

## Bio-Ecological Approach to Cognitive Assessment

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*Because determining a child's educational program usually takes into consideration the child's cognitive functioning, it is vital that those who are involved in this enterprise recognize that many variables contribute to and explain performance. Thus, careful consideration, assessment, and planning are mandatory to plan a child's individual educational program. This article emphasizes that cognitive assessment is both a formal and an informal process that occurs in several contexts—the school, the home, and the community. Therefore, when psychological evaluators assess the cognitive performance of a child, it is necessary to analyze the complete range of his or her social/emotional environments that have contributed to his/her current cognitive performance levels. Thus, it is vital to examine the orientation of family members, the academic assistance students receive at home, as well as the current and previous classroom environments in which the student has been educated. Six nonpsychometric measures (using item equivalency, test-teach-retest, and contextualization) were developed by the authors and are presented in recognition that there are many factors that one must consider when interpreting the performance of a child. © 1997 John Wiley & Sons, Inc.*

• *Bio-Ecological Model* • *cognitive assessment* • *culturally diverse children*

### Introduction

The nature-nurture question has become one of the most polemical questions in psychology: To what extent are variations in cognitive performance due to genetic or environmental influences? Although there is little disagreement that genes and environment matter in intelligence, researchers are divided in terms of the degree

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to which intelligence is heritable. Even if there were consensus regarding the heritability of intelligence, there are other far more troubling issues that continue to keep the nature-nurture controversy alive. One issue has to do with the interpretation of low scores on standardized tests of intelligence in terms of genetic inferiority and the assumption that intelligence is a fixed and immutable characteristic. The genetic argument endures in some circles, despite theoretical and empirical research evidence supporting the notion that intelligence is more than what an IQ test measures and that the trainability of cognitive capacities is indicative of intelligence. The other issue concerns the use of IQ test data in making educational placement decisions. Low scores on these measures are used as "objective" evidence for placing children in special education, low track, or general classes. These placements are not necessarily inappropriate as long as the experiences provided are intended to be adaptive to children's strengths and weaknesses as revealed by the test data. Unfortunately, these judgments of low ability often parallel race, ethnicity, language, and class differences, and children seldom escape from these initial placements in their subsequent schooling experiences.

In this article, we conceive of cognitive behavior as an inextricable bio-ecological phenomenon, and argue for an assessment consistent with this conception. The article is divided into two sections. Section I begins with a discussion of cognitive capacities. This is followed by an examination of the role of the ecology in which individuals develop and express themselves cognitively, and finally a call for a bio-ecological approach to cognitive assessment is made. Section II describes the nonpsychometric measures within the bio-ecological assessment system.

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### **Section I—Conceptual Background**

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#### *Cognitive Capacities*

Numerous theoretical and empirical research findings (Carroll, 1993; Horn, 1985; Sternberg, 1988) from both the psychometric and information processing literature have provided a very good understanding of the internal mental mechanisms responsible, in part, for variations in the expression of cognitive behavior. Terms such as cognitive abilities (e.g., Carroll, 1993; Horn, 1985; Jensen, 1981), cognitive processes (Ceci, 1990; Hunt, 1978; Pellegrino and Slasser, 1979; 1983; Sternberg, 1988), and cognitive potentials (Ceci, 1990; Gardner, 1983) have been used to describe the nature and function of these cognitive indicators of intelligence. These cognitive capacities, as we call them, enable us to acquire knowledge, to reason, to remember, to perceive information through various sensory modalities, to retrieve information from memory, to make decisions, and to exercise judgment. It also seems that there is a speed factor associated with the way these capacities are deployed during the performance of a task.

In the introduction of this special section, the authors discussed Gardner's (1983) conception of multiple intelligences that capture the pluralistic notion of cognitive capacities in seven areas.

