

# From Dynamic Assessment to Intervention: Can we get there from here?

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## Abstract

The dynamic model of assessment is one of Reuven Feuerstein's most important and influential contributions to both theory and practice, one that crosses boundaries of content domain, age, gender and ethnicity, venue, and purpose. Feuerstein not only reinforced the desirability of including intervention within the assessment process itself as a way of increasing the validity, fairness, and relevance of assessments, but he designed and developed one of the most important, and certainly the most influential, of actual procedures. No longer in its infancy, there are now substantial data to support the validity of specific dynamic procedures of a great variety and application. While not assuming that this challenge has been sufficiently met, the greater challenge of determining validity through the ultimate criterion of improvement of student learning in response to implementation of dynamic assessment has yet to be addressed adequately. This is the holy grail of any assessment designed for application in a clinical or educational setting. The authors discuss the intermediate path on this road from assessment to implementation of the resulting recommendations, to response to intervention.

## Keywords

dynamic assessment, response-to-intervention, cognitive assessment, mediated learning experience

## Introduction

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vention within the assessment process itself as a way of increasing the validity, fairness, and relevance of assessments, but he designed and developed one of the most important, and certainly the most influential, of actual procedures (Feuerstein, Rand, & Hoffman, 1979; Feuerstein, Feuerstein, Falik, & Rand, 2002).

Dynamic assessment (DA) describes procedures that include interaction during the course of the assessment, address learning processes related to a wide variety of domains, and focus on responsiveness of the learner to the interactions. The focus is on attempts to move the learner to a higher level of mental functioning through creation of zones of proximal development (Haywood & Lidz, 2007).

No longer in its infancy, there are now substantial data to support the validity of specific dynamic procedures of a great variety and application (see dynamic assessment bibliography at Vanderbilt University, Peabody Library website). While not assuming that this challenge has been sufficiently met, the greater challenge of determining validity through the ultimate criterion of improvement of student learning in response to implementation of dynamic assessment, has yet to be addressed adequately. This is the holy grail of any assessment designed for application in a clinical or educational setting.

In this article we discuss the intermediate path on this road from assessment to implementation of recommendations, to response to intervention. Without implementation of a plan that directly reflects the results of the assessment, there is no truly adequate test of its treatment validity.

Despite high hopes of closing (at least narrowing) the gap between assessment and intervention, there remains an unfortunate disconnect between most of the assessment procedures developed and the need for them to generate information that informs intervention. Most of the DA research addresses issues of predictive validity, and within that, the ability to discriminate between groups. The focus of most research concerned with school achievement (usually reading and math) documents positive relationships between response to the intervention embedded within a variety of dynamic assessment procedures (e.g., Lidz & Greenberg; 1997; Lidz, Jepsen, & Miller, 1997; Petersen, Allen, & Spencer, 2014; Stevenson, Hichendorff, Resing, Heiser, & de Boeck, 2013; Stevenson, Bergwerff, Heiser, & Resing, 2014). Another approach has been to investigate the underlying neuropsychological processes associated with learning during the course of the dynamic assess-

ment to enable inferences to be made about the processes that may possibly be targeted by subsequent interventions that relate to the ability to transfer learning from the assessment to the subsequent intervention (Stevenson, Heiser & Resing, 2013). The closest most of these studies get to documenting prescriptive information generated by the procedures is their contribution to group treatment assignment. There is also a significant literature to document that teachers value the results from dynamic assessments, which they claim have positively influenced their practices and perceptions of their students (Bosma, 1972; Delclos, Burns, & Kulewicz, 1987; Delcos, Burns, & Vye, 1993; Hulbert, 1995). This is not to dismiss the value of the currently available research results they do document, as such information is surely relevant and important, but if one of the unique contributions of the DA model is to refine the prescriptive contributions of diagnostic assessment, then there remains a rather wide gap.

### **Closing the gap between dynamic assessment and intervention**

The first step on the road to closing the gap between dynamic assessment and intervention necessitates a close match between the two venues, that is, between the content of the assessment and the ultimate domain to which the information is to generalize. This is the basis of transfer. Assessment (if it involves learning) is in essence an issue of transfer. It is a sample of the situation to which the information derived is to ultimately apply. Therefore, if the assessment is to inform clinical practice intervention, then the assessment should logically include content that represents this ultimate target. In the case of education settings this argues of course for a curriculum-based approach to assessment. This does not, however, require avoidance or omission of assessment of basic processes that underlie the learning involved in either setting. Intervention that targets reading should of course involve assessment of tasks that involve reading, but should as well include processes (such as attention, self-regulation, visual/auditory perception) that relate to the ability to master reading. Similarly, assessment that addresses clinical issues may well include cognitive and social/affective processes and assumptions that underlie explicit behaviors and thoughts.

