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Article

Dynamic assessment of L2 development:
bringing the past into the future

James P. Lantolf and Matthew E. Poehner

Abstract

The present paper outlines a theoretical framework for the application of dynamic assessment procedures to second language assessment and pedagogy. Dynamic assessment (DA) is grounded in Vygotsky's writings on the zone of proximal development (ZPD) and has been widely researched in psychology and education. DA distinguishes itself from other approaches to assessment by insisting that mediation of the examinee's performance prompts, hints, leading questions etc. – during the assessment procedure is crucial to understanding his/her abilities and for promoting development during the assessment process itself. In this paper, the major approaches to DA are reviewed and some key studies are reported on. The few language-acquisition DA studies that have been carried out to date are then considered. The paper concludes with a discussion of some of the criticisms leveled against DA and recommendations for further research into DA's potential contributions to applied linguistics.

KEYWORDS: ASSESSMENT; INSTRUCTION; MEDIATION; ZONE OF PROXIMAL DEVELOPMENT; DEVELOPMENT; INTERACTION; RELIABILITY; VALIDITY.

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Both authors: The Pennsylvania State University, USA.

Corresponding author: James P. Lantolf, 304 Sparks Building, Pennsylvania State University, University Park, PA 16802. Email: jpl7@psu.edu

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1 Introduction

The present paper outlines a theoretical framework for a research and teaching program within applied linguistics based on Vygotskian sociocultural principles of learning commonly referred to as dynamic assessment (henceforth, DA). The following does not report on an empirical study on DA in an L2 context, but provides a conceptual discussion of DA principles and their relevance for applied linguistics. Although most of the examples we will use to illustrate DA principles and procedures are from the general psychological and educational literatures, we will also provide a few examples from the early attempts to explore the potential of DA in L2 settings[1]. We will also address some of the critiques of DA raised by those who have examined DA through the psychometrician's lens, in particular we will consider the relevance of test reliability and validity. Finally, we will briefly discuss the potential relationship between DA and formative assessment – a topic of considerable importance, and which we explore in greater detail in a more practically oriented paper on DA in the language classroom (Poehner & Lantolf, in progress).

Dynamic assessment integrates assessment and instruction into a seamless, unified activity aimed at promoting learner development through appropriate forms of mediation that are sensitive to the individual's (or in some cases a group's) current abilities. In essence, DA is a procedure for simultaneously assessing and promoting development that takes account of the individual's (or group's) zone of proximal development (ZPD). DA focuses 'on modifiability and on producing suggestions for interventions that appear successful in facilitating improved learner performance' (Lidz, 1991: 6).

2 DA and the zone of proximal development

Vygotsky's writings on the ZPD provide the theoretical underpinnings of DA. Central to the ZPD, and the core concept of Vygotsky's theory of mind, is *mediation*. Higher forms of thinking are socially and culturally derived, emerging as a consequence of our interactions with other individuals and with physical and symbolic artifacts (e.g., books, computers, diagrams, numbers, language, etc.) constructed by others in different places and at different times. In this way, our relationship to the world is not direct but mediated.

Vygotsky (1998: 201) argued against the general view that *independent problem solving* is the only valid indication of mental functioning, suggesting that this reveals only part of a person's mental ability, his or her *actual* developmental level. Indeed, 'determining the actual level of development not only does not cover the whole picture of development, but very frequently encompasses only an *insignificant* [italics added] part of it' (Vygotsky, 1998: 200). He insisted that responsiveness to assistance is an indispensable feature for

understanding cognitive ability because it provides an insight into the person's *future* development. That is, what the individual is able to do currently with assistance, s/he is able to do later alone.

Importantly, potential development varies independently of actual development, meaning that the latter, in and of itself, cannot be used to predict the former. This is because potential development is not an a priori prediction but is derived from concrete mediated activity. The following quote provides what we see as an early description of DA:

> Imagine that we have examined two children and have determined that the mental age of both is seven years. This means that both children solve tasks accessible to seven year olds. However, when we attempt to push these children further in carrying out the tests, there turns out to be an essential difference between them. With the help of leading questions, examples, and demonstrations, one of them easily solves test items taken from two years above the child's level of [actual] development. The other solves test items that are only a half-year above his or her level of [actual] development. (Vygotsky, 1956: 446–7, cited in Wertsch, 1985: 68)

For Vygotsky the two children are simultaneously equivalent and not equivalent:

> From the point of view of their independent activity they are equivalent, but from the point of view of their immediate potential development they are sharply different. That which the child turns out to be able to do with the help of an adult points us toward the zone of the child's proximal development. This means that with the help of this method, we can take stock not only of today's completed process of development, not only the cycles that are already concluded and done, not only the processes of maturation that are completed; we can also take stock of processes that are now in the state of coming into being, that are only ripening, or only developing. (Vygotsky, 1956: 447–8; cited in Wertsch, 1985: 68)

To fully assess an individual's development, it is not enough to determine her or his intrapsychological ability, we must also uncover her or his interpsychological capacity. Said another way, observing a person's history (i.e., actual level of development) presents only part of the picture; the full picture emerges only when we take account of his or her future: the project of DA.