#### *Ecological Cognition*

Ecology is an inclusive term used to describe the sociocultural context that promotes or constrains the deployment of cognitive processes in tasks that require the exer-

cise of intelligence. The notion of the ecological dependency of cognition stems from a basic principle within Vygotsky's (1978) sociohistorical perspective that nascent cognitive potential(s) emerge, develop, and are displayed within a sociocultural milieu.

Vygotsky's sociohistorical perspective has guided much of the empirical research on cognition and development (see reviews by Ceci, 1990; Rogoff and Chavajay, 1995; Sternberg, Wagner, and Okagaki, 1993). Researchers in this tradition have sought an understanding of people's "everyday cognition" by examining their thinking in real-world tasks, in multiple real-world environments. What is remarkable about this body of work is that successful performance on these real-world tasks seems to require the same cognitive processes or strategies that are used in the successful performance on standardized intelligence tests, yet there is weak or no correlation between performance on both kinds of tasks. A more comprehensive explanation of the inseparability of context and cognition may be found in Ceci's (1990) bio-ecological treatise on intellectual development and Sternberg's (1988) triarchic theory of intelligence.

#### *A Bio-Ecological Approach to Cognitive Assessment*

Our bio-ecological approach to cognitive assessment is based on the work of Vygotsky (1978), Ceci (1990), and Sternberg (1988), which suggest a dynamically interactive relationship between cognitive processes and experiences nested within contexts that cannot be understood apart from each other. We take the position that cognition is, in part, a culturally dependent construct. People are born with diverse capacities that predispose them to engage in activities within any given ecology. Behavior may be described as "intelligent" to the extent that the nature and quality of experiences to which people are socialized require the exercise of these capacities. The cognitive capacities required for intelligent behavior in one context may be the same as in another context. The expression of these capacities through behavior may be different, though, to the extent to which the socialization experiences within one context are psychologically different from other contexts. It is also possible that the cognitive capacities required for cognitive behavior in one context may be different from those in another context. Consequently, the expression of these capacities may reflect the context in which they were socialized. This line of thought has led us to conceive of intellectual behavior as an inextricable biocultural phenomenon and argue for a bio-ecological approach to cognitive assessment.

In some ways, standardized tests of intelligence are consistent with a bio-ecological approach. They all purport to measure many cognitive abilities that are indicative of intelligence and that many scholars agree are in part biologically determined. Test items do reflect learning experiences that are similar to the learning experiences common in some home and school contexts. However, a number of caveats must be made regarding standardized intelligence tests, particularly for children from linguistically and culturally diverse backgrounds. It cannot be assumed that (a) the cognitive capacities measured are the only ones of interest; (b) the experiences sampled on the test are common across populations; and (c) the concept of time has the same meaning across populations. On the basis of these concerns, we argue for a more flexible and ecologically sensitive assessment system that allows for greater heterogeneity in the expression of intelligence. In short, we contend that other qualitative, nonpsychometric approaches must complement the quantitative psychometric measures of intelligence.

In the next section, we examine seven nonpsychometric measures that can be used in conjunction with a psychometric assessment measure to assess, in a more comprehensive and heterogeneous manner, the cognitive functioning of culturally diverse individuals.

## **Section II—Practical Applications**

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Before administering any intelligence test, it is necessary to conduct a differential diagnosis. It is only after ruling out the following possible causes of the child's learning/emotional difficulties that a psychometric/nonpsychometric assessment should be done.

### *Health Assessment—Medical Examination Form*

Please review the child's school records to determine that all is well physically. In addition, ask the parent about the child's medical history.

1. Health Examination by a licensed physician or evidence of such in the form of a health certificate. This is important to rule out basic impediments to learning. This includes sensorium functioning: vision and hearing. A dental checkup should also be done to rule out the possibility of dental pain being a depressing factor. Blood work should be done to ensure that the child is not anemic or experiencing dietary deficiencies. The issues of pain and anxiety related to menstruation should be explored. Finally, issues related to enuresis should be examined.