The second point is that there needs to be a focus on what can be done to address the issues that generated the assessment. It is not sufficient to de-

scribe what is wrong, nor is it relevant nor sufficient to focus on determination of a label or category of classification unless, of course, this has direct implications for intervention (rarely the case).

The third point is that inclusion of interventions in the assessment should represent those that are meaningful, preferably evidence-based, and at least experience-based for the setting to which they are to generalize.

This requires a knowledge and experience base for the assessor, who functions in a hypothesis-driven manner in carrying out the assessment.

Interventions are not mere trial and error (though if serendipity works, keep it!). Interventions should make sense and be do-able by the professionals who are to carry them out following the assessment. If not easily implementable, then the appropriate consultation and training needs to be provided. The assessment is the opportunity to provide the evidence suggested in an evidence-based approach. Evidence is not evidence until it is shown to be effective for the individual to whom it is to apply. Evidence from research on large groups is merely suggestive of what might work for the individual. It has little to offer the individual being assessed without demonstration of its effects on this individual.

Use of the DA model supports the use of a formative approach to assessment, one that results in ongoing monitoring and re-assessment. DA can be conceived of as creation of zones of proximal development, zones that continually change as the learner moves to the next levels. However, in our model (Haywood & Lidz, 2007), DA is not mere trial teaching. Our approach to DA involves teaching to the cognitive processes that underlie the target content. The curriculum-based approach to DA connects these processes to academic achievement, and the clinically-based approach makes the connection to processes underlying functional and dysfunctional behavior.

## **Areas of active research that attempt to move us along on the journey**

It is encouraging that there is a considerable amount of research and development in the area of dynamic assessment (see Peabody Library at Vanderbilt University's Dynamic Assessment website). Much of this involves creation of new procedures; some discuss general issues, and others provide validity data for existing applications. In this article we select a sample of stud-

ies and discussions from the most active domains that specifically address issues involved in moving forward on the journey from assessment to intervention. This is not intended to be comprehensive but merely touches the bases of work that is available.

### ***Guided Prompt Model***

Campione and Brown (1987) were among early researchers who focused not only on assessment as a vehicle of identification of students with special needs, but engaged in steps of task analysis of academic domains to help determine the match between skills and knowledge needed for their mastery and development of competence. Their research suggested the lack of success of traditional assessment approaches, even those that generated profiles of strengths and weaknesses, to promote academic competence in low functioning students. They advocated for the need to “evaluate as directly as possible the particular processes underlying successful performance ... (and suggested that) ... the assessment should ideally be situated within a specific domain” (p. 88). Unfortunately, these researchers devised a metric that focused quantitatively on the amount of aid needed to develop mastery, which has the inevitable consequence of generating classification information that is limited in its implications for intervention and instruction. That is, they analyzed the task, not the learner, other than the learner’s intensity of need for help. Nevertheless, this approach has the advantage of improving the basis for classification when this is the chosen goal of the assessment (e.g., Lidz & Macrine, 2001). This choice of approach limits the attempt to close the assessment-intervention gap, though has been quite successful in generating useful and researchable data. However, it could also be argued that the “reciprocal teaching” approach developed under these authors’ auspices offers one model of closing the gap, since there is virtually no separation between assessment and intervention. The teacher is the mediator who engages the students in a complex intervention that involves specific target skills within the domain of reading comprehension (stop and summarize, formulate questions, clarify inconsistencies, predict what comes next). The teacher observes and provides ongoing intervention (primarily modeling and feedback) during the course of provision of the intervention (the same intervention to all). In this particular model, it is not entirely clear whether this is indeed an

example of dynamic assessment (Karpov, 2008). It is certainly a model of good teaching practice, as well as perhaps an example of formative assessment. It could perhaps move closer to DA if the issues of struggling students were addressed in terms of the inferred obstructions to their development of competence, followed by interventions that specifically addressed these needs.

### *Curriculum-based Assessment*

The Lidz & Jepsen Application of Cognitive Functions Scale (ACFS; in Haywood & Lidz, 2007) is an example of a curriculum-based procedure that explicitly attempts to close the gap between assessment and intervention. Not only does it include content and interventions that relate directly to curriculum and teaching practices typical of well designed early childhood settings, but the interpretive information accompanying the procedure includes educational objectives, interventions, and formats that lead to development of Individual Educational Programs and follow-up/tracking for the objectives derived. The ACFS subscales represent basic cognitive processes that underlie successful mastery of academic achievement domains. These include visual and auditory memory, classification, sequencing, planning, and perspective-taking. The Behavior Observation Rating Scale rates the behavior of children that also relates directly to their ability to succeed in an academic environment, such as self-regulation, flexible thinking, persistence, social interaction and interactive communication. The pretest-intervene-posttest format not only records the responsiveness of the learner during the course of the assessment, but provides a detachable posttest that can be used by teachers or educational assessors to track the students' progress in response to implementation of the recommendations for intervention deriving from the assessment.