3 Comparing DA to static assessment

DA researchers have compared and contrasted their approach with assessment procedures that are not sensitive to the ZPD – procedures they often refer to as static assessment (henceforth, SA). While we recognize the dangers inherent in dichotomizing different approaches to any scientific enterprise, we nevertheless

believe that, at least for the sake of exposition, it is useful to lay out some of the differences between more familiar approaches to assessment and DA. Therefore, we rely on the comparisons and the terminology developed by DA researchers with the understanding that many scholars working in the general area of assessment would not fully endorse how SA is characterized.[2]

3.1 Understanding the future

Vygotsky's theorizing on the ZPD is predicated upon a radically different understanding of the future from that which informs SA, and in our view this is the fundamental difference between the two approaches. To appreciate this difference we will consider Valsiner's (2001) work on three models for theorizing the future that have appeared in the psychological literature. In the first, an essentially exclusionary, or atemporal model, humans do not develop but mature as a consequence of either genetically (e.g., innatism) or environmentally (e.g., behaviorism) specified causal factors. The second and third models are characterized by Valsiner as *past-to-present* and *present-to-future*, respectively. The former recognizes 'the role of the past life history of the organism in leading to its present state of functioning' (p. 86). Development in this model is a 'sequence of stages' that a person is assumed to pass through on the way to some final stage; moreover, stages cannot be skipped along the way. The future is predicted '*post factum* – when it already has become present' (Valsiner, 2001: 86). Valsiner notes that this model axiomatically accepts the view that 'the dynamic *changes* of the past that have led to the present can also explain any future. History (of the past) is here utilized to eliminate history (of new development) for the future. The future is assumed to be similar to the past' (ibid.), or as Frank Lloyd Wright's famous dictum puts it, 'The future is now.' Freud's theory of emotional development, Piaget's theory of cognitive development, and, within SLA, Krashen's (1981, 1983) morpheme-order and Pienemann's (1998) processability hypotheses are all examples of past-to-present models of the future.

With regard to assessment, language aptitude and proficiency tests are commonly used to make predictions about the future, and both fit into Valsiner's past-to-present model. Aptitude tests, for instance, construe future learning on the basis of present test performance. Similarly, proficiency tests (e.g. ACTFL-OPI) ostensibly project from observed test performance to future language performance in non-test situations. These tests assume that the future and the present are equivalent; that is, future performance or learning is taken to be a close reproduction of actual performance on the test itself. Past-to-present models of assessment explicitly make bets in favor of some individuals and against others, materially instantiated as the bell curve.

Present-to-future models, on the other hand, concentrate on the *future-in-the-making*. Focus here is on the emergence of novelty, and for Valsiner (2001: 86), the 'research orientation of semiotic mediation belongs to the realm of these models'. Not only do these models allow us to chart out development before it happens, 'through their study *while* [italics in original] they are emerging' (this is what 'proximal' means in the ZPD), but they also compel us to participate actively in the developmental process itself. In other words, our concern is with the 'process of the present (actuality), on the basis of anticipation of immediate future possibilities and through construction of reality out of these anticipated possibilities' (2001: 86). By present, or actual development, Valsiner, echoing Vygotsky, means the person's past *as it is brought into contact with the future*. Present-to-future models, then, predict the future not a priori but on the basis of human agents performing in conjunction, or to use Vygotsky's term, in cooperation, with other human agents.

For testing, the future-in-the-making perspective sees ability not as a stable trait but as a malleable feature of the individual and emergent from the activities in which the person participates. Thus performance on, say, an aptitude test is not complete until we observe how the person behaves in response to mediation, a projection of the future. In other words, to fully understand the person's potential to develop (i.e., her future), it is necessary to discover her ZPD. Importantly, while we are gaining a perspective on the person's future, we are at the same time helping the person attain that future.

DA is very much in line with Valsiner's future-in-the-making model, since it is anticipated that future performance will be different from current performance. Lidz and Gindis (2003: 103) stress this point in the following quotation: 'traditional standardized assessment follows the child's cognitive performance to the point of "failure" in independent functioning, whereas DA in the Vygotskian tradition leads the child to the point of achievement of success in joint or shared activity.' Indeed, Feuerstein, Rand and Rynder's (1988) book on DA carries in its title the plea, 'Don't accept me as I am.' In essence DA sees the future as a bet in favor of everyone.

In DA, as called for in Vygotsky's ZPD, assessment and instruction are dialectically integrated as the means to move toward an always emergent (i.e., dynamic) future. Bronnfenbrenner (1977: 528) captures this notion very nicely in citing a comment made by A. N. Leont'ev, an influential colleague of Vygotsky: 'American researchers are constantly seeking to discover how the child came to be what he is; we in the USSR are striving to discover not how the child came to be what he is, but how he can become what he not yet is.' [3]

3.2 Methodological differences

Sternberg and Grigorenko (2002) enumerate three methodological differences between SA and DA. First, SA focuses on the outcome of past development, while DA foregrounds future development. In Vygotsky's terms, SA taps into already matured abilities but DA promotes functions that are maturing. Second, the examiner/examinee relationship differs in the two approaches. In SA, examiners are expected to adopt a neutral and disinterested stance as a means of minimizing measurement error (Sternberg & Grigorenko, 2002: 29). In DA the examiner intervenes in the assessment process as the 'conventional attitude of neutrality is thus replaced by an atmosphere of teaching and helping' (ibid.). Third, in SA examinees are given little or no feedback on the quality of their performance until the assessment is complete. To do otherwise would threaten the reliability of the instrument. In DA, a specific form of feedback is provided – mediated assistance – and this is the crux of the assessment process. What makes a procedure dynamic or static is not the instrument itself but whether or not mediation is incorporated into the assessment process. In other words, fill-in-the-blank, multiple-choice, open-ended essay, or even oral proficiency tests are in themselves neither static nor dynamic instruments. Their status is determined by the goal of the procedure and the format in which it is subsequently administered.

