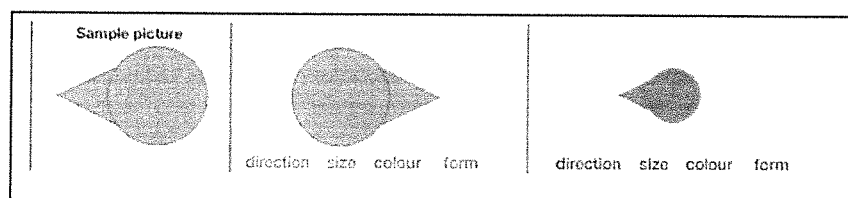
This task, from the middle of the instrument, takes the learner into a more active and direct consideration of the given parameters of a comparison. Precise meaning must be discerned, and the modalities of figural and verbal must be combined and utilized. As such, flexibility in thinking and responding is

exercised. The learner regulates and controls impulsive behavior, scans information to acquire correct responses according to the directions, and must interpret the meaning of the parameter words—for example, what does "form" mean in this context.



A task such as this, from the end of the instrument, moves the comparative process to a higher level of abstraction (and mental representation) by requiring the learner to verbally construct responses reflecting differences in objects according to their attributes in spite of their sharing membership in superordinate classes. It is a precursor to categorical thinking, and broadens the range of the mental operation of comparison, into higher order thinking and more complex operations (such as seriation, permutation, and the like). The reasoning is deductive, moving from the generalization to the specific examples. One can also work inductively, from the characteristics to the specific examples.

*Analytic Perception (AP)*
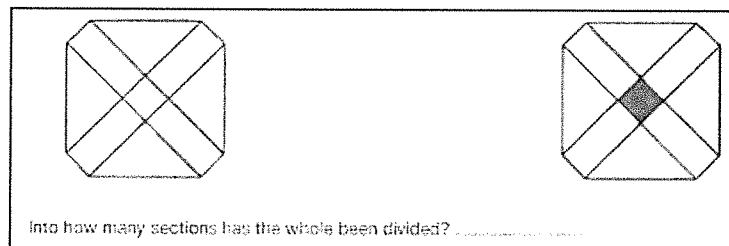


This is the first of many activities in this instrument that gives the learner experience in analyzing a simple or complex whole into its component parts. The learner discovers that every whole has parts and that parts comprise a whole. The parts can be separate or can be integrated into larger composites, but retain their status as parts of the whole. The task also requires labeling, that leads to identification and communication.
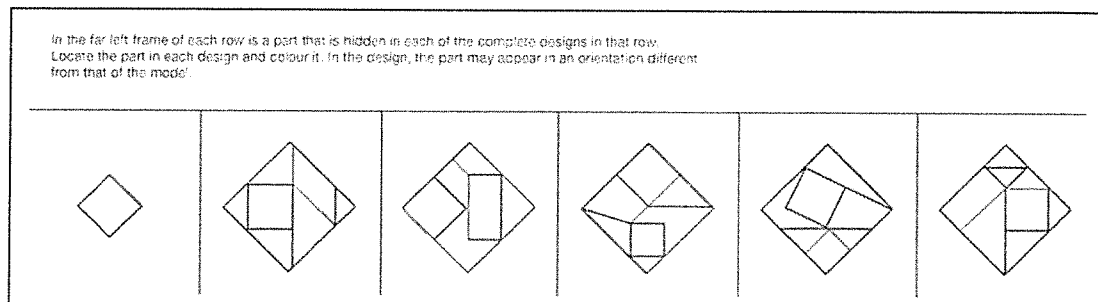
In this task the parts are embedded among other figures, and must be discerned and separated out. The part to be disembeded is different from other parts, but may be similar in some attributes—notably size and shape. The orientation may also be different from the model. The learner must desegregate parts from the whole, and in some instances overcome perceptual distortion.
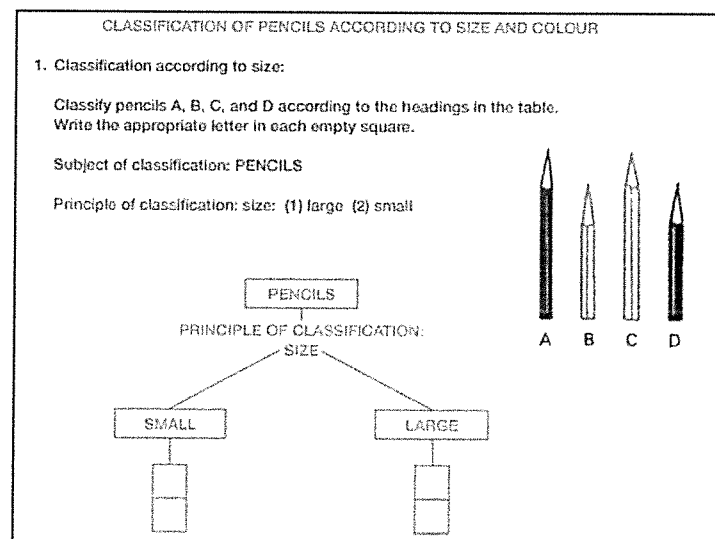