An example of the route from assessment to classroom intervention derived from the ACFS is the subscale of Classification. This task requires the child to sort blocks into categories based on color, shape, and size. The intervention embedded within the assessment teaches the child how to do this, using attribute blocks. If it is determined that this is an area that requires attention and further development, the following objectives become part of the child's Individualized Educational Program:

Classification:

- a) Child will group objects on the basis of abstracted features of color, size function, shape.
- b) Child will change the basis of grouping objects when asked to “do it another way.”

Subskills:

- ability to detect distinctive features
- ability to respond to directions
- ability to make groups based on abstracted distinctive features
- application of grouping concepts across variety of materials, such as toys, clothes, foods (real simulations, as well as pictures).

Suggested classroom interventions for these objectives are derived directly from the assessment:

- Work on visual matching to a model object by attribute,
- Place objects with the same color in the designated box.
- Teach child to sort by at least two attributes; then ask child just to “sort.”
- Once sorted, ask the child to do it another way.

To assess the child’s progress with these objectives, the teacher (or another assessor) can then re-administer the post-test of the Classification subscale.

In the case of the behavior recorded on the Observation form, there are no standardized interventions embedded within the procedure. Nevertheless, suggested interventions for each behavior are offered in the test manual, and the assessor is free to intervene as needed during the course of the assessment.

For example, the following interventions, derived from research and teaching best practices, are offered to address concerns about the child's difficulty with self-regulation:

- Model and encourage task-related self talk.
- Provide opportunities for role playing teacher or parent.
- Change use of time out from use for punishment into use as a self-selected tool for self-control, that is, from time out to time to “cool out.”
- Use self-calming routines such as hands in lap, zipper lip, get eye contact with teacher/parent, breathing, count to ten.

The ACFS is now available in translation and adaptation in Spanish (Calero et al., 2013), Norwegian ([www.pedverket.no](http://www.pedverket.no)) and Czech (Lenka.Krejцова@ff.cuni.cz). Translations (without accompanying packaging) are also available in Dutch (Van der Aalsvoort & Lidz, 2007) and German (Schevel, 2008; Wiedl, Mata, Waldorf & Calero, 2014), and data related to its use in Australia and England are also available.

An even more direct attempt to close the assessment-intervention gap is the Curriculum-based Dynamic Assessment (CBDA) model proposed by Lidz (in Haywood & Lidz, 2007). In this approach, the assessor selects a target task from the learner's actual school curriculum. This task should reflect a specific area of concern from the referral, and can be a homework assignment or a classroom lesson. The assessor then engages in a process- analysis of that task to determine the neuropsychological processes related to development of competence in that domain. The choices of processes reflect those that relate to successful school achievement, such as sensory intactness, attention, perception, memory, language, reasoning, and metacognition; the assessor also needs to specify the basic knowledge and skill base necessary to mastery. Based on the various sources of information available to the assessor at the time (interview, observation, other assessments), the assessor then makes a judgment about the intactness of the learner's processes in relation to those demanded by the task. The issue is the match (or lack) between what the task requires for mastery and the intactness of those processes within the learner's repertory. The assessor then addresses the gaps with interventions that are available either within the literature, the classroom, or the assessor's experience to explore the learner's response to interventions provided within the assessment. The intervention targets the processes related to develop-

ment of competence in the content domain. For example, a student is referred for difficulty with spelling. The ability to spell has a high loading on visual and auditory memory; there are also issues of visual and auditory perception, as well as the language knowledge base issue of having the words to be spelled within the student's vocabulary repertory. Through error analysis and other assessment sources, the assessor determines that the student lacks strategies for placing information into memory storage. With knowledge of viable memory strategies, the assessor tries out a variety of strategies, such as visualization, to determine their degree of success in improving the student's ability to spell.

Despite the fact that this is a highly qualitative approach, it is possible to devise scoring rubrics that are specific to the domain, and the entire procedure can be administered within the pretest-intervene-posttest format.

In the current example, a teacher-made spelling test can be used, and items selected from this test pulled out for alternative pre/post tests. Once the pretest is administered, those items can be used for the intervention, since the posttest would use the alternative set. The student is given the posttest words to learn to spell, and then tested on the set. Alternatively, the original pretest words can be used, which would still provide useful information about the student's success with learning that set. This approach obviously places a great deal of work and thought on the assessor, but, in actuality, it is possible to do a meaningful (and very informative) CBDA within as brief a time as 20-30 minutes if the assessor is very careful to select a domain and task that directly represents referral concerns. The obvious advantage is that it is not possible to get closer to the instructional setting than to use the actual material content of that setting.

