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Intellectual Assessment and Intellectual Disability

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Three decades ago, the American Association on Mental Deficiency (AAMD) proposed a definition of intellectual disability (ID) that not only emphasized the academic side of intelligence but also considered two other important factors—adaptive behavior and the time of occurrence of the disabling condition: "Mental Retardation refers to significantly subaverage general intellectual functioning existing concurrently with deficits in adaptive behavior and manifested during the developmental period" (Grossman, 1983, p. 1).

Since that time, the definition of who should, and who should not, be classified as mentally retarded has been debated extensively but revised only slightly in two more recent editions of the AAMD's manual (Luckasson et al., 1992, 2002). The importance of intellectual functioning—as indexed through existing instruments such as the Binet, Wechsler, or Kaufman tests—has remained the first, and most salient, criterion in the definition of ID. What has changed in the most recent definitional modifications is the ideological and theoretical context in which intelligence is embedded.

Although the newest manual (Luckasson et al., 2002) gives lip service to planning, reasoning, problem solving, abstract thinking, speed of learning, and profiting from experience, it falls back on traditional IQ tests in order to diagnose and classify. The practice of IQ-based subgrouping (forming mild, moderate, severe, and profound categories)

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has been dropped and, in its place, professionals are urged "to accompany diagnosis with descriptions of need supports" (Luckasson et al., 2002, p. 27) and to search for coexisting strengths in other psychological and social domains, in addition to identifying deficits. Although the field of ID is essentially left with traditional IQ tests that yield "objective" scores necessary to meet a specific diagnostic criterion, there is a sense, in both the 1992 and 2002 AAMR revisions, that "something more" is needed in order to both *identify* and *educate* children and adolescents with ID. In this chapter, we review intellectual assessment from past, present, and future perspectives, with the aim of suggesting new perspectives on intellectual assessment that have remedial and educational merit.

This chapter discusses traditional tests of intelligence, the potential of dynamic assessment, contemporary perspectives on intellectual assessments and ID, and the importance of integrating metacognitive skills—especially self-regulation—into a dynamic assessment framework. We contend that an increased emphasis on the contextualized assessment of cognitive, social, and emotional self-regulation is not only consistent with AAMR's underlying philosophy and assumptions about the proper role of intelligence in the definition of ID but also, more importantly, provides a fresh perspective on how a focus on self-regulation, in the context of dynamic assessment, can serve as a bridge between assessment, education, and contextualized learning.

HISTORY OF INTELLIGENCE TESTING

The first intelligence test was developed in 1904 by Alfred Binet and Theodore Simon for use in screening children for ID in the French public schools (Hunt, 1993). Their goal was to develop a test that could separate those who were performing poorly in school because of ID from those who were performing poorly for other reasons, namely lack of effort (Thorndike, 1997). Around 1910, Henry Goddard brought the Binet–Simon Scale to the United States, translated it to English, and began administering it to school children. In 1916, Lewis Terman produced the Stanford revision of the Binet–Simon Scale, and in its 1937 revision, the scale officially became known as the Stanford–Binet (Thorndike).

Several others were also working on development of tests to measure intelligence around this time. A pioneer in the American intelligence testing movement was David Wechsler who published the first version of the Wechsler–Bellevue in 1939, a scale for use with adults (Thorndike, 1997). The middle of the twentieth century was a time of relative stagnation in the area of test development. Later in the century, there would be changes in the theory behind intelligence testing that would yield new tests based on these underlying theories. Alan Kaufman, who had been influential in critiquing previous intelligence tests, published his own test in 1983, the Kaufman assessment battery for children (KABC; Lichtenberger,

Broadbooks, & Kaufman, 2000; Thorndike, 1997). In the following section, we review these tests of intelligence.

PROMINENT INTELLIGENCE TESTS

Stanford–Binet

Although the Stanford–Binet remains one of the most popular intelligence tests since Terman introduced it in the United States, it has undergone several revisions with the two most recent, the Stanford–Binet IV and V (Roid, 2003; Thorndike, Hagan, & Sattler, 1986). Although earlier versions of the Stanford–Binet lacked a specific theoretical framework, the fourth edition makes use of the latest advances in psychometric theory. This places the Stanford–Binet IV clearly within what Kamphaus, Petoskey, and Morgan (1997) refer to as the fourth wave of intelligence testing, set apart from the first three waves because of its strong theoretical framework. The Binet IV is used from the age of 2 years to adulthood. It contains 15 tests in four areas (verbal reasoning, abstract/visual reasoning, quantitative reasoning, and short-term memory), yielding four subscores as well as a composite score. The composite score represents the best estimate of general intelligence.