Correct the errors.
Do the separate parts in each frame fit together so that they form the complete design? If they do not, correct.
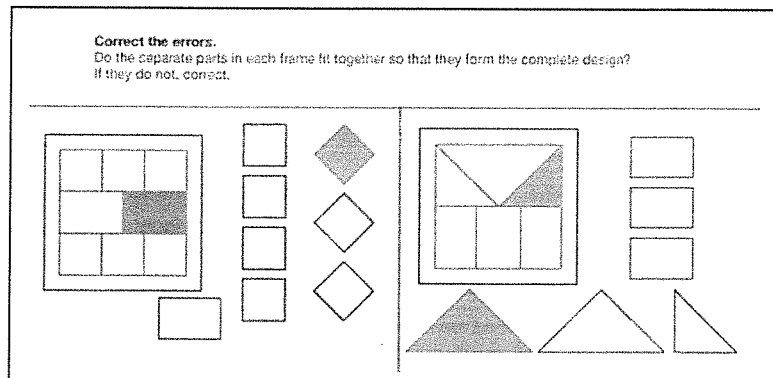
In correcting the errors the learner must use skills that are both consolidated and flexible, checking initial perception of the stimuli and the efficacy of the response. Flexibility is needed in shifting from one to another strategy, and a degree of activity in both crossing out the incorrect part and drawing the part that is needed to correct the array. Errors pages, that are inserted from time to time in each instrument, provide for the mediation of feelings of competence and build awareness and the necessity to look carefully and consider both perceptual and conceptual information.

## Categorization (CAT)

The Categorization instrument follows upon COMP, extending concepts and mental operations into more abstract levels. As the example below shows, the learner must organize information according to dimensions shared by other members of the "class," using the process of classification. A "classification" vocabulary is introduced that the learner must use to organize information. A later activity on the same page (but not shown here) asks the learner to classify according to attributes, give a name to the class, and identify the exception. The learner can use different problem solving strategies to find commonality, and must use interiorized (mental pictures) to examine and select correct answers.

```
WHAT IS ANIMATE?     WHAT IS VEGETATION?       WHAT IS INANIMATE?


Ball, flower, girl, chalk, clothing, tree, picture, dog, leaf, straw, bird, plant, tomatoes,
pencil, fish, apple, book, donkey, grass, chair, wheat, mouse.


    List four things that belong under the heading ANIMATE:
    _____


    List five things that belong under the heading INANIMATE:
    _____


    List three things that belong under the heading VEGETATION:
    _____
```

The second task we have selected from CAT introduces the concept of categorizing according to a *principle*, and using the *subject* of the classification for both inclusion and differentiation. This engages the process of both individual and simultaneous comparison. The task uses size as the principle. Later tasks can take the same objects and classify them according to different principles, such as color. In this task, and others that follow, a diagrammatic representation is introduced, that can be made more complex, to show in a graphic modality the classificatory relationships. Another feature of this task is that a letter or number can be used as a code for the information being depicted.

```
          CLASSIFICATION OF PENCILS ACCORDING TO SIZE AND COLOUR

1. Classification according to size:

   Classify pencils A, B, C, and D according to the headings in the table.
   Write the appropriate letter in each empty square.

   Subject of classification: PENCILS

   Principle of classification: size: (1) large  (2) small

                                                        A   B   C   D
              ┌──────────┐
              │  PENCILS │
              └──────────┘
        PRINCIPLE OF CLASSIFICATION:
                  ╱ SIZE ╲
        ┌────────┐        ┌────────┐
        │ SMALL  │        │ LARGE  │
        └────────┘        └────────┘
```
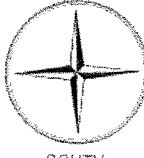
## Orientation in Space II (OS-II)

This instrument follows upon OS-I, moving from personal space as a frame of reference to geographical space, represented by the Compass Rose depicted in the task below. This requires the learner to expand beyond oneself to a larger and more abstract space. The concepts of fixed and variable relationships is thus

expanded. The geographical labels are both internalized (to self position) and externalized to known objects in the learner's world. The concept of a closed system is introduced—that of discovering the position of one element from its relationship to other elements of the system.
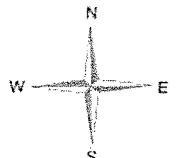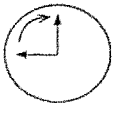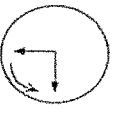


The next task shown requires the learner to deal with multiple sources of information and multiple modalities for the way the information is conveyed (pictorial, verbal, symbolic, numerical/mathematical). Much information must be processed, and systematically retained, internalized, checked out, and then responded to. As such, this is a highly complex and abstract task, but it builds upon previous concepts, operations, and activities, and can be efficiently and successfully mediated. The learner discovers individual differences in the efficient use of different ways of gathering and processing information. Different ways of reaching the same goal are demonstrated (concept of *reversibility*), and summative behavior is reinforced.