4 Interventionist versus interactionist approaches to DA

In this section we elaborate on the differences between the two primary approaches to DA – *interventionist* and *interactionist*. In the latter, assistance emerges from the interaction between the examiner and the learner, and is therefore highly sensitive to the learner's ZPD. In the former, forms of assistance are standardized, therefore emphasizing the psychometric properties of the assessment procedure. Interventionist DA is concerned with quantifying, as an 'index of speed of learning' (Brown & Ferrara, 1985: 300), the amount of help required for a learner to quickly and efficiently reach a pre-specified end point. Interactionist DA, on the other hand, focuses on the development of an individual learner or even a group of learners, regardless of the effort required and without concern for a predetermined endpoint. Using the train metaphor proposed by Elkonin (1998: 300), we might argue that those interested in speed and efficiency of learning, (i.e., interventionist DA), focus on how quickly a train moves toward the final station along a set of tracks. Interactionist DA, following Vygotsky more closely, is not as interested in the speed of the train along the already constructed track as with helping the person lay down new track leading toward a station that is potentially always relocating (see Newman & Holzman, 1993, on development as creativity and transformation).

4.1 Interventionist DA – 'sandwich' format

Two formats exist within interventionist DA, referred to by Sternberg and Grigorenko (2002) as the 'sandwich' and the 'cake' approaches. The 'sandwich' approach, pioneered in large part by Milton Budoff and associates (Budoff & Friedman, 1964; Budoff, 1968; Corman & Budoff, 1973), primarily relies on a pretest-intervention/training-posttest format administered in either an individual or group setting, and reminiscent of traditional experimental research designs. Budoff reports the performance of examinees as a pre-training score, post-training score and post-training score adjusted for pretest level. These are then used to group learners as high scorers (i.e., those with high pre-training scores, and who therefore do not manifest much improvement as a result of training), gainers (i.e., those whose scores showed marked improvement as result of training), and non-gainers (i.e., those who performed poorly on the pretest and did not profit from instruction). Budoff's approach provides general strategies for improving performance on a particular type of test instrument (e.g., Kohs Block Designs). For example, following the pretest, learners receive coaching that might include the importance of paying attention to the simplest elements in the block design, the need to check block construction against the design card, and to attend to the color design of the blocks (Sternberg & Grigorenko, 2002: 75). However, this training is not particularly sensitive to an individual's ZPD.

Budoff's use of a pretest-training-posttest methodology is motivated by his concern with the psychometric properties of the assessment procedure. Indeed, he is critical of interactionist approaches such as Feuerstein's (discussed below), arguing that 'it is difficult to distinguish the contribution the tester makes to student responses from what the student actually understands and can apply' (Budoff, 1987: 56). This, in our view, is a clear parting of the ways with how Vygotsky theorized the person–environment relationship. As Elkonin (1998: 299) explains, for Vygotsky interaction between the child and the adult is 'not a factor of development, not what acts from outside on what is already there, but a *source* [italics added] of development.'

4.2 Interventionist DA – 'cake' format

In the *cake* format, the examinee is provided with mediation drawn from a standardized menu of hints, ranging from implicit to explicit, during the administration of the assessment itself. Thus, the 'cake' metaphor alludes to the layering of test items and hints in such a way that a menu of hints can be accessed, as required, for each question or problem *before* moving on to the next item on the test. Two well developed interventionist approaches to DA that follow a 'cake' format are Jürgen Güthke's *Leipzig Learning Test* (LLT) and Ann

Brown and colleagues' *graduated prompts approach* to intelligence assessment and cognitive development. We briefly describe each of these in the following sections.

The Leipzig Learning Test (LLT)

The LLT, originally introduced as the *Lerntest* (see Güthke, 1982), comprises a broad array of subject areas, including language tests (Güthke, Heinrich & Caruso, 1986). An LLT language aptitude assessment might proceed as follows. Examinees are given sets of geometric figures paired with words from an invented language and among other things are asked to carry out a pattern completion task as in Figure 1.

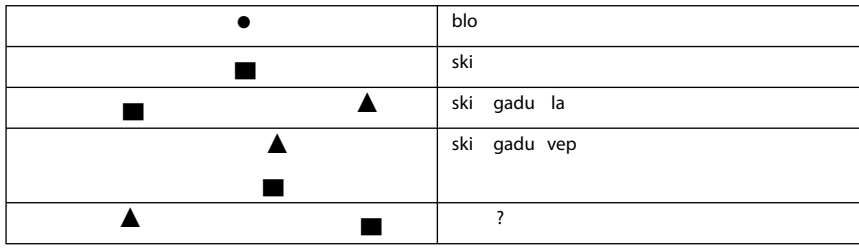

Figure 1 LLT Language Aptitude Diagnostic (Güthke, Heinrich & Caruso, 1986: 906)

If an examinee's first attempt is incorrect, s/he is provided with the following vague hint: 'That's not correct. Please, think about it once again.' If the second attempt is also unsuccessful, the examiner offers a more explicit hint: 'Think about which rows are most relevant to the one you are trying to complete.' If the third attempt fails the examiner offers an even more explicit hint: 'Let's look at rows three and four.' If the response is still inaccurate, a very explicit hint is offered: 'Let's look at rows three and four and focus on the differences in both the positions of the objects and the words.' If this fails to produce the correct response, the examiner provides the correct pattern and explains the solution: 'The correct pattern is *gadu ski la*; *gadu* represents the triangle, *ski* the square, and *la* the objects' relative horizontal positioning.' The next item is then attempted and while the items become increasingly complex, the same standardized set of five prompts is used throughout. Whenever an individual produces a correct response, the assessor asks him/her to explain the rule underlying the pattern, thereby helping the assessor identify instances of random guessing.