In contrast to many other popular intelligence tests, the Stanford–Binet IV is unique in that a single test can be used to assess individuals at any meaningful point in the lifespan. Although the Binet has been widely used to assess mental deficiency, some studies have also raised concern that the Binet IV may not be sensitive enough to detect developmental delays in very young children (Saylor, Boyce, Peagler, & Callahan, 2000). The fifth edition of the Stanford–Binet, which was released in 2003, includes five factors (fluid reasoning, knowledge, quantitative reasoning, visual–spatial processing, and working memory) and both verbal and nonverbal domains. This new version provides a better assessment of the strengths and weaknesses of individuals at the extremes of the intelligence distribution making it more sensitive in measuring younger children and high-risk individuals (Riverside Publishing Company, 2002).

The original Wechsler–Bellevue Scale was a measure of adult intelligence (Wechsler, 1939). Although it technically was designed to assess people between the ages of 7 and 69, it was not until the 1949 publication of the Wechsler Intelligence Scale for Children (WISC) that the Wechsler scales became appropriate for children (Kaufman & Lichtenberger, 2000). This extension placed the WISC in direct competition with the Stanford–Binet. In 1967, the Wechsler tests were scaled so as to be appropriate for even younger children, with the development of the Wechsler Preschool and Primary Scale of Intelligence (WPPSI; Wechsler, 1967). Since its first introduction, the original Wechsler–Bellevue has been revised three times, culminating in the 1997 version of the Wechsler adult intelligence scale—third edition (WAIS-III; Wechsler, 1997); the WPPSI is also in its third edition (Wechsler, 2002) and is appropriate for children from ages 2.5 to 7.5. The

WISC has recently been revised (WISC-IV; Wechsler, 2003) for children aged between 6 and 16 years.

The Wechsler scales are currently the most widely used IQ tests, even surpassing the Stanford–Binet in popularity. They are preferred because of their age appropriateness to specific groups of people as well as their stability and reliability over time. The Wechsler tests consist of two subscales, verbal and performance, each of which can be used in interpreting strengths and weaknesses. Originally, the Wechsler scales led the way in clinical profile analysis (Flanagan, McGrew, & Ortiz, 2000; Kamphaus et al., 1997), which aims to understand the overall clinical picture of the individual being assessed. There are also concerns regarding item sensitivity and item breadth, especially prevalent in the low IQ range.

Kaufman Battery

The KABC-II (Kaufman & Kaufman, 2004) was a response to the problems that plagued intelligence testing throughout much of the twentieth century, including translating IQ scores into contextualized learning settings. The KABC was originally developed as an assessment tool thoroughly grounded in theory. Its main goal was not merely to assess children for the sake of determining a single intelligence score, but rather to gain information about a child's learning potential so as to apply that knowledge to children's learning in the classroom (Lichtenberger et al., 2000). The KABC-II, designed for children between the ages of 3 and 18, consists of five scales: simultaneous processing, sequential processing, planning, learning, and knowledge. There is also a nonverbal scale that can be both administered and completed using gestures. Another major goal of the KABC-II was to provide an assessment tool that would be sensitive to a wide range of children including ethnic minorities and children with disabilities. In particular, the Kauffman has found much less of a difference in intelligence scores between African American and Caucasian children than the WISC-III.

Bayley Scales of Infant Development

The Bayley scales of infant development (BSID; Bayley, 1969) have a tradition that is different from other traditional intellectual assessments. In particular, the BSID, as well as the current revision, the BSID-II, is rooted in theories of infant development rather than intelligence per se. For this reason, Bayley scores have been found to be only moderately predictive of later IQ scores (Black & Matula, 2000). However, because the Bayley is appropriate for use with a wide range of children and is one of the few tools that can assess infant development, it tends to be especially sensitive in identifying both developmental delay and developmental disability. This is a particularly useful instrument for the early identification of developmental problems in young children (Black & Matula).