LINGUISTIC ASSESSMENT. (See the Family/Community Support Assessment Measure)

PRIOR EXPERIENCES. Educational/psychosocial previous experience, that is, aspects of the child's learning style that would inhibit or facilitate the expression of cognitive behavior.

FAMILY ISSUES. What familial factors are affecting the child's performance in the classroom/school setting?

### *A Psychometric Measure*

Any standardized test that taps a child's cognitive ability can be used. The important point to remember is that there is no single psychometric measure that taps the three interrelated and dynamic dimensions of intelligence—biological cognitive processes, culturally coded experiences, and cultural contexts. Therefore, *any psychometric measure or an amalgamation of tests (interbattery testing, the process approach to assessment, cross-battery testing)* that emphasize a score-oriented approach should be used in conjunction with nonpsychometric measures outlined here. The critical issue is that this comprehensive approach to testing emphasizes the importance of *how* clients achieve their scores rather than focusing entirely on the scores themselves.

*Nonpsychometric Assessment Measures*

The following nonpsychometric assessment measures ought to be given as part of the battery of tests to gain further understanding of the child's potential cognitive functioning and his/her ability to function in other settings besides the school:

- Family/Community Support Assessment
- Other Intelligences Assessment
- Item Equivalency Assessment Measure
- Test–Teach–Retest Assessment Measure
- Ecological Taxonomy of Intellectual Assessment
- Stage of Acculturation
- Teacher Questionnaire

### ***Family/Community Support Assessment***

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This questionnaire is necessary to determine what support systems the child has at home and in the community, what the child's previous educational experiences have been, and what language is spoken at home.

Parent's Name:

Date:

Child's Name:

Regionality: United States—urban/inner city/suburban/rural

If country of origin is not in the United States:

Where is the native country?

How long has the child been in the United States?

Are the parents/significant other residing in the United States?

Who else resides in the home?

What have been your child's previous educational experiences?

- Was your child ever retained?
- How often per week is your child absent?
- What has been your child's academic performance in
  - math—poor/fair/good/very good
  - reading—poor/fair/good/very good
- Did your child participate in any supplemental instructional programs? If yes, what programs were they?

In the event that there is one parent in the home, but there is also a significant oth-

er residing at home, fill in the other relative instead of mother/father. If there is only one adult in the home, then leave the other-parent section questions blank.

How many years has the mother been residing in the United States?

How many years has the father been residing in the United States?

What is the mother's place of birth?

What is the father's place of birth?

### Linguistic

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- |   |                   |               |
|---|-------------------|---------------|
| 1. Does mother speak English?           | Rank how well.    |               |
| Not fluently                            | Somewhat fluently | Very fluently |
| 2. Does mother speak another language?  | What language?    |               |
| Not fluently                            | Somewhat fluently | Very fluently |
| 3. Does mother read English?            | Rank how well.    |               |
| Not fluently                            | Somewhat fluently | Very fluently |
| 4. Does mother read another language?   | What language?    |               |
| Not fluently                            | Somewhat fluently | Very fluently |
| 5. Does mother write English?           | Rank how well.    |               |
| Not fluently                            | Somewhat fluently | Very fluently |
| 6. Does mother write another language?  | What language?    |               |
| Not fluently                            | Somewhat fluently | Very fluently |
| 7. Does father speak English?           | Rank how well.    |               |
| Not fluently                            | Somewhat fluently | Very fluently |
| 8. Does father speak another language?  | What language?    |               |
| Not fluently                            | Somewhat fluently | Very fluently |
| 9. Does father read English?            | Rank how well.    |               |
| Not fluently                            | Somewhat fluently | Very fluently |
| 10. Does father read another language?  | What language?    |               |
| Not fluently                            | Somewhat fluently | Very fluently |
| 11. Does father write English?          | Rank how well.    |               |
| Not fluently                            | Somewhat fluently | Very fluently |
| 12. Does father write another language? | What language?    |               |
| Not fluently                            | Somewhat fluently | Very fluently |

### Other Home Linguistic Questions

In what language did the mother receive most of her education?