The results are reported as both a score (i.e., the number of prompts required and the amount of time taken to complete the test) and a profile (i.e., analysis of the types of errors produced and the forms of assistance to which

the examinee was most responsive), which serves as the basis for subsequent teaching in which examinees are offered instruction aimed at redressing the problems that arose during the assessment. Later, a second parallel assessment is administered following the same procedure as the first. Importantly, this second administration does not assume that all examinees will complete all items without assistance but, rather, it is expected that the hints required will be fewer and less explicit.

Currently, Güthke and his colleagues (see Güthke & Beckmann, 2000) are developing computerized versions of the LLT, which can be administered on a large scale. In one version, the assessment procedure is adaptive such that examinees can skip around within a particular program until they either cannot produce the correct answer or require assistance to do so, at which point they are detoured to earlier items that were skipped. However, the detour is sensitive both to the type of help required as well as to the source of the problem resulting in the incorrect solution. Thus, if an individual produces a response that shows understanding of some aspects of the language (e.g., word order) but not others (e.g., agreement morphology), s/he is led into a detour that focuses on the problematic dimension and then is led back into the more complex problems integrating syntax and morphology. A distinct advantage of the computerized LLT is that it can be administered to large numbers of individuals simultaneously, yet at the same time it can, to a point, individualize the assessment without sacrificing its psychometric properties (2000: 42).

The Graduated Prompt Approach

In the Graduated Prompt Approach to DA, Brown and her colleagues (see Brown & Ferrara, 1985; Campione, Brown, Ferrara & Bryant, 1984) administer tests offering mediation that is designed to teach examinees to solve problems through discovering and applying a specific set of principles within domains such as reading, science, and mathematics. Brown's approach to DA is unique in that once the examinees have mastered the relevant principles and can solve problems independently, the examiner then attempts to discover their ability to 'transfer' what they have learned to novel problems. As in the LLT, the examiner provides assistance as needed from a pre-established menu of hints arranged from general to specific culminating with the solution to the problem. In the initial posttest the examinees are given 'novel exemplars' of the original problem types (Campione et al., 1984: 81); they are next given a set of 'near transfer' problems which integrate the same principles as in the original task but in new combinations. Then the examinees are presented with a set of 'far transfer' problems requiring 'the use of a new but related rule or principle in addition to the familiar ones'. Finally, the examinees are asked to respond to a set of 'very far transfer' problems that are even more complex. Based on

the examinee's assisted and unassisted performance throughout this testing procedure, the researchers generate learner profiles comprising two axes – one measuring how quickly examinees are able to learn the new patterns and the other measuring how far they can extend this knowledge to novel problems (see Brown & Ferrara, 1985).

4.3 Interactionist DA

Minick (1987: 127) points out that for Vygotsky the ZPD is neither a way to assess learning potential, nor a means of measuring learning efficiency, but 'a means of gaining insight into the kinds of psychological processes that the child might be capable of in the next or proximal phase of development and a means of identifying the kinds of instruction, or assistance that will be required if the child is to realize these potentials.' Unlike in interventionist orientations to DA, interactionist approaches follow Vygotsky's preference for 'qualitative assessment of psychological processes and dynamics of their development' (Minick, 1987: 119).

Reuven Feuerstein, a leading advocate of interactionist DA, has produced a robust set of studies very much in line with Vygotsky's understanding of the ZPD (Feuerstein, Rand & Hoffman, 1979; Feuerstein, Rand, Hoffman & Miller, 1980; Feuerstein, Rand & Rynders, 1988). Feuerstein, Rand & Hoffman (1979) argue that traditional conceptualizations of the examiner/examinee roles should be abandoned in favor of a teacher-student relationship in which both are working toward the ultimate success of the student. They write, 'It is through this shift in roles that we find both the examiner and the examinee bowed over the same task, engaged in a common quest for mastery of the material' (p. 102). In this way, they bring instruction to center stage and downplay the importance of psychometric measurements.

At the heart of Feuerstein's approach is the *mediated learning experience* (MLE). Feuerstein describes the MLE as a process through which environmental stimuli do not impact directly on the organism but are filtered through some other person, usually an adult mediator, who selects, frames, modifies, and imposes order on the stimuli to ensure that 'the relations between certain stimuli will be experienced in a certain way' (Feuerstein, Rand & Rynders 1988: 56). Sternberg and Grigorenko (2002: 54) point out that the mediator not only modifies the stimuli or task but also affects the learner by 'arousing him or her to a higher level of curiosity and to a level at which structural cognitive changes can occur'. While differences exist between Vygotsky's and Feuerstein's theories (e.g., Vygotsky emphasizes the history of a person's development, and therefore agues that activity is always and everywhere mediated), both researchers understand mediation as 'the psychological component of cultural transmission' (Feurerstein et al., 1981: 271).

The MLE encompasses several important components, including feelings of competence, ability to self-regulate, and the internalization of general learning principles that guide the individual in 'learning how to learn'. In addition, the mediator must carefully select, schedule, and repeat as necessary, culturally determined stimuli for presentation to the individual. This enables the learner to more easily internalize the cultural practice s/he is participating in with the mediator. This process of internalization occurs as a result of the child's imitation of the models provided by the mediator.[4] In order to extend current abilities to future performance the individual must extend what has been internalized by anticipating outcomes that are likely to result from specific actions (Sternberg & Grigorenko, 2002: 50–51).