The second edition of the Bayley (BSID-II; Bayley, 1993) was designed for infants and children between the ages of 1 and 42 months and consists

of three scales: a mental scale, a motor scale, and a behavioral rating scale. The mental scale provides a score for overall cognitive development whereas the motor scale yields a similar score for overall motor development. Of interest in the behavioral rating scales is the fact that the child's caregiver is also asked questions concerning the typicality of the child's behavior during the assessment (Black & Matula, 2000).

Each of the major intelligence tests in use today has specific advantages and disadvantages. The Stanford–Binet and Wechsler scales have remained the most popular instruments, even in the twenty-first century, but are not without competition. The Kaufman scales, in particular the KABC-II, are innovative in that they are more theoretically driven than other tests and are process-oriented rather than outcome-oriented. Finally, the Bayley scales offer promise in identifying early signs of delay in infants and very young children.

In the next sections, we offer three critiques of traditional assessments of intelligence from the viewpoints of dynamic assessment, contemporary theories of intellectual assessment, and an integration of the assessment of self-regulation within a dynamic assessment framework. The aim is to help bridge the gap between definitional assessment and the achievement of human potential through integrating assessment and learning.

STATIC VERSUS DYNAMIC ASSESSMENT

In the intelligence testing literature there has been a growing awareness of alternative forms of assessment due to the static, time-bound nature of the more traditional testing methods (Freeman & Miller, 2001). This section elucidates the ways in which traditional measures of intelligence are sometimes inadequate when measuring ID or learning disabilities and highlights how the dynamic assessment approach provides a richer understanding of each individual's potential for cognitive growth and development.

Shortcomings of Traditional Approaches to Assessment

Traditional intellectual assessments, based on the assertion that prior learning adequately predicts future performance, fail to address and measure the responsiveness of an individual to instructions and practice (Bransford, Delclos, Vye, Burns, & Hasselbring, 1987). Hence, the claim is made that traditional intelligence tests sometimes underestimate what a child or adult can learn and achieve. Traditional or static approaches are seen as lacking because they tend to represent a one-instance sampling of behavior, assume common preparatory backgrounds of examinees, focus on end products, use a standardized administration format that restricts the assessment of individual potential (Lidz, 1997), and hides or fails to identify nonintellectual factors that can affect performance (Tzuriel, 1992). It is not surprising that Fletcher, Francis, Rourke, Shaywitz, and Shaywitz (1992) argue that intelligence measures have been used to place children

into special education settings based on assessments that underestimate their learning ability or reflect "nonstable" discrepancies between their potential and achievement.

Lastly, traditional assessment does not provide information for designing potentially effective instruction (Bransford et al., 1987; Haywood & Brown, 1990; Utley, Haywood, & Masters, 1992). Static assessments, in which children are expected to answer questions and solve problems without help, contain little information about performance in typical situations in which teaching and learning occur (Haywood & Brown). Thus, traditional assessment does not recognize the learner's potential to succeed when given adequate environmental supports (Jitendra & Kameenui, 1993).

The Nature and Purpose of Dynamic Assessment

Dynamic assessment differs from standardized assessment in a number of ways. The major goal of standardized assessment is to classify and group students for differential instruction (Lidz, 1997). In contrast, dynamic assessment is characterized by a pretest-intervene-posttest administration format that focuses directly on learning processes (Lidz & Pena, 1996; Missiuna & Samuels, 1989; Swanson, 1996). Swanson contends that any procedure that attempts to modify performance via examiner assistance, in an effort to understand learning potential, represents dynamic assessment. If the goal is to understand how a child learns, it is best to engage the child in a real-life learning process; this is the principle component of dynamic assessment (Lidz, 1997).

The theoretical grounding for dynamic assessment is Vygotsky's notion of the "zone of proximal development" (Vygotsky, 1986). Vygotsky suggested that development of higher mental functioning requires social interactions within zones of development at increasingly complex levels. In accord with Vygotsky, Feuerstein, Rand, and Hoffman (1979) suggested that a dynamic assessment process has the potential to assess the modifiability of basic cognitive structures. The intent is to provide information that can serve as the basis for enhancement of the cognitive functioning of the learner, regardless (but not independent) of his or her current level of performance (Freeman & Miller, 2001; Lidz, 1997).