### ***Speech-language pathology:***

Dynamic assessment has been of particularly strong interest to researchers and practitioners in the domain of speech/language pathology.

Peña and Gillam (2000) offer a significant contribution to this domain in their development of three procedures that target the content areas of vocabulary development, narrative, and explanatory discourse. In these procedures there is a direct relationship between the semi-scripted mediations incorporated into their pretest-mediate/intervene-posttest design and the re-

sulting recommendations to the teachers and clinicians who will be working with the referred children. Their interventions follow a framework suggested by Lidz's (1991) modification of Feuerstein's Mediated Learning Experience outline, and deliver a content-related array of mediation of intent, meaning, transcendence, competence, along with profiling the learner's responsiveness to the interventions in terms of processes involved with initiation/maintenance of attention, task-related ability to discriminate/compare and comment, self-regulation, persistence and planning. In all three procedures, the assessor helps the learner understand the reason for learning the content and tries to develop a need to develop competence. The strategies relevant to the tasks are reviewed, with multiple opportunities offered for in-context practice. The assessor also completes a 'modifiability scale' to provide qualitative description of the responsiveness of the learner to the interventions. The information available to the clinician from this assessment includes the degree and nature of effectiveness of the interventions, and profile descriptions of the learning processes and degree of modifiability of the learner.

### *Second language learning*

Researchers in the domain of second language learning tend to pay especially close attention to the details of the interaction portion of the assessment. However, they also tend to gravitate toward the graduated prompt model, which then leads almost naturally to computerization of their assessments (e.g., Teo, 2012). With the use of computers in this domain, as in that of mathematics, there is often an adaptive component, with the input from the computer able to adjust to the responses of the learner. One of the interesting findings is that this approach has resulted not only in teaching of domain content, but seems to promote metacognitive functions in the learner, for example, improved self-regulation, monitoring, and evaluation (Teo, 2012).

However, quite in contrast to a computerized, guided prompt approach is the Lantolf and Poehner study (2010) that offers an example of ultimate blending of DA and intervention in their description of an elementary school teacher of Spanish to English dominant children (although these authors also use a guided prompting approach in their second language assessments).

The teacher in this project was self-motivated to find a way to move the principles and practices of DA developed for second language learners, as described in the Lantolf and Poehner Teacher's Guide (2006), into her own practices as an itinerant Spanish language teacher. These authors then intended to incorporate the information learned from this project into their guide to enhance its relevance for DA-guided teaching practices. Having a teacher blend DA with her own teaching practices of course represents the ultimate closing of the assessment-intervention gap. The ability to do this, ideally in relation to the DA-based information offered by diagnostic specialists, represents an optimal outcome for the larger assessment process. Both teachers and parents as ultimate implementers can move from passive receivers of information to active users and ongoing developers of further information.

A central aspect of such a model of implementation is the mediational component of feedback. Lantolf and Poehner (2010) cite research findings that suggest the superiority of explicit metalinguistic feedback for mastery of specific content products, but argue for the importance of both implicit and explicit mediation for effective internalization and self-regulation of learning-as-process (see Lidz, 1991, for a model of mediation that promotes self-regulation in the Mediated Learning Experience Rating Scale).

The teacher in this case study was essentially trying to enhance her mediation-based instruction. She focused each of her lessons on a continuum of choices of mediations (aka graduated prompts) that offered a total possibility of six to eight moves by the mediator as follows:

1. pause
2. repeat phrase as a question
3. repeat the part of the phrase that contains the error
4. point out to the student that there is an error and ask student to identify it
5. point out the error for the student
6. ask an either/or question
7. offer the correct response
8. provide explanation of why

The degree to which this is 'mediation' can be argued (especially from a Feuersteinian point of view), but it is clear that such an approach could enhance teachers' ability to track and record the students' responsiveness and the de-

gree of success of their instruction. Provision of the results of the application of this approach may itself provide meaningful feedback to the students, and, in the case of effect upon the teacher, the model may provide regulation and enhancement of her attention to the progress and needs of the students en-route to improved competence.

Poehner & Compennolle (2011) described the intertwined nature of their mediation-as-assessment and intervention for second language learners of French.