The components of MLE are concretized into a dynamic procedure known as the learning potential assessment device (LPAD) that incorporates some well-known assessment instruments (e.g., Raven's Colored and Standard Progressive Matrices and the Rey-Osterrith Complex Figure Test) with a mix of instruments designed specifically for the LPAD. The LPAD requires the examiner to interact flexibly with the individual examinee, negotiating the assistance and guidance required to 'modify the cognitive structure of the individual' (Feuerstein, Rand & Rynders, 1988: 204). The examiner thus functions as a mediator who reacts to the learner's responsiveness and is more concerned with cognitive transformation than with performance efficiency.

In Minick's (1987: 138) view, while Feuerstein's model reflects Vygotsky's ZPD in allowing the assessor greater freedom to interact with the learner and thereby deploy a wide array of assistance to foster development, Feuerstein fails to provide extensive data on the psychological processes underlying performance and development. However, two recent studies, Karpov and Gindis (2000) and Peña and Gillam (2000), document these processes in considerable detail.

Interactionist DA and psychological processes

Karpov and Gindis (2000) report on a set of case studies of analogical reasoning in children with learning problems. One study focused on a seven-year-old child diagnosed with limited cognitive and linguistic abilities and with attention-deficit-hyperactivity disorder (ADHD). The child's solo performance on a diagnostic assessment indicated that she was unable to reason even at the visual-motor level (e.g., count objects by touching or moving them). At the outset of the DA procedure, it took a good deal of time and effort for the evaluator to focus the child's attention on the explanation and manipulation of geometric shapes (a square, a circle, a triangle, a cross, and a star) required to carry out the reasoning task. Through dialogue, the evaluator succeeded in focusing the child's attention on the task, and eventually she began to show an

ability to reason at the visual-motor level (i.e., she could complete an analogy representing the relationship among a series of geometric shapes by physically manipulating the shapes). The evaluator then pushed the child to the next level (i.e., visual-imagery reasoning) where she was required to complete similar analogies only by looking at the shapes rather than physically moving them. Finally, the evaluator ceded increasing responsibility for solving the problems to the child by encouraging her to use private speech to regulate herself during task performance. Contrary to the outcome of the child's solo performance, the DA demonstrated that the child was *not* cognitively deficient but was in fact able to perform at an age-appropriate level once she learned to use her own speech for self-mediation, thereby overcoming the challenges presented by ADHD (p. 151).

Peña and Gillam (2000) discuss a series of DA case studies designed to distinguish children with language impairments ('unusual difficulties learning language', p. 543) from those with problems arising from language differences (e.g., bilinguals, non-standard dialects, etc.). Focusing on three domains of language (vocabulary, narrative ability, and discourse performance), the researchers engaged the children through highly interactive forms of mediation. For instance, some of the children had difficulty understanding the importance of using single words to denote objects, events, and concepts. Peña and Gillam incorporated items from the traditionally administered pretest into two subsequent MLE sessions that were carried out dialogically with each child. The leading questions included 'Have you ever known someone who was _____?' and 'What does it mean when X said Y?' The researchers also asked more open-ended questions such as, 'What would happen if the puzzles were moved to the art area?' (2000: 553).

In one case, a four-year-old Spanish-English bilingual child's performance on the *Expressive One-Word Picture Vocabulary Test-Revised* (EOWPVT-R) was below normal, but it was not clear whether this was due to the linguistic and cultural bias of the test or to a genuine language impairment (2000: 551). For most test items, she was either non-responsive or simply replied, 'I don't know.' Through a DA procedure, Peña and Gillam were able to uncover the source of the child's problem and provide mediation to help her ameliorate the problem. While her performance on the EOWPVT-R did not improve following mediation, she did show improvement in her ability to self-regulate and plan, as well as in her motivation and attention to the task. On the basis of the DA, the researchers concluded that the child's difficulties were rooted in a language impairment rather a language difference. They then made several recommendations to allow the teacher to further promote the child's development.

5 L2 dynamic assessment

In this section we will consider some of the L2 research on DA. To our knowledge there have been five publications specifically framed within DA theory.[5] Two of these, Güthke, Heinrich and Caruso (1986) and Peña and Gillam (2000) have already been discussed above. A study by Kozulin and Garb (2002) will be surveyed as an example of interventionist L2 DA and studies by Antón (2003) and Gibbons (2003) will be presented as examples of interactionist L2 DA. Although Gibbons (2003) is not specifically situated within a DA framework, it is relevant because it examines classroom L2 learning from the perspective of a group ZPD.

5.1 Interventionist L2 DA

Kozulin and Garb (2002) report on a subset of a larger study on EFL reading comprehension skills conducted among young adult at-risk immigrants to Israel. The authors developed an instructional curriculum that included a DA component focusing on helping learners develop general comprehension strategies that could be used to access meaning in a broad array of texts, regardless of a given text's vocabulary and grammatical properties.

Students were first asked to read a simple passage in English and to answer a set of comprehension questions. Following the pretest, classroom teachers, who had been trained as mediators, reviewed the test with the students, 'mediating for them the strategies required in each item, building together with the students process models for each item, and indicating how strategies can be transferred from one task to another' (2002: 19). Additional forms of mediation included 'an information page' that was given to students which included grammatical and lexical information relevant to the pretest text (e.g., use of auxiliary verbs 'to be' and 'to do'; question words, formation of negation, etc.) and an activity that required students to read four texts and answer comprehension questions focusing on text structure, cohesive devices and background knowledge. Unfortunately the authors do not specify precisely how the teachers mediated the test items, whether this was done individually or in a group, and what the focus was (e.g., grammar, text structure, etc.). Following the mediation students completed a posttest that closely paralleled the pretest.