Dynamic assessment identifies children's developmental abilities and limitations in relation to their learning context (Missiuna & Samuels, 1989) and encourages enthusiastic participation by both the clinician and the child (Nigram, 2001). The assessor actively engages the child in a true learning interaction and tries to promote changes in a positive direction (Freeman & Miller, 2001). Dynamic assessment yields three kinds of information: (1) "baseline" performance, i.e., learning without assistance; (2) amount and type of help required to reach a higher level of performance; and (3) the individual's response to that help. That is, to what extent has a person learned principles and strategies and then applied them to new problems that have the same cognitive requirements (Haywood & Brown, 1990; Lidz, 1997).

In sum, dynamic assessment sheds light upon children-as-learners, offers insight into the modifiability of cognitive skills (especially the extent to which children are capable of change in response to intervention), assists teachers and clinicians in generating hypotheses about children's learning potential, and based on these formulated hypotheses determines intervention strategies that might improve their performance (Lidz & Pena, 1996).

Implications for Assessment and Classification of MR or LD

Nigram (2001) suggested that because traditional assessment procedures using standardized tests do not provide information about children's learning potential, the concept of dynamic assessment is becoming more common in the field of communication disorders, special education, and other behavioral sciences. The utility of the dynamic assessment approach as a "nondiscriminatory" assessment is highlighted when assessing the learning potential of children who are culturally different, handicapped, or language-impaired (Haywood & Brown, 1990). As such, results from various studies have suggested that mediated learning helps "special" children to perform in zones of proximal development in which they formerly showed no competence (Gutierrez-Cellen & Pena, 2001; Pena, Iglesias, & Lidz, 2001).

Dynamic assessment is a valuable addition to traditional psychometric approaches, due to the fact that motivational and instructional factors are considered in the analysis of intellectual–cognitive performance (Jitendra & Kameenui, 1993). As such, the addition of dynamic assessment serves to compensate for the shortcomings of traditional assessments by approaching issues that otherwise are not considered, such as improving the understanding of the learner's knowledge of task features as well as discerning the learner's ability to maintain and transfer what was learned.

CONTEMPORARY PERSPECTIVES ON INTELLECTUAL ASSESSMENTS AND ID

Although there is a growing recognition of the need for dynamic assessment of intellectual abilities, the most commonly used intelligence tests still fail to take this into account. In fact, one of the major shortcomings of traditional measures of intellectual assessment is that these tools are generally not thoroughly grounded in underlying theories of intelligence. In fact, theory and measurement of intelligence have become separate areas of investigation, such that theories of intelligence are not always consistent with existing measures (Anderson, 1999; Deary, Austin, & Caryl, 2000; Harrison, Flanagan, & Genshaft, 1997; Styles, 1999). Nowhere is this more evident than in the models of intelligence provided by Gardner, Sternberg, and Borkowski.

Multiple Intelligences

Howard Gardner's model asserts that people have multiple intelligences (MI) rather than a single, general intelligence (Chen & Gardner, 1997; Gardner, 1983, 1993; Torff & Gardner, 1999). This approach posits that intelligence consists of vertical (i.e., separate, specialized) faculties, in contrast to the traditional horizontal view which accepts the notion of a single set of centralized processes that underlie intelligence (Torff & Gardner, 1999). Gardner has postulated that it is important to consider not only abstract thinking skills and problem-solving abilities in the definition of intelligence, but also the function of those skills and abilities when applied to real-world problems. Research has focused on atypical populations who display uneven cognitive profiles, survivors of brain damage who have lost some abilities yet maintained others, and cross-cultural studies that investigate culturally valued knowledge and abilities (Chen & Gardner, 1997). MI considers an intelligent person to be the one who can solve problems or create products that are valued by individuals of their culture (Gardner, 1983). Gardner emphasizes that the definition of intelligence is culture-laden; that what is considered intelligent in one culture may be different from what is considered intelligent in other cultures.

According to MI theory, humans possess at least eight distinct intelligences: linguistic, logical/mathematical, spatial, musical, bodily/kinesthetic, interpersonal, intrapersonal, and naturalist (Torff & Gardner, 1999). Each of these is thought to function as an autonomous faculty, yet they do not work in isolation from one another. The theory rests on the assumption that raw propensities in each domain are shaped and defined by cultural and educational experiences (Chen & Gardner, 1997). Furthermore, everyone is thought to possess the same ensemble of MI, but not everyone exhibits equal strengths or similar profiles (Gardner, 1997). Thus, MI theory suggests assessing individuals' patterns of aptitude rather than obtaining discrete scores in separate domains. No particular intelligence is assigned priority (Chen & Gardner). Rather, each is seen as equally important.