Also focusing on the mediational interactions between assessor and learner, Alavi, Kaivanpanah, and Shabani (2012) developed an inventory of strategies used during the course of group dynamic assessment of their English as a Second Language learners in Iran. Such a list is useful in providing a repertory to assessors to guide their interactions, which would then provide an outline for development of recommendations directly from the assessment. From their study emerged a list of eight strategies:

- confirmation or rejection of the response
- reply of either the entire segment or portion of the content
- putting words together
- repetition of the error as a question
- offering contextual reminders
- offering metalinguistic reminders
- use of a dictionary
- provision of the correct response with an explanation

### *Reading/literacy*

Carney and Cioffi (1990; 1992), in their case example, point to a long history among researchers of reading in the generation of interventions based on an interactive approach to assessment. Within the reading domain they explore the effects of a DA approach in relation to word recognition and text comprehension, and describe a graduated prompting approach that includes a series of instructional episodes designed to determine the degree of effectiveness of a variety of instructional alternatives. The type of instruction provided is individualized to the nature of the errors and perceived needs of the student. The information derived from this approach includes effectiveness of instruction for the student on speed, accuracy, use of prior knowledge, and

integration of concepts (in the case of comprehension). Considerable judgment and knowledge on the part of the assessor in the domain of reading would be necessary. The primary issue for these researchers is that the instruction is embedded within their assessment and directly applicable to subsequent remediation efforts.

Guterman (2010) offers another example within the reading domain of the effectiveness of incorporating mediation of metacognitive processes within the instruction and assessment of this content. Her research generated helpful questionnaires targeting metacognitive processes that could easily move information about the learner from the assessment situation into the classroom.

### ***Mathematics***

Mathematics is a domain particularly amenable to computerized presentation, and this option has been applied to dynamic assessment procedures by researchers such as Gerber (2000). The DA model, in his case called *Dynomath*, focuses on multidigit multiplication for secondary level students diagnosed with learning disabilities. Gerber designed the program to reflect the basic processes (specifically Working Memory), procedures, and knowledge base involved in mastery of this content with the goal of determining the possible relevant individualized interventions to enable the successful progress of the students. The program provides error-based prompts, and tracks the student's error history and responses to strategy-based prompts. Information regarding the student's speed and accuracy is available as well. The information available to teachers from this procedure includes the next instructional step, details about the student's zone of proximal development such as the speed and nature of responsiveness to the direct and strategic instruction.

Jeltova and her colleagues (2011) offer an example of group administered DA in the mathematics domain. This is part of their larger program of 'dynamic instruction' that incorporates Vygotsky-based dynamic principles of interaction into both the curriculum and the curriculum-related dynamic assessment. In this model the assessment-instruction relationship is assured.

Tzurriel and Trabelsi (2014) described their approach that sets a clear path between assessment and intervention. This approach connects the Seria-

Think Instrument, a DA assessment procedure (Tzuriel, 2000), with the Serial-Think Program by way of applying interventions taken from the mediation of processes addressed within the DA (planning and self-regulation) to the curriculum content of mathematics. Their research documents the considerable success of this approach with third grade children diagnosed with Attention Deficit Hyperactivity Disorder.

### **Applications in research and practice in psychopathology and developmental disabilities<sup>3</sup>**

Given that dynamic assessment is typically used to estimate learning potential or educability (Rey, 1934), it is reasonable to ask in what ways it is relevant to the study and treatment of psychopathological conditions, which are usually associated more with emotional states than with cognitive functioning. The answer is multi-faceted, relating to at least the following aspects.

Various conditions in psychopathology and developmental disabilities are characterized by deficits in psychological abilities and intellectual performance effectiveness (e.g., schizophrenia; Hunt & Cofer, 1944; Kraepelin, 1919; Raffard, Gely-Nargeot, Capdevielle, Bayard, & Boulenger, 2009). Much of the behavioral ineffectiveness in psychiatric conditions and developmental disabilities can be attributed to cognitive inefficiency in addition to or in tandem with emotional disturbance. Dynamic assessment can reveal previously unsuspected abilities and ways to improve the cognitive performance and behavioral effectiveness of persons with psychiatric disorders and developmental disabilities (Feuerstein, 1970; Kaniel & Tzuriel, 1992). Addressing the abilities revealed by dynamic assessment and employing the strategies used to unmask them can lead to improved cognitive effectiveness, which in turn can reduce behavioral and social difficulties as well as intra-psychic conflict (see, e.g., Haywood, 2000; Haywood & Menal, 1992).