In what language did the father receive most of his education?

What language does your child most often speak to his/her mother?

What language does your child most often speak to his/her father?

What language does your child most often speak to his/her siblings?

What language does your child most often speak to his/her friends?

In what language are radio or television shows most often received at home?

How many hours per week does your child read?

In what language does your child most often read?

How many hours per week does your child see you reading?

In what language does your child most often see you reading?

Linguistic proficiency:

Linguistic dominance:

**Educational**

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13. Mother's level of education attained in native country or in the United States:		
Did not finish HS	Finished HS	Finished college
14. Father's level of education attained in native country or in the United States:		
Did not finish HS	Finished HS	Finished college
15. Is anyone at home able to assist this child in his/her homework?		
Never	Sometimes	Always
16. Is the child able to study at home?		
Never	Sometimes	Always
Why not?		
17. Is any person or organization in the community able to assist the child in his/her homework?		
Never	Sometimes	Always

**Social/Community**

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18. Are you involved in any church/community organization?		
Never	Sometimes	Always
19. Is your child involved in any church/community organization?		
Never	Sometimes	Always
20. Are you involved in any interest group or club?		
Never	Sometimes	Always
21. Is your child involved in any interest group or club?		
Never	Sometimes	Always
22. Does your child go to any nonschool events with friends without adult supervision?		
Never	Sometimes	Always
23. Does your child go to any nonschool events with friends with adult supervision?		
Never	Sometimes	Always
24. Is your child involved in any sports in the community?		
Never	Sometimes	Always
25. Is your child involved in any form of employment?		
Never	Sometimes	Always

Examine the circle responses and comment on the level of support based on these answers, the clinical interview, behavioral/cultural observation etc.

More "Never" responses—Low

More "Sometimes" responses—Moderately Low/Adequate

More "Always" responses—Adequate/Moderately High

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***Other Intelligences Assessment Measure***

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In keeping with Gardner's position that all children can excel in one or more type of intelligence, this measure attempts to capture two commonly found intelligences among culturally different children—musical and bodily kinesthetic.

**Musical Intelligence**

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Interview with the *child*:

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Do you play a musical instrument?	Yes/No
If Yes, what instrument?	
How long have you been playing this instrument?	
What level of proficiency have you attained?	
Beginner	Intermediate
	Advanced

Please check off if you can do the following:

Listen to a piece of music, then create a song

Could I obtain a copy of your certificate/diploma/teacher feedback in music?

Do you have samples/audiotapes of musical performances? Yes/No

Do you have samples/audiotapes of composition? Yes/No

Do you have samples of written/performed/composed songs? Yes/No

Do you have lyrics of raps, songs, or rhymes that you wrote? Yes/No

Did you compile discographies? Yes/No

*Interview with the parent and music teacher:*

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Does your child play a musical instrument? Yes/No

If Yes, what instrument?

How long has your child been playing this instrument?

What level of proficiency has your child attained?

Beginner Intermediate Advanced

Could you furnish me with a copy of your child's/your student's certificate/  
diploma/teacher feedback in music?

Do you have samples/audiotapes of musical performances of your child? Yes/No

Do you have samples/audiotapes of compositions of your child? Yes/No

Do you have samples/audiotapes of compositions of your child? Yes/No

Do you have samples of written/performed/composed songs of your child? Yes/No

Do you have lyrics of raps, songs, or rhymes that your child wrote? Yes/No

Did you compile discographies of your child? Yes/No

### **Bodily-Kinesthetic Intelligence**

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*Interview with the child:*

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Do you play any sports? Yes/No

If Yes, what sport(s)?

How long have you been playing this game?

What level of proficiency have you attained?