Implications of Gardner's Multiple Intelligences Approach

According to the MI approach to education, students should be able to carry out specific analyses, interpretations, comparisons, and critiques not only in a classroom setting, but also in a real-world setting. To attain this goal, Gardner (1991, 1993, 1997) has suggested that teachers should use a variety of instructional strategies. He argues that this multifaceted method of teaching would maximize students' abilities to learn in a way that is consistent with their own intellectual strengths to the extent that different strategies are effective in enhancing specific intelligences. Moreover, Gardner (1993, 1997) urges educators to employ multiple assessment techniques, rather than a single formal test, in order to better understand each student's abilities and performance. In this regard, Gardner's

suggestions are conducive to the use of dynamic assessment rather than of traditional, static assessment.

Triarchic Theory of Intelligence

Like Gardner's MI theory, Sternberg's triarchic theory posits that the fundamental nature of intelligence consists of more than a single general factor (Sternberg, 1988). Sternberg has adopted a systems approach in which several aspects of intelligence are examined together in order to explain how intelligence operates as a system (Sternberg, 1997). This theory posits that there are three distinct, yet interrelated, types of intelligence: analytical, creative, and practical (Sternberg, 1988; Sternberg, Castejón, Prieto, Hautamaki, & Grigorenko, 2001). Although the three aspects of intelligence are theoretically distinct from one another, all make use of the same underlying set of information-processing abilities (Sternberg et al., 2001).

The first component of the triarchic theory, analytical intelligence, consists of executive processes, knowledge, and performance (Sternberg et al., 2001). Creative intelligence is represented in behaviors and strategies employed when a person is faced with an unfamiliar task or situation. Practical intelligence is demonstrated by positive adaptation to real-world environments. According to the theory, individuals may possess strengths in one or more aspects of intelligence. Like Gardner's MI approach, the triarchic theory assumes that the definition of intelligence may vary from culture to culture, based on the values of the particular culture (Cooper, 1999; Sternberg, 1999). Sternberg's triarchic theory indicates that intelligent behavior is demonstrated through the application of information-processing skills and abilities to coping with relatively novel tasks and situations. The Sternberg Triarchic Abilities Test (STAT), based on Sternberg's theory (Sternberg et al., 2001), uses verbal, quantitative, and figural items to assess analytical, practical, and creative intelligence. Because the goal of the STAT is to assess abilities that are not measured by traditional intelligence tests (Sternberg), there is little information available regarding correlations between the STAT and these other measures. Thus, it remains unclear whether the STAT may predict academic achievement more accurately than traditional measures of intelligence.

Implications of Sternberg's Triarchic Theory of Intelligence

The implications of the triarchic theory of intelligence are related to the notion that the goal of education should be to recognize and enhance talents that are important to pursuing a career and succeeding in later life. Sternberg asserts that intelligence is malleable, and as such he posits that psychologists and educators can, to some extent, remediate deficits in cognitive skills and abilities (Sternberg & Grigorenko, 2000). He emphasizes that school practices should be altered in several ways in order to make educational practices more consistent with research findings (Sternberg & Grigorenko, 2000). For example, he recommends that IQ scores should

not be the sole determinant of assignment to educational tracks because traditional intellectual assessment procedures, in contrast to dynamic assessment procedures, do not provide information on a sufficiently broad range of abilities. Another recommended change is that instruction and assessment should be diversified to reflect analytical, practical, and creative abilities. Finally, Sternberg recommends that teachers should consider students' values and strive to encourage them to understand why it is important for them to learn to their full potential, thereby inducing students to enjoy learning more fully and ultimately to experience personal and career success.

