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6 ASSESSMENT FOR EARLY INTERVENTION; EVALUATING CHILD DEVELOPMENT AND LEARNING IN CONTEXT

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INTRODUCTION

Assessment is a process in which various strategies are used to evaluate child learning and development, including evaluation of the cultural, social and physical contexts within which learning and development occurs. It would seem self-evident that early intervention for infants who have disabilities should begin with assessment of the child's developmental status and continue with ongoing evaluation of environmental support and programme effectiveness.

Yet, until recently, assessment has predominantly involved psychometric tests that provide data on a limited range of behaviours in a few constrained settings. Such an approach to assessment reflects medical diagnostic procedures, which attempt to classify various signs and symptoms into aetiological and prognostic categories (Johnson, 1982; Wallace and Larsen, 1978). The labelling that emerges from such testing is not especially useful for designing teaching programmes, and may even inhibit intervention efforts for some children when a prediction based on normative data is not optimistic about future learning.

Increasingly, however, the assessment literature has begun to address the complexity of human learning and the plasticity of development. In particular, recognition has emerged for the significance of the environment and behaviour-environment interactions for learning (Kendall, Lerner and Craighead, 1984; Voeltz and Evans, 1983). Such thinking has focused on ecological

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concepts and on the need to understand and assess contextual influences on children.

Bronfenbrenner (1979) conceived of the ecological environment as extending far beyond the immediate situation directly affecting the developing person and stressed the significance of linkages between settings such as the home, community and the broader social-political contexts within which the family functions. These ideas may at first seem somewhat abstract and removed from the immediate concerns of the practitioner who must generate data and suggest directions for a specific infant who has disabilities.

However, both assessment processes and assessment data should be viewed in context. This context includes such issues as the cultural-political system that may impact on the infant's present status and future life chances. For example, there seems a common pattern for indigenous people who are also ethnic minorities in their country to show higher infant mortality rates and lower educational and employment achievements than in the dominant culture in that country.

It also includes the particular professional, such as a psychologist and the type of data he or she collects. The developmental, social and educational models that professionals work from will be reflected in the way in which the infant is assessed and described and in the intervention strategies that are proposed from the assessment.

The present chapter indicates the implications of such an ecological perspective on assessment. The emphasis will not be on a detailed description of specific assessment devices, their uses and limitations. Such information is available in other sources (e.g. Fewell, 1984; Johnson, 1982; Sheehan, 1982). Rather, the present chapter focuses on identifying the questions that assessment might ask and the assumptions and implications of both the questions asked and the strategies used to answer those questions.

THE GOALS OF ASSESSMENT

An overriding factor that will help determine both the assessment strategies that are used, and the type of outcome data obtained involves the goals that the psychologist has for the assessment. The

assessment may be aimed at a description of the infant's behaviour and general developmental status. Such a description may be the first part of a classification process that will assign the child to a category of disability. This, in turn, may be a step toward accessing an appropriate intervention programme and related resources for the child and family.

A critical question involves the purpose of the assessment. Yet an answer to the question, 'Assessment for what?' is not easily arrived at. The goals set by each psychologist reflect the context within which that person works. A major part of that context involves the professional's personal perspectives on such issues as the limits or plasticity of child development, on the commonalities of experience or the uniqueness of children who have disabilities and of their families, and the psychologist's views on the ways in which the education system and community should meet the special needs of children and their families.

Psychologists are involved in all of these issues as they plan and carry out their assessments. They need to be aware that certain kinds of assessment data imply a certain model of assessment that will influence their conceptualization of the infant and his or her needs. Normative data, for example, derive from a statistical model in which points on a continuum are arbitrarily identified as discriminating 'normal' from 'abnormal' development, with related predictions for future achievements. Another example of possibly hidden assumptions influencing assessment involves the psychologists who work with the concept of 'least restrictive environment' (Vincent *et al.*, 1980) in planning early intervention and preschool services for children. Their assessment and subsequent placements will differ in significant ways from the data and planning that would be generated by psychologists who work with the concept of the 'non-restrictive environment' as the basis of community integration for families with infants who have special needs (Taylor *et al.*, 1986). In the former case, children will be categorized and they and their families may make early contact with segregated facilities providing special programmes. In the latter case, categorical labels are not part of assessment and resources would be located in a way that would support all children and families in regular preschool and community settings (Ballard, 1988).

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The outcomes for children and families in the preceding example could differ radically, and the effects of assessment and subsequent intervention strategies may extend across many years. Such possibilities suggest that the psychologist and the assessment strategies that she or he uses may become influential components of family systems, helping determine their perceptions of their needs and rights and how they manage the disability.

Assessment, therefore, is not simply an issue of measurement and of recommending a next step. The assessment process itself should be seen as potentially reactive, with the person undertaking the assessment becoming a part of the many factors impacting on the family, and therefore on the child. In this respect alone, assessment is a complex process that demands a high level of expertise in the areas of evaluation and in understanding the contexts within which child learning and development occur.

It is important, therefore, to evaluate the various processes that may be used in assessment and the attempt to anticipate possible 'collateral outcomes' from these processes. Collateral outcomes are effects that were not intended as part of an action, but that may be more significant than the intended outcome itself. Collateral effects may be negative, such as the low expectation for learning that may result from a low score on a developmental scale, or positive, such as the community acceptance and understanding that may result from enrollment of infants who have disabilities in regular childcare or preschool facilities. In the following sections an attempt will be made to suggest potential collateral outcomes to which the assessing psychologist should be alert.