*Family Relations (FR)*

In the sequence of presentation of instruments, FR utilizes the classificatory and structural organization activities of CAT, builds upon the comparative concepts of COMP, and provides the learner with both familiar and novel ways of manipulating information about something that is highly meaningful (and generally culturally universal) for the learner. In the first task shown, a family structure is presented diagrammatically (a genogram or "family tree") that shows relationships of one family member to another. The concept is that of a "family system" of inter-relationships, and the task is to identify individuals within the system on the basis of a given relationship. Signs and symbols are used to convey information. Reciprocal relationships are portrayed, and the

activity of the page is to identify them on the basis of the direction, conveyed by arrows.
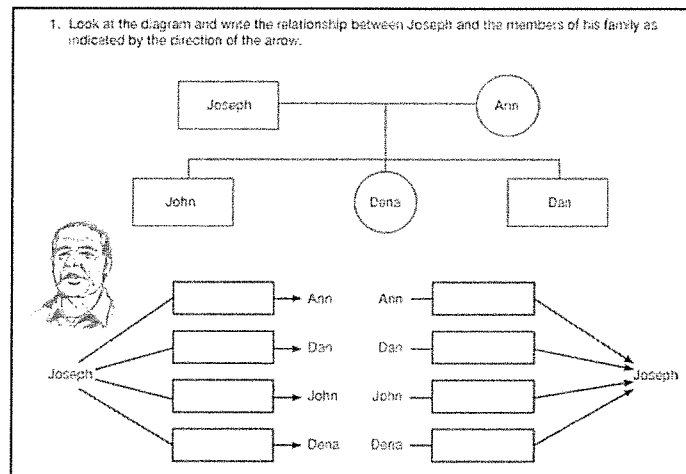


In the next task, the family system has expanded, to include several additional generations and lateral expansion, into "extended family" by virtue of marriage, the birth of children, and a grandchild. We show this task to describe how activities are included to crystallize previously acquired concepts through increasing the complexity of the information and requiring the learner to manipulate information within the context of more details and permutations of relationships.
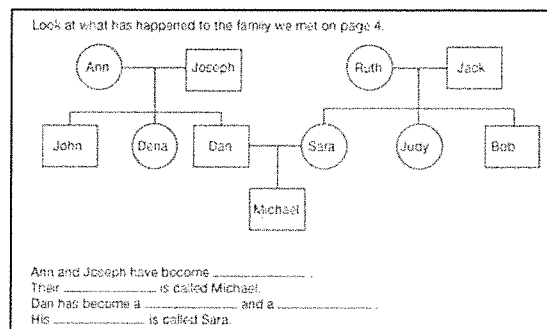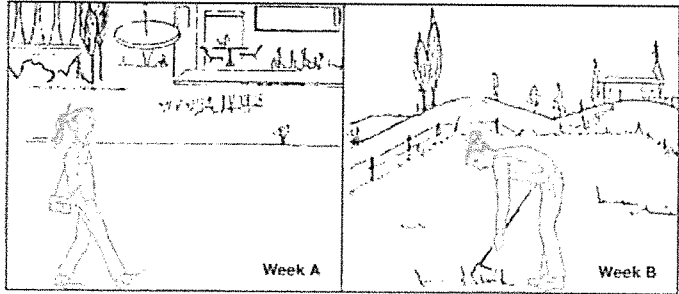


## Temporal Relations (TR)

The activities of this instrument offer the learner a diverse range of experiences manipulating time (and eventually space). In the task below the learner is required to manipulate objects and events, placing them into a temporal sequence. The modality is verbal. Some of the temporal relationships are cyclical—recurring in a continuous cycle, and some are discrete or discontinuous—marked by distinct beginnings and endings. There is content knowledge involved in the task. Although the objects and events are selected for their familiarity, some learners may not have had experience with them (either culturally or experientially), and some pre-teaching may be necessary to successfully complete the task.

In the task that follows, temporal concepts are linked to spatial concepts in order to solve the problems. The specific content of the problems is less important than the variables of time, distance, and speed, but the learner must differentiate the relevant information from that which is not.



## Instructions (INS)

This instrument is usually given to learners after others in this group, and presumes considerable operational skills and perceptual, verbal, and conceptual mastery. The goal is to be integrative, and to use the figural and verbal modalities to efficiently decode, plan, and follow directions. The task below is taken from an advanced page in the early phase of instrument, and introduces the concept *between* to describe a type of relationship among objects in a visual array (after establishing and practicing concepts of *above, below, to the right, to the left,* etc.). The task further requires the learner to divide the frame into imaginary parts and to determine the positions by inference. This task, and many others like it in the instrument introduces instructions that emphasize sequence or process.