A Process-Oriented Model of Metacognition

A third contemporary approach to intellectual assessment, Borkowski's process-oriented model of metacognition, attempts to explain strategy use and information processing in terms of links between motivation and executive functioning (Borkowski, Chan, & Muthukrishna, 2000). Borkowski's process-oriented model of metacognition describes the way in which people regulate their cognitive processes (Puustinen & Pulkkinen, 2001). This model takes the focus off of traditional views of intelligence and instead emphasizes the value of strategy selection and strategy-based learning (Borkowski et al., 2000). Metacognitive theory attempts to explain successes and failures in strategy generalization through providing an understanding of the ways in which strategies develop and explaining how their use becomes generalized over time and in various settings (Borkowski, Milstead, & Hale, 1988). According to this theory, which is essentially a model of self-regulated learning, strategy-based learning begins as a deliberate, effortful process for novice learners (Borkowski et al., 2000). In time, previously learned skills and knowledge are generalized to new situations and tasks through the use of regulatory processes and motivational beliefs (Borkowski & Muthukrishna, 1995). The successful integration of cognitive, motivational, personal, and situational characteristics—the main components of the metacognitive system—is at the heart of human intelligence and adaptation (Borkowski et al., Pressley, Borkowski, & Schneider, 1990).

Implications of Borkowski's Process-Oriented Model of Metacognition

The educational implications of Borkowski's model are rather straightforward: educational environments should teach students that they can gain personal control over their own academic outcomes through the use of self-regulatory strategies (Borkowski et al., 2000). Essentially, this recommendation centers around the development of self-regulation skills. In order to teach the type of self-regulation necessary for metacognitive success, educators should continually encourage students to appraise their problem solving and provide basic instruction, or frameworks, for students to effectively self-monitor their problem solving. This process will

eventually aid students in developing a sense of control over their own learning. In turn, these perceptions of control are likely to have a positive impact on motivation, regulation, achievement processes, and academic outcomes. Moreover, these perceptions will influence students' judgments about their ability, their willingness to apply effortful strategies, and their feelings of satisfaction.

SELF-REGULATION, DYNAMIC ASSESSMENT, AND ID

Cognition and Social–Emotional Regulation as Intellectual Behaviors

In the metacognitive model of Borkowski et al. (2000), self-regulation plays a key role in an individual's understanding of the importance of task analysis, strategy selection, and monitoring. This specific type of cognitive regulation is at the root of most of the learning problems of individuals with ID, who often do not use strategies efficiently or fail to generalize newly acquired strategies appropriately. The latter problem is often due to immature forms of self-regulation. This higher order skill is also important for everyday learning. For instance, mental planning and monitoring are involved in practical skills such as preparing meals and keeping and remembering appointments as well as relating to others and deciding who to trust (e.g., police officers, teachers) and whose advice is disputable (e.g., people who might attempt to manipulate them).

The "ideal" self-regulated student is unusually active during complex learning situations, especially through their utilization of strategies and the setting of realistic goals. In addition, self-regulated students actively monitor their learning progress and adapt strategies to fit the context and the goals at hand (Martinez-Pons, 1996; Pintrich, 2000). Unfortunately, many individuals with ID often experience problems in developing these high-order regulation skills. In fact, Whitman (1990) has proposed that self-regulation is the central problem in defining a variety of intellectual impairments.

The appropriate context and proper choice of tasks used in special education classrooms may be important ways to increase the self-regulatory functioning of individuals with ID. For instance, Stright and Supplee (2002) compared small-group seat work to teacher-directed instruction, and found that students' monitoring of their progress varied considerably across settings, with small-group seat work being more conducive to active monitoring. Moreover, the type of task utilized by teachers for instruction has been shown to influence students' motivation (Turner, 1995). Open tasks requiring higher order thinking exert a stronger influence on students' motivation than do closed tasks involving memory skills. In addition, role-playing, peer tutoring, and the practice of new strategic-based skills on a variety of tasks may allow mentally retarded individuals to be more likely to transfer and apply these strategies more efficiently and to a wide variety of learning settings.

Language and Regulation

Another related concern, particularly relevant when discussing self-regulation, is that of language abilities. Research has shown that language plays a central role in guiding all domains of self-regulation. In brief, language allows for self-reflection and response inhibition through the utilization of internal verbalizations (Abbeduto & Hesketh, 1997; Vygotsky, 1987). In fact, children with language problems tend to display significantly lower ratings on teacher's reports of emotional regulation than do their more "typical" counterparts (Fujiki, Brinton, & Clarke, 2002). Additionally, research has demonstrated that mature adolescents, and most adults, utilize private speech when attempting difficult tasks as their preferred means of problem solving (Duncan & Cheyne, 2002). In this sense, language abilities and skills set the stage for the emergence of mature forms of emotional and cognitive self-regulation and sequential reasoning.