Kozulin and Garb argue that the students' abilities could not have been fully captured on the basis of their performance on the pretest alone; rather it was necessary to determine the extent to which they had benefited from the intervention. They therefore devised a formula to calculate what they call the learning potential score or LPS, which quantified the gain between the pretests and posttests. This, they argued, provided a more complete picture of the learners' ability because it allowed the researchers to group students as low, moderate and high performers, and to make instructional recommendations for how to better help each of the groups in the future.

5.2 Interactionist L2 DA

Antón (2003) and Gibbons (2003) are early empirical examples of potential applications of interactionist DA to L2 learning. Antón (2003) reports on an interactionist DA procedure used for placement purposes in a university advanced L2 Spanish program and demonstrates that the DA procedure revealed important differences among students that may have otherwise remained hidden. Gibbons (2003) illustrates the relevance of interactionist DA in an L2 content-based primary-school setting. Although not explicitly framed as a dynamic assessment, Gibbons' study does focus on a teacher co-constructing a ZPD by mediating the performance of her students following a series of small group experiments with magnetism. Given the central role of mediation in this study and the excellent example it provides of working in the ZPD, it is relevant to DA and is therefore included in the present discussion.

DA and language placement

Antón (2003) used a DA procedure to place students in advanced-level courses in a university undergraduate Spanish program. Student performance was evaluated on the basis of accuracy in the use of sentence-level grammar and vocabulary. The goal of mediation in Antón's study was to generate a diagnostic evaluation for more appropriate placement in courses that would better match their development level. We will discuss two representative excerpts from Antón's protocols in which the examiner prompts the students in order to give them the opportunity to revise their performance in appropriate ways. Students who were able to revise under prompting were considered to be at a more advanced stage than students who could not and were therefore placed in different courses.

In the first example, a student attempts to use Spanish past tense verbs while relating an oral narrative based on a short film about a family traveling through Spain. Upon completing the narration the examiner questions the student about details of the story, focusing in particular on the student's use of the past tense (for convenience we present the interaction in English):

Example 1

E=Examiner; S=Student

E: You started the story in the past and then, half way you switched
S: Yes, yes
E: To the present.
S: Yes, yes. I heard
E: Do you want to try again using the past ? And you can ask me.

If there is a verb you do not remember it's OK.

S: Yes, yes, from the beginning ?

E: Perhaps from the middle

S: In the past, yes, yes.

E: Did you realize that you made the switch ?

S: Yes, yes, I heard.

The student re-narrates the story from the middle and, with only two or three slips back into the present, uses the appropriate past tense forms.

Not only was the student able to appropriately re-narrate the story when given the opportunity but under questioning he indicated his awareness of the problem. From a DA perspective, to evaluate the learner's developmental level solely on the basis of his initial unmediated performance would have resulted in an incomplete assessment. We agree with Antón that the learner had a greater degree of control over past tense than the original performance suggested. To put it in Vygotsky's terms, the past tense was in the process of maturing and the learner required only a leading comment to make this manifest.

In a second protocol, another student, asked to narrate the same film, used the present tense exclusively throughout the narrative. When given the opportunity to renarrate the story, this student experienced greater difficulty than the student in Example 1; in particular he has problems appropriately distinguishing first from third person and was only able to produce the correct form when the examiner narrowed the possibilities to two options. In Example 2 we present the protocol in Spanish with an English translation:

Example 2

S: *Jugué al tenis* [I played tennis]

E: *Jugué o jugó* [I played or she played?]

S: *Jugó* [She played]

The problem continued throughout the narration, as illustrated in Example 3:

Example 3

E: … *Muy bien. Y aquí dijo, que hizo?* [Very good. And here you said, what did she do?]

S: *Comí* [I ate]

E: *Comí o comió* [I ate or she ate?]

S: *Comió* [She ate]

E: *Comió*

In Examples 2 and 3, the student was unable to produce the correct verb form without assistance and, importantly, did not seem to appropriate the assistance since following the interaction in Example 2 he required the same type of explicit feedback in Example 3.

On the basis of their solo performance both students experienced problem controlling the past tense in narration. From a DA perspective, however, it is clear that their respective degree of control over the relevant morphology differs to a considerable degree, as shown by their need for and responsiveness to different types of feedback. Therefore, they have different ZPDs and consequently require different types of instruction.

DA in the L2 classroom

Gibbons (2003) investigated how two teachers mediated their respective eight- and nine-year-old students into using sufficiently explicit descriptions of physics experiments on magnetism. Gibbons argues that much of the mediation provided by the teachers was sensitive to the children's ZPD, 'through this mediation, students' contributions to the discourse are progressively transformed across a mode continuum into the specialist discourse of the school curriculum' (Gibbons, 2003: 247). From a DA perspective, the children's actual level of development was reflected in their use of everyday expressions 'stick' 'hold' and 'push' and their future development aimed at an ability to use the corresponding technical terms 'attract' and 'repel'. The brief protocol in Example 4 illustrates the interaction between one of the teachers and her students. The teacher is interacting with the entire class as she asks the students to report their experimental observations of the behavior of magnets and objects carried out in small groups.

Example 4

1	Teacher:	Tell us what happened
2	Beatrice:	Em we put three magnets together / it still wouldn't
3		hold the gold nail.
4	Teacher:	Can you explain that again ?
5	Beatrice:	We / we tried to put three magnets together … to
6		hold the gold nail … even though we had three
7		magnets … it wouldn't stick.