In the task below, the learner must divide the space in the frame
representationally, and place the shapes inferentially. Concepts of intersection,
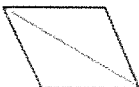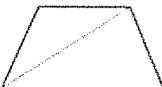and the structural requirements based on correct inferences must be
accomplished.
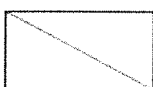


In the following task, the learner must use coded references, and understand the
concept of bisection. As with many tasks toward the end of the instrument,
completion will provide both consolidation crystallization of what has been
learned.



## Illustrations (ILL)

The instrument Illustrations (ILL) presents the learner with a series of pictures
that are used to reinforce concepts taught in other instruments, or to build
particular social or functional concepts. As the learner scans the picture,
describes the action and develops a working narrative for what is observed, and
formulates the cause and effect relationships, works out motivation, solutions,
and elaborations of the theme or actions, concepts are built and transcendence is
experienced.
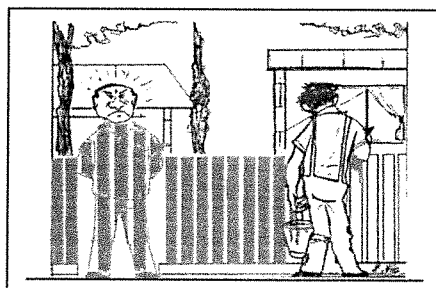


Each picture, such as the one above, presents the learner with a variety of stimuli
and narrative situations. Here a humorous situation is depicted, with
opportunities to consider the reaction of the "victim" and the motivation or
behavior of the "perpetrator." Other pictured situations present ethical or moral
dilemmas, perceptual incongruities, ingenious solutions to problems presented,
needs for reflective thinking, or unexpected and incongruous solutions to

problems or situations.

## Representational Stencil Design (RSD)
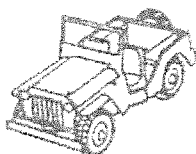
The tasks of the instrument Representational Stencil Design (RSD) require the learner to identify the elements of a complex design by mentally deconstructing and reconstructing the design from separate elements that are combined in the complex design. The learner first learns to scan and differentiate solid color stencils and those with geometric designs "cut out" of the solid color stencils. The learner is then presented with designs made up of two or more stencils. The task is to identify which stencils are combined to create the design. Elements of shape and color are manipulated, using both direct observation and inference (as some parts and elements are hidden by the superimposition of other parts). The mental representation is practiced by a series of analytic and inferential questions that relate to a particular design, building and elaborating a variety of mental operations. Questions such as "How many stencils are in the design?", and "In one design the color white appears twice. What are the numbers of the stencils that contribute the white color to the design?" are examples of the learning that occurs.
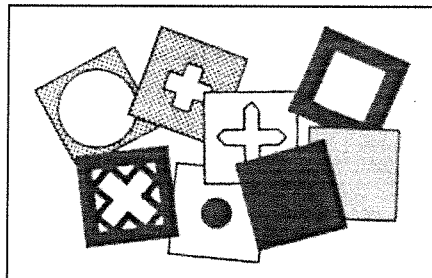


The recreation of a given design by identifying which stencils and in which order they are superimposed on one another is a complex mental task because it is done representationally rather than by physical manipulation. Many perceptual, inferential, and logical functions are involved.

## Syllogisms (SYL)

The task below introduces the concept of syllogism using pictorial information and diagrammatic cues (the brackets to denote and label elements). The principle is presented first, and then the example is given. The learner must finish the conclusion by a simple deductive process. Previous tasks in the instrument have taught the concepts of sets and members, using both elements of inclusive and exclusive properties.

A much later task in the instrument shows concept of subsets, expanded to include subsets that have their own subsets. The example below further expands the concept to include a hierarchy of universal sets and nested subsets, and requires the learner to understand the relationships between universal sets and their subsets, and to draw conclusions from inferences based on the given relationships. The modalities of information to be processed are verbal, figural, and graphic, represented in a Venn diagram.



1. All soldiers are people.
   All officers are ............................ .
   CONCLUSION: All officers are people.
   Are all soldiers officers? ...........................
   Are all people soldiers? ...........................
   Are all people officers? ...........................
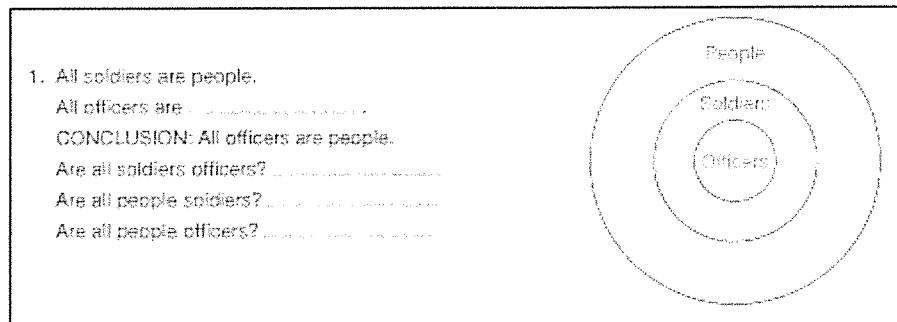
## Summarizing the Cognitive Effects of the Program