Haywood and Lidz (2007, especially pp. 49-73) have addressed these issues in detail. They observed that what appears to be loss of or failure to

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<sup>3</sup> Some of the material covered here regarding the use of dynamic assessment in research and clinical practice with persons who have psychiatric and developmental disorders was reported previously by Haywood and Lidz (2007). The discussion in the present article includes similar and more recent information.

have developed intellectual resources is instead a matter of the masking of intelligence or obstructed access to one's own intelligence. Thus, when dynamic assessment is successful in revealing learning potential, it is illogical to assume that its procedures have created intelligence where it was not before; rather, those procedures have enabled access to the intellectual resources that were present all along, by helping learners (and patients) to overcome obstacles to such access. Various authors over the last century have listed non-intellective obstacles that bar access to one's intellectual resources (Binet, 1911; Feuerstein, 1970; Feuerstein & Rand, 1974; Haywood, 2013; Rey, 1934). Such obstacles include cultural difference and cultural deprivation, impoverished language both receptive and expressive, low levels of general knowledge, inadequate motivation for learning, attention deficits, emotional disturbance, inadequate habits of thinking and learning logically, and sensory handicaps. Indeed, schizophrenia has been characterized as a "thought disorder" throughout its modern history, with the implication that it constitutes a disruption (if not destruction) of the normal processes of thinking.

In the following sections we offer examples of the utility of dynamic assessment, in both research and clinical practice in the domains of psychiatric disorders, developmental disabilities, and encephalopathy.

Research in which dynamic assessment has been used to study persons with psychiatric disorders has centered largely in the domain of schizophrenia. Because schizophrenia is characterized as a thought disorder, researchers have been interested in determining whether it is possible to distinguish identifiable patterns of thinking, especially as revealed in language structure and use.

Ever since the classic review by Hunt and Cofer (1944), it has been generally agreed, based on a growing body of evidence, that schizophrenia is characterized in large part by relatively ineffective application of intellective resources in learning and perceptual tasks as well as in everyday life. Our task in the present article is to demonstrate the utility of dynamic assessment as both research tool and clinical instrument in this domain. The concept of learning potential is useful in this regard because it implies capacity for learning that is greater than is being demonstrated in patients' behavior (Rafard et al., 2009)—a situation that fits admirably with the strategies of dynamic assessment.

Wiedl and his associates have used dynamic assessment as a research tool (see Haywood & Wingefeld, 1992, for a discussion of DA as a research tool)

to study schizophrenia (Wiedl, 2001; Wiedl & Schottke, 1995, 2002a, 2002b; Wiedl, Wienobst, & Schottke, 2001; Wiedl, Wienobst, Schottke, & Neuchterlein, 2001; Wiedl, Wienobst, Schottke, & Kauffeldt, 1999). Carlson and Wiedl (2013) listed several domains of intellectual functioning in which dynamic assessment (or learning potential assessment) has been found to be useful in efforts to understand the relation of cognition and psychopathology, especially the major psychiatric disorders such as schizophrenia. These domains include cognitive differentiation, social perception, social problem solving, communication, and skill in interpersonal interaction. Assessment in these areas of functioning feeds directly into a treatment program, the Integrative Psychotherapy Program of Brenner, Roder, Hodel, and Kienzle (1994). Given that psychological therapies are highly verbal and centered on the relation of cognitive and affective functioning, it is entirely reasonable to expect intervention of an essentially cognitive nature to be effective in altering both cognitive and affective states. Thus, dynamic assessment efforts have been focused on the thought processes of self perception, metacognition (e.g., Moritz, Veckenstedt, Randjbar, & Vitzthum, 2011), understanding of implications of one's own behavior, selective attention (Wiedl & Schottke, 1995), and predictors of rehabilitation success (Wiedl, 2001; Wiedl, Schottke, & Calero, 2001), among others.

DA has also been used to distinguish clinical subtypes in schizophrenic patients. Sclan (1986) studied chronic schizophrenic patients who were diagnosed as either paranoid or non-paranoid subtypes of schizophrenia, using Haywood's Test of Verbal Abstracting (described by Haywood & Lidz, 2007) and Feuerstein's Representational Stencil Design Test (RSDT; Feuerstein et al., 1979, 2002). He found that (a) paranoid schizophrenic patients made fewer errors on both tests than did non-paranoid patients, (b) paranoid patients derived greater benefit from the interposed mediation in spite of having posted high pre-test scores, and (c) the two clinical subgroups could be reliably differentiated according to the types of errors they made on these tasks. DA thus aided the prognostication process and provided possibilities for therapeutic intervention in the cognitive realm.