Beginner Intermediate Advanced

Do you dance/act/paint/draw? Yes/No

If Yes, what type of dance?

How long have you been dancing/acting/painting/drawing?

What level of proficiency have you attained?

Beginner Intermediate Advanced

Could I obtain a copy of your certificate/diploma/teacher feedback in  
sports/dance/drama?

Do you have videotapes of projects/demonstrations? Yes/No

Do you have samples of projects actually made? Yes/No

Do you have photos of hands-on projects? Yes/No

*Interview with the parent and sports/dance/drama/art teacher:*

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Does your child play any sports? Yes/No

If Yes, what sport(s)?

How long has your child been playing this sport?

What level of proficiency has your child attained?

Beginner Intermediate Advanced

Does your child dance/act/paint/draw?	Yes/No
If Yes, what type of dance?	
How long has your child been dancing/acting/painting/drawing?	
What level of proficiency has your child attained?	Advanced
Beginner	Intermediate
Could you furnish me with a copy of your child/your student certificate/diploma/ teacher feedback in sports/dance/drama/art.	
Do you have videotapes of projects/demonstrations of your child?	Yes/No
Do you have samples of projects actually made of your child?	Yes/No
Do you have photos of hands-on projects of your child?	Yes/No

**The Personal Intelligences**

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*Intrapersonal.* Using the clinical interview, the clinician should examine the child's intrapersonal strengths and weaknesses such as self-concept, self-esteem issues.

*Interpersonal.* Social skills scales and observation in social/community settings should assist in assessing interpersonal. In addition examine:

- peer group reports
- videos, photos, or write-ups of cooperative learning projects
- certificates or other documentation of community service projects
- written teacher reports
- written parent reports

Break down further into Intellectual/Social/Affective  
Furthermore, the following questions can be asked:

*Child Interview*

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Are you involved in any church/community organization?		
Never	Sometimes	Always
Are you involved in any interest group or club?		
Never	Sometimes	Always
Do you go to any nonschool events with friends without adult supervision?		
Never	Sometimes	Always
Do you go to any nonschool events with friends with adult supervision?		
Never	Sometimes	Always
Are you involved in any form of employment?		
Never	Sometimes	Always
Do you accompany your parent or any relatives to the store or any agency and serve as a translator for him/her?		
Never	Sometimes	Always
Are you responsible for caring for or supervising your younger siblings while your parents/relatives are not at home?		
Never	Sometimes	Always
Could you cook/iron/make the grocery? Please circle the ones you do well.		
Please list any other domestic/community chores for which you are responsible.		
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*Parental Interview*

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Is your child involved in any church/community organization?		
Never	Sometimes	Always
Is your child involved in any interest group or club?		
Never	Sometimes	Always
Does your child go to any nonschool events with friends without adult supervision?		
Never	Sometimes	Always
Does your child go to any nonschool events with friends with adult supervision?		
Never	Sometimes	Always
Is your child involved in any form of employment?		
Never	Sometimes	Always
Does your child accompany you or any relatives to the store or any agency and serve as a translator for you?		
Never	Sometimes	Always
Is your child responsible for caring for or supervising his/her younger siblings while you are not at home?		
Never	Sometimes	Always
Could your child cook/iron/make the grocery? Please circle the ones your child does well.		
Please list any other domestic/community chores for which your child is responsible.		

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These data will be incorporated in the report in a qualitative/descriptive manner.

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**Item Equivalencies Assessment Measure**

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In addition to *suspending time* for all of the timed subtests, each item on the IQ tests can be matched to the child’s culture. Thus, if the examinee did not obtain full score points on any subtest, the item equivalency measure can be administered.

Although it is not statistically possible to quantify cultural equivalence, powerful information can be obtained clinically. Thus, psychologists who consider themselves more than just psychometricians will still find this measure very helpful because they can clinically create a cluster of items that form the construct of intelligence for a particular cultural group. Tabulating two scores—one following standardization procedures and one measuring the child’s potential—should result in a more accurate assessment of the child’s cognitive potential.