The FIE-E program is a designed, in its structure and modality of presentation, to achieve the goals of cognitive modifiability in the population of elderly adults. Here we summarize them to show the cognitive changes that they produce. Some examples of the ways in which the FIE-E program does this are:

- searching and finding geometric forms in a cloud of amorphous dots, developing planning behavior, searching and scanning for relevant information (*Organization of Dots*),

- identifying relative positions in personal and geographic space to identify orientation and frames of reference (*Orientation in Space-I; Orientation in Space-II*),

- considering characteristics of objects in order to compare diverse objects and events, and create relationships among them (*Comparisons*),

- analyzing part/whole relationships using geometric forms to both infer relationships and combine and integrate information from disconnected elements (*Analytic Perception*),

- maintaining and manipulating relationships in time and space (*Temporal Relations*), in more abstract relationships such as familiar family systems (*Family Relations*),

- classifying objects and events in groups and subgroups (*Categorization*),

- following complex directions in verbal and figural modalities, being flexible with moving from one source of information to another (*Instructions*),

- decoding visual patterns and numerical patterns according to rules and relationships (*Representational Stencil Design and Numerical Progressions*), and

- using analogical and transitive thinking to develop complex, abstract relationships (*Syllogisms and Transitive Relations*)

## Parameters of Program Design and Implementation

**Locus of Activity:** Programs designed for the elder can be implemented in a variety of settings:

- adult day care settings and community centers (where individuals come from their home environments for structured activities);

- residential care facilities (serving higher functioning elderly individuals, usually described as *independent living* or higher level *assisted living*).

- in-home settings where the care-giver (or specially trained provider) comes on a scheduled basis for individualized intervention.

**Modalites of Intervention:** The program is provided to the elder participant either as a specially planned and experienced event, with the activities introduced and mediated by a specially trained provider (teacher/mediator), or by the regular care giver who is trained to conduct the program.

**Strategies of Program Implementation:** Activities related to implementing programs on site should be considered three phases:

(1) *Pre-Implementation Phase*: creating awareness and engaging in needs assessment activities. Meeting with interested personnel in potential settings—both line staff and program administrators. Presenting and discussing the parameters of the program, both verbally, with well designed written documents, and video examples of program activities. At this phase the goals have to do with providing information about the potential of the program to meet the needs of the target population. Discussion of elements of program design should be undertaken, exploring structural options in the setting and the best ways of presenting the program to maximize positive outcomes for participants. Staff resources to bring the program into action must be discussed--will the program be presented by setting staff who will need to be trained, or provided by outside trainers. Should there be a plan to gradually prepare setting staff to take over the program implementation? Initial and longer-range costs should be considered.

(2) *Introducing the Program on Site*: This phase is determined by the type of setting (day care, residential, in-home, etc.) and level of participant's functioning. Number of sessions per week, time duration of sessions, presence of assisting and support personnel to provide mediation, and the pace and structure of the program presentation are all variables to be considered in the planning. Initial observations of structural decisions should be considered in making adjustments to conditions. Additional considerations are planning consultation and gathering information about participants from setting personnel, inviting observations of the program, meeting and reviewing progress and reactions with family members, and coordinating what occurs in the program implementation with other activities in the setting.

(3) *Ongoing Activities*: In this phase of the program the teacher/mediators should be observed periodically, invited to share their experiences, and aspects of program provision should be reviewed and necessary adjustments made. The setting should be visited periodically by program coordinators to review activities and calibrate necessary adjustments. Consultation with program administrators and line staff is important to be sure that the program is coordinated with other aspects of program and structure relevant to the setting. Levels of enthusiasm, critical reactions of participants, reactions of family members and others who interact with the participants should be observed and reflected in program adjustments. These activities can be both formal (on a planned and scheduled basis) and informal, through spontaneous contacts as the program develops.

*Data gathering is important.* Demographic information (age, gender, levels of education, vocational history, attendance, levels of physical and/or mental status are all relevant to understanding the composition of the groups, and interpreting outcome effects. Questionnaires can be constructed to provide information on pre-program levels of functioning, needs, attitudes, etc. and post-program levels, reflecting changes occurring. Formative evaluation— session-by-session information on reactions, needs, suggestions for structural or instructional changes—can also be gathered and contribute important information both for making program adjustments and interpreting outcome effects. In some instances, to be carefully selected, formal assessments (utilizing both dynamic and some standardized measures) of cognitive functions can also be undertaken. Outcome effects to be identified are attendance patterns, levels of cognitive functioning, third-party observations, self-perceptions of change (or lack thereof). This data gathering should be pre-planned, according to the needs of the setting or other determined research goals (in conjunction with setting goals and needs).