One long series of studies has been focused on the ability of schizophrenic patients to form verbal abstractions, that is, to assign abstract meaning to events and language. Clinicians who have worked with schizophrenic patients will not fail to see the relevance of this kind of thinking. The interpretation of proverbs has been used for a century as an informal psychiatric test

with persons who suffer from psychiatric disorders, including schizophrenia. Typically, such patients do poorly on these tests, often seeming to be fixated at a concrete level of understanding. Thus, when asked “What does this saying mean: Don’t cry over spilt milk?” patients with schizophrenia are likely to give concrete responses, such as “You shouldn’t cry because the milk is poured out” rather than to understand the metaphorical nature of the proverb. Blaufarb (1962) showed that patients with schizophrenia significantly more often give abstract and generalized responses (e.g., “It is useless to be sorry after something is already done”) when given three different statements of the proverb, that is, using three different metaphors that have the same abstract meaning, whereas the “enriched” procedure did not help the abstracting performance of persons without psychiatric disorders. Hamlin, Haywood, and Folsom (1965), using the same technique of stimulus enrichment within assessment, replicated that finding and extended the phenomenon to show that the ability to form verbal abstractions is not lost but is masked with the onset of symptoms of psychosis. The series was confirmed and extended by Haywood and Moelis (1963), who demonstrated that general intellectual performance varies as a function of the persistence of psychotic symptoms. Thus, an early form of dynamic assessment led to a change in prognostication in cases of chronic schizophrenia, if not immediately to specific treatment strategies, although clinicians were quick to adopt more effective strategies for interacting verbally with schizophrenic patients, insisting, for example, on the utility of stating relatively abstract meanings in multiple ways as well as by focusing more sharply on the use of metaphoric language and its interpretation.

A very similar dynamic assessment strategy was subsequently used in the study and treatment of persons with intellectual disabilities. Rather than using interpretation of proverbs, Gordon and Haywood employed a verbal similarities task (e.g., “In what way are an orange and a banana alike, and “In what way are an orange, a banana, a peach, a plum, and a pear alike?”). The 5-exemplar items yielded significantly higher abstraction scores than did the 2-exemplar items in persons whose intellectual disability was associated with cultural-familial circumstances but not in persons who did not have intellectual disability or in those whose disability was associated with demonstrable organic pathology. Subsequent research (e.g., Haywood & Switzky, 1974; Tymchuk, 1973) replicated these findings with different groups of intellectually low-functioning children and adolescents in different settings. The re-

search led to the development of a clinical dynamic assessment instrument, the Test of Verbal Abstracting (TVA; reported by Haywood & Lidz, 2007) that is used now in the clinical assessment of both typical individuals and persons with a variety of developmental disabilities, including autism, Prader-Willi syndrome, learning disabilities, as well as intellectual disability. The TVA is staged in such a way as to indicate either “exit” or “continue to investigate” at several points in the assessment.

Dynamic assessment is used as well in neuropsychology for assessment of the habilitation potential and promising directions for rehabilitative strategies in persons who have central nervous system based disabilities. Three quarters of a century ago, André Rey (1941) used an early form of dynamic assessment, notably his Plateaux Test (Rey, 1934), in the psychological examination of persons with traumatic brain injuries. The same test is incorporated, with a more obvious dynamic-mediational aspect, in Feuerstein’s Learning Propensity Assessment Device (Feuerstein, Rand, & Hoffman, 1979; Feuerstein, Feuerstein, Falik, & Rand, 2002). Haywood and Miller (2003) demonstrated the use of group-administered dynamic assessment of adults with traumatic brain injuries to show that these persons improved their cognitive performances significantly with interposed mediation of cognitive and metacognitive strategies. Heinrich (1991) adapted the Halstead Category Test for dynamic administration by interposing mediation of basic cognitive and metacognitive operations between static pre-test and post-test. He then examined patients who had experienced severe head trauma, and found that they were able to derive significant benefits from the interposed mediation on tests of near transfer but were less successful on tests of far transfer, suggesting that more intensive and prolonged mediation would be required to lead to improvement in the far transfer tasks. Contrary to the prevailing pessimistic view of the likelihood of cognitive improvement in patients with severe head trauma, these two studies revealed previously unsuspected learning potential in these patients and provided bases for more prolonged therapeutic intervention. Several of Rey’s tests have been translated and adapted for dynamic assessment by Haywood (see Haywood & Lidz, 2007) and are used clinically to search for rehabilitative potential in persons with traumatic brain injuries.

As we have noted previously (Haywood, 1977; Haywood & Lidz, 2007), dynamic assessment and neuropsychological assessment strategies have much in common, not least their shared goal of eliciting maximal rather than typi-

cal performance, a determination not to permit failure, and a search for cognitive strengths (what has been spared) rather than emphasizing only what has been lost. Dynamic neuropsychological assessment is one of the most promising of the various clinical applications of DA.