(Gibbons, 2003: 264)

In Example 4 teacher's question in line 4 is a fairly implicit hint that something was not quite adequate in Beatrice's original description of the groups' magnetic experiments. As Gibbons points out, Beatrice's use of 'still' in line 2 requires some shared knowledge of what happened in the actual experiment (2003:

263). In her recast of what the students observed in the experiment, Beatrice shifts to a somewhat more explicit mode of discourse and in line 6 uses the expression 'even though' to indicate causality (2003: 254). However, she fails to use the appropriate scientific jargon and continues to describe the experiment with the everyday verbs 'hold' and 'stick'.

Moving on to another student, Michelle, the interaction given in Example 5 occurs:

Example 5

1	Teacher:	Tell us what you found out.
2 3	Michelle:	We found out that the south and the south don't like to stick together.
4 5	Teacher:	Now let's / let's start using our scientific language Michelle.
6 7 8 9	Michelle:	The north and the south repelled each other and the south and the south also … repelled each other but when we put the / when we put the two magnets in a different way they / they attracted each other.

(Gibbons, 2003: 264)

In Example 5 the teacher asks Michelle to describe the experiment and once again the student fails to produce the appropriate scientific language. This time, however, the teacher, perhaps realizing that her earlier prompt to Beatrice was too implicit, offers a more explicit hint in line 4. Michelle complies and rephrases her description using the technical expressions 'repel' and 'attract'. Although Michelle initially failed to use the appropriate language, she was able to comply solely on the basis of the teacher's reminder, and did not require the teacher to provide the precise terms. We argue that the students had developed in their ability to use scientific terminology, but they had not yet reached a level of complete independence from the teacher's mediation.

From the perspective of DA, the students were moving beyond their *actual* level of development, grounded in the specifics of concrete situations and characterized by use of everyday language, toward more explicit and generalized descriptions incorporating technical jargon. However, this development only manifested itself as a consequence of the teacher's mediation, without which assessments of the students' knowledge would have underestimated their progress and would have been unable to provide a glimpse into their future.

6 The psychometric critique of DA

DA has not been accepted with open arms by members of the testing community. The lion's share of criticism stems from perceptions of DA's psychometric shortcomings. In this section we briefly address some of these issues.

Snow (1990) objects to the dynamic–static contrast proposed by DA researchers, dismissing the distinction as a 'propaganda device' (1990: 1134). In his view, 'static' is a misnomer because both 'static' and 'dynamic' tests are concerned with predictive validity (i.e., the future). We do not disagree with Snow, but we point out that SA and DA differ with regard to the nature of their predictions. In DA prediction is about an imagined future that emerges only through mediated activity (i.e., development); in SA, prediction is about generalizing an individual's test performance to subsequent non-test situations. To recall Valsiner's (2001) discussion, DA predicts a future-in-the-making while SA predicts a future-in-the-present.

Snow also objects to using the term 'assessment' to describe DA. He argues that without linking assessment in some way to measurement, 'fundamental in all science', the term is 'meaningless' (1990: 1135). Büchel and Scharnhorst (1993: 101) have responded by encouraging DA researchers to link assessment and measurement through 'standardization of the examiner–subject interaction', as in interventionist DA. Similarly, Glutting and McDermott (1990: 300) criticize Feuerstein's procedure because of its reliance on improvisation and 'creative latitude in the administration of mediated learning experiences' and because some children receive more help than others during the interaction. They also worry about 'instrument decay' as 'teaching prompts on early test items can result in autonomous changes in the difficulty level of subsequent items'. For Vygotsky, improvization and creativity are essential to providing appropriate forms of mediation in the ZPD (Newman & Holzman, 1993), while measuring a child's performance provides little more than 'a purely empirical establishment of what is obvious to persons who just observe the child' and adds nothing new to what is already known through direct observation (Vygotsky, 1998: 205). This gets at the fundamental purpose behind and meaning of assessment: for Vygotsky, the task is not to *measure* but to *interpret* the child (Vygotsky, 1998: 204).

6.1 Reliability

Another criticism of DA concerns test reliability and standardization; presumably, without standardization there can be no reliability (Büchel & Scharnhorst, 1993: 103). Traditionally, test reliability derives from a commitment to standardization whereby all sources of potential error should be minimized to ensure that the observed score on a test is as close to the true score as possible.

Reliability assumes that what is being measured is more or less stable. Within DA, interventionist researchers are committed to the reduction of measurement error through standardized form of mediation. Interactionist DA, on the other hand, is more problematic when placed under the psychometrician's lens. Interactionist assessors argue that abilities are inherently unstable, and that to be maximally useful in promoting development assistance must be tailored to the needs and responsiveness of specific learners or groups of learners, a requirement which undermines standardization. For Feuerstein et al, the goal is 'to *undo* the predictive value of the initial assessment by modifying functioning through the mediational process' (Feuerstein, Rand & Rynders, 1988: 199). In what to some is no doubt a curious turn, the more reliable the procedure, the less effective it is in promoting individual development. As Lidz (1991: 18) cogently puts it, 'the word "dynamic" implies change and not stability. Items on traditional measures are *deliberately* selected to maximize stability, not necessarily to provide an accurate reflection of stability or change in the "real" world.' [6]

6.2 Validity

While reliability is detrimental to interactionist DA, validity is not. DA derives its validity not from the assessment instruments but from the procedures followed in the administration of the instrument. Given that the purpose of DA is to push the person's (language) abilities forward, to the extent that this is achieved, the validity of the procedure is established. Of course, researchers may differ with regard to how they understand the abilities they want to assess (e.g., how they define language proficiency). Nevertheless, with appropriate mediation DA can be used to promote development of the ability in question.