Because the Wechsler scales are the most widely used of all intelligence tests, a cursory review of a few of the Wechsler items will be examined to demonstrate the ecological nonpsychometric measures for obtaining the potential intelligence.

*Similarities Subtest*

Cummins (1984) points out that when referring to concept formation, evaluators must keep in mind that it is difficult for examinees to know similarities or differences in objects if they have little or no experiences with the objects themselves.

*Question 4.* “In what way are a piano and a guitar alike?” Many children from third-world countries may not have ever seen or heard a piano. Perhaps the *cuatro*, another string instrument, could be substituted.

*Question 6.* “In what way are an apple and a banana alike?” Apples are not grown in tropical climates. Perhaps mango could be substituted. The important thing here is that the child knows the concept of fruits of different kinds.

#### *Vocabulary Subtest*

Although McGrew (1995) found that vocabulary is only moderately influenced by American culture, Hilliard’s (1979) question on “what precisely is meant by vocabulary?” is a valid one to which advocates for IQ tests have not yet answered. Words may have different meanings in different cultures. For instance, although the word “tostone” means a quarter or a half dollar to a Chicano, it means a squashed part of a banana that has been fried to a Puerto Rican (tostón).

Another important factor is that most of vocabulary is contextually determined, that is, it is learned in everyday contexts rather than through direct instruction. Children accomplish this decontextualization by *embedding unknown words in simple contexts*. Children who did not know the word meanings in isolation were able to figure out the words when placed in a surrounding context. Of course, on traditional IQ tests, children are asked word meanings in isolation. Although this may be acceptable for children who have had adequate educational opportunities in adequate social environments, for children who come from educationally deprived environments, word definition without the surrounding context may lead to invalid findings regarding their intelligence, in particular, knowledge acquisition.

On the Wechsler scales, the examiner can contextualize all words by asking the child to say them in a sentence. Credit is only given if the child (not the examiner) says it in a sentence.

#### *Arithmetic*

For potential testing on the Arithmetic subtest of the Wechsler scales, use paper/pencil and say to the child who fails: “Please use this paper/pencil and try to solve the problem.” This response will fall under a potential score.

Arithmetic taps skill, memory/attention, and speed. In the standard procedure, it is difficult to tell which is operating. Potential testing allows the examiner to take into account which factor is operating.

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#### **Test/Teach/Retest Assessment Measure**

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This test is only to be administered if you ascertain that the child was not exposed to these types of items before the testing, that is, if the child never played with blocks/puzzles, etc. Then, you are to teach the child and afterwards retest him/her. For instance, on the Block Design, Picture Arrangement, or Object Assembly subtests of the Wechsler scales, if a child fails the beginning item on both trials, teach it and give the test again. Give credit under potential if the child gets it correct. The important point to remember is that the exact procedures are followed as in the standardized testing, except time is suspended, teaching is done, and potential scores are given after the child passes the teaching items.

In addition, please try to answer the following questions:

1. How much did the child benefit from the training intervention?

2. How much training is needed to raise the child's performance to a basic minimum level?
3. How well did the child retain the skills learned in the training period?
4. How much more training is needed to ensure that the child retains what they learned?
5. How well does the child generalize to other settings (home) what he/she has learned?
6. How easily is the child able to learn other difficult problems different from what he/she has learned in training?

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### ***Ecological Taxonomy of Intellectual Assessment***

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Children should be assessed in several settings—the school, home, and community. Observing children's interaction with their family and friends in their most natural settings brings to the assessment robust knowledge of the family dynamics and cultural experiences of the child.

Look for:

- the way they communicate
- the way they socialize
- the activities they engage in
- the friendships they have
- the roles they play
- the respect or lack thereof they are given by family and friends

In addition, assess the child's intelligence by bringing in some real-life experiences to the psychometric measure. For instance:

If a child is unable to attain success on the *mazes*, take the child to a real-life maze situation and see if the child can find his/her way out.