As is true in the case of dynamic assessment in educational settings, its use in research and practice in clinical psychology has not yet led definitively to prescriptive treatment—at least not treatments that have been empirically demonstrated. It is equally true that the groundwork has been laid for such developments; i.e., DA has allowed us to extend the knowledge base to the point that it is now possible to develop empirically the treatment strategies and programs whose basis is derived from DA of cognitive functions and their interface with emotionality and rational behavior.

### **Concluding thoughts and future directions**

With the increasing advocacy of evidence-based procedures in the educational and clinical literature, it is clear that realization of this goal is considerably easier to say than to do. Determining and even defining what is in fact evidence is, to say the least, a considerable challenge. The good news is that there are meaningful efforts to collect and evaluate such evidence (e.g., What Works Clearinghouse at [ies.ed.gov](http://ies.ed.gov)). The bad news is that there is no documentation that this information is in fact evidence for any specific individual or group that faces the teacher, therapist, or assessor at any specific time. We are unaware of any intervention or instruction that is one hundred per cent effective for one hundred per cent of the people one hundred per cent of the time. Most of us are quite pleased to find effects that are significant at the .05 level with any group-administered treatment. We suggest that such group-based evidence is only hypothetical until it is actually tried out with the individual or group to whom it is to apply. Clearly, this is too much of a burden for each and every instance, and instructional and treatment activities have to proceed in terms of probabilities of success. However, we see direct trial as necessary in the case of individuals who do not respond to the “evidence-based” interventions described in most group-based research (or even in single case studies). For individuals who do not respond, the single case, exploratory laboratory of dynamic assessment can, in our view, provide the only source of real evidence that truly closes the assessment-intervention gap. We

in fact fail to see how an assessment can be considered 'comprehensive' or how referral questions involving treatment decisions can be addressed without such information.

Standardized IQ typically predicts the criterion of academic achievement but offers no direction for instruction other than assignment to groups. These groups are hardly homogeneous in any meaningful way and are unlikely to have any simple or homogeneous response to instruction. That said, it is also true that some interventions show promise regardless of the group to which they are applied. Therefore, research needs to be double-pronged. On the one hand, there needs to be ongoing research into evidence-based practices, and, on the other hand, it cannot be assumed that any single practice will necessarily work for a specific individual. The notion of evidence needs to be rethought and broadened, with increased value (and definition of validity) assigned to prescription rather than confined to prediction. It may be necessary, but certainly not sufficient, to be able to predict future success or failure without guidelines for turning failure into success. Furthermore, as Kozulin (2013) points out, interventions need to maximize the possibility of transfer. Despite our advocacy for closing the gap between assessment and intervention, we do not propose that this gap be so tightly closed that generalizable principles and transferable strategies, the content typical of a cognitive approach to education, are neglected.

Feuerstein's work almost from the start began with both an assessment instrument (Feuerstein, Rand, & Hoffman, 1979) and a curriculum (Feuerstein, Rand, Hoffman, & Miller, 1980) designed to intervene with similar or identical functions and processes as the assessment. It would be ideal to assume that the assessment instrument is administered to determine areas of need for intervention, followed by selected instruments from the intervention to address these areas of need. In our experience and observation, this is rarely the case. All too often there is a gap or even a total disconnect, and students tend to be engaged in the entire intervention program without an attempt to make the match between areas of need and nature of prescribed interventions (e.g. review by Hadas-Lidor, Weiss, & Kozulin, 2011). Identification of areas of need and determination of the appropriate interventions are central to the closure of the assessment-intervention gap. Even among practitioners of DA, there has been too much of a reflexive response to administration of diagnostic procedures and generation of interventions. This can contribute to observations by some that DA is too time-consuming. Even de-

velopers of DA need to be concerned about issues of efficiency and specificity. The Hadas-Lidor, Weiss, and Kozulin (2011) case study demonstrates that such gap closure can be achieved with the instruments designed by Feuerstein and his colleagues.

Clearly the source of gap closure within the DA assessment process lies within the intervention portion of the assessment. Much can be achieved with a computerized adaptive approach to profile learners and their individualized responses to program content. Graduated prompts have the potential to yield instructionally relevant information, though are rarely designed to do so. Perhaps even more is available within the mediational approach to DA, which can be tailor-made for each individual, though this has its own limitations that have been well discussed in the literature. The challenge remains for researchers, developers, and practitioners to continue their efforts to “mind the gap.” It is also clear from research such as that reviewed above that there has been meaningful progress toward this goal.

One document that shows promise of moving practitioners toward the goal of gap closure is the handbook by Lauchlan and Carrigan (2013). This is a very helpful, clearly written manual for educational (school) psychologists, written to lead them to and through the dynamic assessment process. The authors not only review background theory, principles, and practices, but provide a number of very practical check lists and a wide array of strategies that can provide a bridge between the assessment and instructional situations.

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