## The Training of Caregivers

Caregivers should receive 20-40 hours of training in the implementation of the FIE-E program. In this publication we will outline the training syllabus in detail. Here we will summarize its main components:

- learning about the theory of structural cognitive modifiability (SCM), so that they understand the modifiability potential of the client population learning to identify and use the parameters of mediated learning experience (MLE), so they will learn how to bring the cognitive modifiability engendered by the FIE-B program to the learners, and bring MLE into their routine care taking interactions (activities of daily living—ADL's) with their clients—bridging from program to practice.

- learning how to present and mediate the instruments of the FIE-E program to the clients. The caregivers are introduced the tasks in the instruments, learn how to use them with the elder population, including how to mediate them and broaden the learning to other aspects of the life of the elderly learners.

- identifying and applying strategies learned in FIE-E to aspects of the elderly participant's lives--activities of daily living, demands and tasks of the environment, relating to social and other challenges of daily life, etc.

The training can be in either (1) a concentrated, intensive seminar occurring over a short period of time (one to two weeks), or (2) spread over a longer time period, and integrated into other training or support activities occurring in the care setting. The training is best presented as a group experience, to enhance the sharing of knowledge and bringing the learning into the most efficient application for the integration of cognitive aspects into the care giving context. In either modality of training, it can be a specially constructed training experience (focusing on the cognitive aspects) or designed to fit into the ongoing, training and in-service support required by the setting (thereby becoming *adjunctive* to existing training).

*Who Are the Caregivers?* The caregivers can be either or both those who provide daily care to clients (with ADL's) or those who have specific activity-based care responsibilities (activity therapists, "educational" providers, etc.).

*The Focus of Training:* The training can be differentiated in two ways:

(1) Integrating cognitive aspects into activities of daily living (ADL's), with the potential of improving the experiences for the clients by increasing their understanding and focused participation in them, making the caregivers aware and giving them strategies to improve the nature of their interactions with their clients; or

(2) As a "life style" program, going beyond simple ADL's, adding meaningfulness, engaging in activities that enhance cognitive and

intellective processes by using what is experienced in the instruments, and going beyond them to engage in activities made meaningful through exposure to the FIE-E instruments. This will be reflected in new degrees of task engagement, interpersonal interactions, and a broadened sense of meaning (positive alternatives of awareness and activity).

In situations of relevance to the care providing setting, the program can be designed to have the training received by the caregivers accepted as meeting governmental or existing required professional accreditation standards for in-service, ongoing training. This can be ascertained and planned for at the program/project design stage of implementation.

*The Training Curriculum:* The teachers/mediators who will provide the program should be familiar with the goals and instruments of the FIE-E, and with the programmatic goals of the implementation for the senior population. These have been described earlier in this resource book: *prevention* of the normal deterioration of aging, *deceleration* of deterioration that has been experienced, and restoration of lost functions. We recommend that programs initially focus on prevention, to help the elderly experience cognitive support in more normalized environments. The program can be directed to deceleration and restoration, expanding the goals and responding to the needs of settings and populations, as we have described in the matrix included in this publication (see above).

### The General Objectives in Designing and Presenting the FIE-E Program:

➢ To use FIE-E and the mediation associated with its presentation and activities to *preserve* those cognitive functions that the elderly participant has in his/her repertoire.

➢ To prepare for future activities within the context of his/her living situation and environmental demands.

➢ To engender hope and positive, optimistic engagement in future activities.

➢ To develop a functional optimism and feeling of belongingness to family and community, using activities that engage mind, memory, and elaborative relationships to the surrounding world

This can be accomplished, in the application of the FIE-E program through presenting, preserving, and modifying experiences through the activation of the three phases of the mental act:

❖ Observing the world of stimuli surrounding and impacting the individual,

❖ Elaborating the information through finding and making relationships, forming hypotheses, testing them out, verbally and conceptually justifying them, building virtual knowledge, and

❖ Solving problems efficiently, in collaboration with others, projecting to meaningful situations in life experience.

### Modalities of Learning Experience

The elderly participant will be exposed to mediated learning experience (MLE) and to a specially selected and organized exposure to the FIE-E instruments. The teacher/mediator must be familiar with the MLE parameters in order to direct mediation appropriately in the learning interactions, the developmental sequence of cognitive functions (in particular when they are impaired or deficient) in order to target learning interventions, and the nature of the tasks presented (what we have designated as elements of the Cognitive Map). Each of these operational conceptual organizations is presented below. The teacher/mediator must be familiar with them in order to understand how they are reflected in the tasks and structure of the FIE-E instruments (selection of tasks, sequence of presentation, structure of the presentation of the "lesson"), in order to bring them into the learner's exposure to the program to meet learning objectives and insure positive learning outcomes. In the training and orientation of the teacher/mediator, these conceptual frameworks will be considered from the perspective of the learning needs of the elderly participant and the overall goals of the program.

**The Cognitive Map**: an analysis of the task/activity presented to the learner. There are seven elements of the mental act that the tasks relate to:

1.  CONTENT: the subject matter and information required by the task, which the student must be familiar with in order to successfully address it. If the needed content is missing, it must be the focus of teaching.