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### ***Stage of Acculturation***

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Assess what cultural adjustment difficulties the individual may be experiencing. This is because most culturally different children undergo some change (minimal as it may be) at unpredictable periods.

1. Physical changes—the individual must cope with living in a new place where pollution and other environmental hazards can be a new experience.
2. Cultural changes—linguistic and social institutions are different; thus, the individual has to adjust to these differences. The individual has to function within new social networks both within their own group and outside of their group.
3. Psychological changes—the individual may experience an alteration in his/her mental status due to culture shock as they adapt to the new milieu. This is a period of psychological transition from back-home values to host-home values. Individuals begin to understand the host culture and feel more in touch with themselves.

4. Adjusted—the individual has adjusted to the new culture, but values his/her cultural mores as well. Thus he/she is bicultural.

### **Teacher Questionnaire**

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What has been the child's previous educational experiences?

- Was the child ever retained?
- How often per week is the child absent?
- What has been the child's academic performance in:
  - math—poor/fair/good/very good
  - reading—poor/fair/good/very good
- Did the child participate in any supplemental instructional programs? If yes, what programs were they?
- What is the child's motivational/attention levels in class?
- How persistent is this child?
- How does the child relate to his/her peers?
- How does the child behave in class? In other words, is the child reflective or impulsive?
- Is the child responsible? How so?
- Is the child disciplined? How so?
- Does the child prefer to study alone or in a group?
- Does the child prefer dim or bright lights?

Based on the above findings, it is critical for clinicians to make recommendations commensurate with their assessment findings. Thus, if after doing potential *cognitive assessment*, the clinician should recommend what he/she believes are the best ways the teacher, parent, or mental health worker can intervene in working with the child. In other words, if *teaching* helped, then one should recommend one-on-one teaching for a particular number of sessions. If *extending time* helped, then one should recommend that the child be given extra time and more opportunity for practice. If *contextualizing* words helped, examiners should recommend that initially as the child acclimates to the new environment, he/she be given an opportunity to receive his/her assignment in a surrounding context. If the child was found to do better on *paper and pencil* tasks than on tasks requiring mental computations, then one should recommend that paper and pencil assessment be allowed. If the child has *other intelligences*, the examiner should recommend programs wherein these can be further enriched.

It is also important to use all of the *resources in the community*—church, social/recreational community programs, after school programs, legal aid, psychotherapeutic programs, etc.

In summary, a psychologist must be able to assist the school-based support team, the teacher, the family, and the child in developing a course of treatment that maximizes every opportunity for the child to move from his/her actual functioning to his/her potential functioning in a 3-year period. In other words, the child should show significant gains after the intervention period in all areas assessed.

**TABLE 1 General Reminders for the Bio-Ecological Assessment System**


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The Bio-Ecological Assessment must be done in the following order:

**1. Do a differential diagnosis by first looking at**

- (a) Review school / clinic record—to secure the child's medical history.
- (b) Teacher interview—Ask about the child's medical history, linguistic and other intelligences, and teacher questionnaire.
- (c) Parent interview—Interview the parents at school or in the clinic. Ask about the child's medical history other intelligences, and conduct the family/community support assessment to ascertain linguistic abilities, educational experiences, and family issues.

**2. Assess the child's psychometric intelligence in school (see checklist page)**

You must have two scores: one for the standardized questions and one for the potential questions.

**3. Assess the child ecologically by observing the child in the home/community.**

**4. Parent interview—for further ecological assessment of the child in the home/community.**

**5. Teacher interview—for further ecological assessment of the child: observe the child in the classroom, playground.**

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A case sample of a bio-ecological assessment and a bio-ecological report are presented in the following article by Gopaul-McNicol and Armour-Thomas.

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