Güthke and his colleagues have undertaken to psychometrically establish the construct validity of the *Lerntest*. The interactionist tradition, aligned with Vygotsky's understanding of the ZPD, establishes construct validity through a qualitative analysis of the psychological processes that underlie an individual's performance. Feuerstein, Rand and Rynders (1988: 205) state that in DA, 'very little attention is given to product or to the absolute magnitude of a result. More importance is attached to learning about the process that has brought about a particular product.'

Carlson and Wiedl (2000), echoing Messick's (1988) recommendations, argue that equally important for DA is consequential validity, particularly with regard to 'the context of and justification for its use, a result of pragmatic judgments combined with scientific analysis. If a measure cannot be justified for its practical utility it becomes irrelevant' (2000: 708). In Antón's (2003) work consequential validity took center stage as the Spanish faculty were able to make better informed placement decisions for their advanced students.

7 Conclusion

DA focuses on promoting development through mediation in the ZPD. To this end it insists on the inseparability of assessment and instruction and foregrounds individuals over test instruments. Interactionist approaches are closer to Vygotsky's notion of the ZPD and how he understands the processes at work in human development, adopting a clinical perspective on diagnosing ZPDs and helping individuals develop. Interventionist approaches, on the other hand, focus on helping individuals become more efficient in their learning, and therefore have retained 'some of the psychometric properties of more traditional "static" forms of assessment' (Lunt, 1993: 164). In our view whether one favors an interventionist or interactionist approach depends on the goal and circumstances under which an assessment is carried out. Interactionist approaches, because they are more labor-intensive and time-consuming, are likely to be more useful in classroom settings involving relatively small numbers of students while interventionist procedures seem more appropriate for large-scale assessments. The trade-off is that in gaining efficiency, one loses access to unique information on psychological processes that can only be brought out through interaction with individuals (Lunt, 1993: 167). On the other hand, as illustrated in Gibbons' (2003) study, it is possible to work within the ZPD of an entire class of students through dialogic interaction. We encourage language researchers and practitioners to pursue both approaches to DA. In particular, we believe that the recent work of Tzuriel and Shamir (2002) on computer-administered DA and Güthke's computerized LLT hold considerable promise for large-scale DA.

On the face of it, it might appear that interventionist DA shares features with summative assessments because of its psychometric properties and because it can be administered in a large-scale format and that interactionist DA parallels formative assessment because of its apparent ties to the classroom setting. While a full discussion of this important topic is beyond the scope of the present study, we would like to point out that the distinction between summative and formative assessment accepts the dualism between testing and instruction, which DA, because of its theoretical link to the ZPD, does not. Researchers are beginning to recognize that formative assessment can provide more than feedback into the instruction cycle and opportunities for learners and teachers to reflect on learner performance. Indeed, as the work of Rea-Dickins (2001) demonstrates, in some types of formative assessment, especially in what Ellis (2003: 313) refers to as 'incidental' formative assessment, teachers are able to guide learners through dialogic interaction toward enhanced performance and learning. However, this type of activity tends to be intuitive on the part of the teacher rather than guided by principles of learning theories, such as proposed by Vygotsky. Torrance and Pryor (1998), for instance, show that although

some teachers react in an emotionally supportive way to learners' problematic performances, they are not sensitive to the ZPD and the appropriate mediation required to promote development. We address these and related issues in another paper (Poehner & Lantolf, in progress) in which we focus specifically on DA, formative assessment, and classroom practice.

Notes

1 Poehner (in progress) is conducting an extensive DA study on the oral proficiency of advanced university L2 French students. However, this study is still in an early stage and we are unable to report any findings.

2 An anonymous reviewer of an earlier version of this paper comments that 'There are many who are working in non-DA paradigms who are nevertheless concerned with the detailed interaction between test takers and testers' and that therefore 'the boundaries [between DA and SA] are not as clear cut as the author(s) would like to suggest by setting up this dichotomy.' Although we are sympathetic to this observation, we also think it is fair to point out that DA is not fundamentally about the interaction between test takers and testers per se and its potential impact on any given assessment, but it is about promoting development through appropriate forms of mediation.

3 Lidz (2003) notes that in the former Soviet Union, standardized testing was proscribed in favor of dynamic approaches to assessment from the 1930s to the early 1980s and DA was the 'only paradigm accepted in psychology and remedial education' (2003: 105).

4 For a full discussion of imitation and internalization see Vygotsky (1987; 1998), Tomasello (1999), and as it relates to language learning, Lantolf (2003).

5 Sternberg and Grigorenko (2002) discuss a study by Grigorenko, Sternberg and Ehrman (2000) which reports on a language aptitude test. Sternberg and Grigorenko refer to the test as an example of DA. However, nowhere during the administration of the test does mediation occur. The fact that the test presumably taps the examinee's ability to learn during the test is not what makes a test dynamic; rather it is the provision of mediation by the examiner that marks a procedure as dynamic (see Sternberg and Grigorenko's 2002 definition provided above). Another study by Schneider and Ganschow (2000) offers some interesting speculation on how DA might be used to help L2 learners with dyslexia, but given its conceptual rather than empirical focus, we will not review it here.

6 Swain (1993), in discussing the variable performance of French immersion students on a series of oral as well as on a series of written tests, questions the psychometric assumption that for a test to be appropriate it must have high internal consistency. Indeed, citing the work of Shohamy (1988), which shows that reading ability varies across genre, register, topic, etc., Swain (1993: 202) notes that 'One might wish to argue that a good test of second language reading proficiency must have a low internal consistency.'

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