2.  MODALITY: the "language" of presentation of the task, which the student must be able to respond to. In FIE the modalities are figural, pictorial, numerical, verbal, and logico-verbal.

3.  PHASE: the three levels or parts of the mental act: input, elaboration, and output. Tasks are analyzed according to the predominant or critical phase elements that must be responded to. Learners may have deficiencies in one or more of the phases which must be recognized in the task and become the focus of mediation

4.  OPERATION: the actions that the task requires in order to successfully master it. Different tasks require different mental operations, or combinations (e.g., comparing, putting items in serial order, developing inferences, etc.). Additional operations may be identified and applied as a consequence of mediation of the task.

5.  LEVEL OF COMPLEXITY: the quantity of information to be handled, and the degree of familiarity/novelty. Often referred to as the number of "bits" of information present in the

task. With more familiarity, the size of the "bit" is increased, allowing for the processing of more information and reducing its complexity.

6.   LEVEL OF ABSTRACTION: the "distance" that the task requires from the direct, concrete manifestation of an object or event. Generally, the more "symbolic" or "conceptual" a task is the greater its degree of abstraction.

7.   LEVEL OF EFFICIENCY: as an element of the task, it is the requirement in the activity for accuracy, speed, and concomitantly, carries (for each learner) a degree of subjective, perceived level of difficulty. In many respects, it is a function of the previous six elements.

*The Cognitive Functions*: As the tasks are presented to the learners, the mediator needs to identify the ways in which the learner can be helped to improve learning and solve problems with increased comfort and intellectual insight. We target three phases: input (taking information in), elaboration (analyzing and making information meaningful), and output (responding accurately and effectively as problems are solved and solutions reached). We list them here as "deficient cognitive functions" to indicate how to direct mediation to overcome deficiencies or enhance functioning.

**Input Level:** include those impairments concerning the quantity and quality of data gathered by the individual as he is confronted by a given problem, object, or experience.

1.   Blurred and Sweeping perception
2.   Unplanned, impulsive, and unsystematic exploratory behavior
3.   Lack of, or impaired, receptive verbal tools which affect discrimination (e.g. objects, events, relationships, etc. do not have appropriate labels).
4.   Lack of, or impaired, spatial orientation; the lack of stable systems of reference impairs the establishment of topological and Euclidean organization of space.
5.   Lack of, or impaired, temporal concepts.
6.   Lack of, or impaired, conservation of constancies (size, shape, quantity, orientation) across variation in these factors.
7.   Lack of, or deficient, need for precision and accuracy in data gathering.
8.   Lack of capacity for considering two or more sources of information at once; this is reflected in dealing with data in a piecemeal fashion, rather than as a unit of organized facts.

**Elaboration level:** includes those factors which impede the efficient use of available data and existing cues.

1.   Inadequacy in the perception of the existence and definition of an actual problem.
2.   Inability to select relevant vs. non-relevant cues in defining a problem.
3.   Lack of spontaneous comparative behavior or limitation of its application by a restricted need system.
4.   Narrowness of the psychic field.
5.   Episodic grasp of reality.
6.   Lack of, or impaired, need for pursuing logical evidence.
7.   Lack of, or impaired, internalization.
8.   Lack of, or impaired, inferential-hypothetical, "iffy" thinking.
9.   Lack of, or impaired, strategies for hypothesis testing.
10.  Lack of, or impaired, ability to define the framework necessary for problem-solving behavior.
11.  Lack of, or impaired, planning behavior

12. Non-elaboration of certain cognitive categories because the verbal concepts are not a part of the individual's verbal inventory on a receptive level, or they are not mobilized at the expressive level.

> **Output level:** includes those factors that lead to an inadequate communication of final solutions. It should be noted that even adequately perceived data and appropriate elaboration can be expressed as an incorrect or haphazard solution if difficulties exist at this level.

1. Egocentric communicational modalities.
2. Difficulties in projecting virtual relationships.
3. Blocking.
4. Trial and error responses.
5. Lack of, or impaired, tools for communicating adequately elaborated responses.
6. Lack of, or impaired, need for precision and accuracy in communicating one's responses.
7. Deficiency of visual transport.
8. Impulsive, acting-out behavior.

*Parameters of Mediated Learning Experience (MLE):* There are 12 parameters of mediated learning experience that have been identified. They have been described earlier in this resource book.

*Structuring the Training:* The teacher/mediators of the program should be given an opportunity to learn these operational conceptual systems, integrating theory with practice. It is advisable for those who do not have any prior training or background in implementing the Feuerstein systems to be given a preparation seminar consisting of 40 hours of exposure. The training should be given by an experienced Feuerstein practitioner, and include relevant theory, structural and operational processes, observation and practice with the application of MLE to the dimensions of the program and the target population(s).

## Program Provision for the Clients

Trained (and supported) caregivers will then offer the program, (according to the differentially described parameters) to the clients. It can be offered in their activity settings on site or in home care environments, as a group learning experience (preferable) or as an individualized, therapeutic experience. Decisions should be made as to whether the groupings should be homogenous, as to levels of social and cognitive functioning, or heterogeneous, including a range of levels of functioning. There are benefits and limitations to either arrangement, and this can be planned and organized at the level of program implementation.