Social–Emotional Regulation and Intellectual Disability

There is a strong link between emotional regulation and the quality of social relationships, with more adept emotional regulators exhibiting more successful social interactions. Gottman (1997) has shown that the same metacognitive skills needed for intellectual success are also crucial in managing one's emotional states. These include the abilities to recognize emotional states and to move from state-to-state in order to restore emotional equilibrium—essentially a form of emotional self-regulation. Some mentally retarded individuals are likely to experience difficulty in forming and developing social relationships—a defining characteristic of their disability—in large part because of deficiencies in basic skills related to emotional regulation (e.g., Geschwind, Boone, Miller, & Swerdloff, 2000).

Dynamic Assessment, Regulation, and ID

ID is not a static entity; instead, each individual manifests varying behaviors and differential ranges of salient behavioral characteristics. For this reason, it is essential that an accurate diagnosis of ID be made through assessment of each individual's range of task-related competencies, particularly in the domain of self-regulation, from emotional, cognitive, and social perspectives. In addition, creating goals, a treatment plan, and instructions based on the principles of dynamic assessment are efficient ways to ensure optimal assessment and development in many domains that encompass the definition of ID.

There are a number of ways to include self-regulation within a dynamic approach to assessment. Several tasks are available dependent upon which aspect of self-regulation and age of the child are the foci. In infancy, the *Still-Face* paradigm addresses regulatory abilities (Moore, Cohn, & Campbell, 2001). Early childhood tasks such as *Toy Cleanup* assess compliance, whereas the *Mother-in-Teaching Context* task measures motivational aspects of regulation (Kochanska, Tjebkes, & Forman, 1998). During

adolescence, motivation and strategy use can be assessed with the *Motivational Strategies for Learning Questionnaire* (Pintrich, Smith, Garcia, & McKeachie, 1993).

Interventions aimed at self-regulation should always occur in multiple contexts. For instance, delays in behavioral regulation could be practiced and modeled both with parents at home as well as with teachers at school. Also, new strategies should be modeled and demonstrated; for example, using words to ask for another student's possession rather than simply grabbing the object. Moreover, games like *red-light, green-light* foster effortful control, placing children in touch with their body movements as governed by verbal instruction. In short, pre- and postassessment of emotional, social, and cognitive regulatory skills set the stage for discovering how well children and adolescents respond to appropriate instructions in the home and in the classroom.

INTELLECTUAL ASSESSMENTS: FUTURE PERSPECTIVES

Although new theories of intelligence, new approaches to assessments, and new definitional concerns with existing measures of IQ have all gained momentum during the past decade, the field of ID has not "budged" in terms of its reliance on traditional, static, and noncontextualized measures of intelligence. This lack of change in definitional direction seems attributable to several factors: (1) the "need" for a cutoff point (e.g., 70–75) that distinguishes individuals who meet, from those who do not meet, the major criterion (i.e., intelligence) associated with ID. This "need" is often more related to practical issues, such as securing additional school funding, establishing eligibility for other entitlements, or influencing judicial consequences for those convicted of serious crimes than to educationally relevant rationale (Reschly, Myers, & Hartel, 2002); (2) the psychometrically strong foundation upon which traditional IQ tests rest and their long histories of success in diagnosis; (3) the failure of the "new wave of theories" to find their way, as yet, into the arena of mainstream assessment; (4) a gap between the tools or instruments that might define and assess new constructs (such as self-regulation) and basic educational practices; and (5) the lack of a "clear-cut winner" among new theories and new constructs that reflect that multiple—sometimes interactive—components of intelligence.

From another perspective, it might be unreasonable to expect the old approach to be supplanted by the new, at least overnight. What might realistically occur is a phased-in approach wherein traditional assessments (appropriate for diagnoses) are augmented with contextually based tests (more useful for remedial education). Out of this dual approach to intellectual assessment could emerge renewed interests in creating an IQ test that is theoretically, diagnostically, and educationally relevant, although separate tests that evidence predictive validity for each of these purposes might also suffice for clinician use. Construction of a single test, or related tests, would satisfy the needs of many of the current stakeholders associated

with intellectual assessments: testing corporations, researchers, educators, psychometricians, parents, the public at large, and all the children who will be assessed for ID in the future.

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