The program can be offered as a daily experience or on a schedule that offers two to three exposures per week (as a minimum level of engagement). "Homework" assignments should be structured into the program exposure, as clients enjoy completing lesson tasks on their own, and interacting with their significant others (spouses, children, other living companions), showing them the activities they have mastered, how they learned them, and the like.

## Financial Support Requirements

The financial requirements of implementing the program are as follows:

(1) Provision of training:  20/40 hours of caregivers training. Ongoing consultation and support, number of hours to be determined by the implementation schedule

(2) Provision of materials: cost of instruments provided to clients (to be determined by   number of instruments and number of clients exposed to the program).  Can be estimated to be approximately $3-$4 (US) per instrument per client.  Number of instruments can be estimated to be 4-6 instruments per client per calendar year.

These estimates of cost are subject to negotiation at the program planning and implementation phase.

*Potential Sources and Needs for Financial Support*: Both short term and longer range options should be considered, and presented to care provision settings, potential philanthropic organizations (NGO's), existing institutions directed toward these needs and goals, and governmental entities.

- Redirecting existing resources to include the activities described above, without incurring extra cost,

- Seeking new funding to expand existing activities, supported by the rationales described above, or elaborated according to desired and justified program expansion,

- Identifying research variables of particular interest to specific organizations focused on geriatric issues, and preparing research proposals directed to them—engaging in outreach activities (note: this will require additional funding or support from existing venues),

- Adaptation of FIE instruments to relate to the needs of the elderly population (note:  this will not be a major expenditure as the instruments do not need extensive revision to be used with the elderly),

- Planning for outreach and dissemination as the results of the implementation are ready to be shared, moving from initiation to implementation to institutionalization.

## Research Implications and Opportunities

This program offers a number of opportunities, evolving from particular interests and observations of issues related to outcomes, experiences with implementation, and the like. We will offer just a few to suggest possibilities:

❖ Issues related to the addressing particular disabilities in the elderly.

❖ Identifying differential effects of various aspects of training and models of program application.

❖ Developing and adapting FIE instruments, and modalities of training, the meet the needs of applications for the elderly.

In a separate publication we offer a prospectus for developing and conducting a research oriented activity related to the program(s) being undertaken (Elderly Research Model, Feuerstein Institute, 2012).

## Summary: Where to Go and How to Get There

Cognitive modifiability is a natural and necessary condition for human existence. It occurs at all ages, and is not inevitably limited by transitory conditions. It is confirmed and supported by the knowledge now available as a consequence of the revolution in the brain sciences. However, it requires a systematic and energetic intervention to promote, support, and sustain cognitive functioning. The Feuerstein Instrumental Enrichment Program for the elderly (FIE-E) is one such engine to energize modifiability—designed and implemented in ways that are proven to create the changes in the brain that will stimulate positive and preventive effects in the elder individual. For populations such as the elderly, the need and potential is clearly manifest, and the FIE-E program, adapted for the elderly population, represents a meaningful approach. However, the planning, implementing, and sustaining programs must be carefully considered. This resource book is provided to help those interested in considering and developing such programs to identify the needed information. Our goal has been two-fold: to provide information regarding needs and how such programs should be structured, and strategic directions to bring projects into fruition. By considering carefully the parameters of both need and potential, and directing the intervention precisely to them, important benefits are realized. This publication outlines these parameters, and suggests the dimensions of needed and appropriate intervention. The staff of the Feuerstein Institute stands ready to help you move forward in this regard. We will be pleased to hear from you and assist you in your efforts.

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# References

Feuerstein, R., Feuerstein, R.S., Falik, L. H. & Rand, Y. (2006) *Creating and Enhancing Cognitive Modifiability: The Feuerstein Instrumental Enrichment Program.* Jerusalem, Israel: ICELP Publications.

Feuerstein, R., Feuerstein, R.S., Falik, L. H. & Rand, Y. (2002) The Dynamic Assessment of Cognitive Modifiability: Theory, Instruments and Techniques. Jerusalem, Israel: ICELP Publications.

Feuerstein, R., Rand, Y. & Feuerstein, R.S. (2006) You Love Me!!...Don't Accept Me As I Am: Helping the Low Functioning Person Excel. Jersualem, Israel: ICELP Publications

Feuerstein, R., Feuerstein, R.S. & Falik, L. H. (2010) *Beyond Smarter: Mediated Learning and the Brain's Capacity for Change.* New York: Teacher's College Press.

Feuerstein, R. & Lewin-Benham, A. (2010) *What Learning Looks Like: Mediated Learning in Theory and Practice, K-6.* New York: Teacher's College Press.

Kliem, J. A. & Jones, T. A. (2008) *Principles of experience dependent neural plasticity: Implications for rehabilitation after brain damage.* Journal of Speech, Language and Hearing Research, 51, (February).