ASSESSMENT AND TESTING

Normative testing has traditionally been a dominant model across most areas of assessment and the field of infancy and early childhood has been no exception.

The most commonly used standardized techniques for assessment during infancy involve the tests developed by Gesell (1940; Gesell and Amatruda, 1947), Cattell (1940) and Bayley (1969). Gesell's intention was to assess developmental status in terms of the 'totality of an infant's effective functioning ... composed of

motor, adaptive, personal-social and language behaviours...', all of which derived from what was assumed to be a 'maturational unfolding process generally unaffected by external influences' (Yang and Bell, 1975). Cattell (1940) intended to measure infant intelligence and saw her test as a downward extension of the Stanford-Binet. The Bayley test is presented as a Mental Scale, Motor Scale and the Infant Behaviour Record. The test is intended to establish a child's current developmental status in relation to others of similar age and the author does not recommend predicting a child's later abilities from the scale scores. Nevertheless, the usual inference from normative testing is that performance that deviates from the norm indicates pathology, while this finding in turn is usually seen as suggesting that future problems may derive from current developmental abnormalities. Identification of difference, therefore, is usually taken as a signal for intervention.

Yang and Bell (1975) suggest that all three of these traditional scales support a view that infant development and intelligence are 'relatively unencumbered by environmental influence' and involve a 'maturationally and genotypically controlled conception of development' (p. 175). All three tests 'have proven to be systematically poor predictors of later performance' (Yang and Bell, 1975, see also Dunst and Rheingrover, 1982).

Assessment could leave aside the issue of prediction and simply evaluate current developmental status, but there are still significant issues demanding extreme caution in interpreting data from normative testing. Simeonsson, Huntington and Parse (1980), for example, suggest that while developmental scales may appear to be similar in content and purpose they may not give comparable results. They note that the Bayley Scales and the Griffiths (1970) test of infant abilities have been shown to give substantially different results in a study with 50 high-risk infants (Ramsay and Fitzhardinge, 1977) and that a study comparing the Bayley Scales with the Gesell Developmental Schedules using a sample of 21 infants with Down's syndrome (Eippert and Azen, 1978) showed that the tests did not yield the same developmental patterns and could not, therefore, be considered interchangeable. The normative model presents further problems for interpreting data when there is evidence that the individual being assessed may not be like the individuals who made up the normative sample. The

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Bayley Scale, for example, compares each infant to others of his or her age in the standardization sample, a sample that includes only 'normal' children living at home and excludes 'prematures, institutional infants and those from bilingual homes' (Collard, 1972, p. 728). Given that the experiences and development of infants who have disabilities are unlikely to be 'normal', there are obvious difficulties in rationalizing the comparison of their performance with that of non-disabled children. Further problems emerge when assessment involves modifying the presentation of the test to the needs of the child's disability. When an examiner changes the guidelines for administering a test or test item, or changes response requirements, then test validity is clearly violated (DuBose, 1982). Also, there is evidence that, compared with non-disabled peers, preschool children who have disabilities show test scores that are more seriously depressed when they have been tested by an examiner not known to them (Fuchs *et al.*, 1985). Fuchs and his colleagues showed that tests are not simply a sample of responses to standard stimuli, but represent social interactions to which disabled and nondisabled children attribute different meanings. It would seem that, rather than being 'objective' tests, these assessments are 'subjectivized' by children who have disabilities in terms of their unique experiential backgrounds.

Given that infant learning and development is an interactive, reciprocal, social process (Kendall, Lerner and Craighead, 1984), then a single, normative comparison within limited performance and environmental constraints offers little information of value to early intervention. Nevertheless, such testing is still seen by some practitioners (e.g. Sailor and Guess, 1983, p. 232) as a first identifying step. Test users should know that when used outside the normative comparison group for that instrument then their data are not valid. They should also be aware that such testing often carries a powerful impression of a 'scientific' model of assessment so that test results may be taken much more seriously than the validity and quality of the data warrants. A negative collateral outcome of such testing is that it reinforces inappropriate assumptions, practices and concepts such as categorization and labelling, well illustrated by the 'prominent physician' cited by Stratford (1985), who claimed he had not seen 'one mongoloid that has an educable IQ' (p. 149).

While prediction based on intelligence quotients and developmental quotients presents more unsolvable problems than useful information, the general issue of identifying infants at risk remains a major concern for research and practice. Various screening strategies will be briefly reviewed before alternatives to normative testing are examined.

SCREENING FOR DEVELOPMENTAL DISABILITIES

The difficulty of predicting later development is frequently noted in discussions on strategies for identifying infants at or near birth who may be at risk of handicapping conditions. Gentry and Adams (1978), for example, review research on three assessment areas of: medical examination; environmental, maternal and infant risk factors; and standardized tests (e.g. Denver Developmental Screening Test, Frankeburg, Dobbs and Fandal, 1967). Gentry and Adams (1978) note that while risk factors and screening test scores identify a relatively large proportion of infants who have severe disabilities, research shows that screening tests are only tentative indicators of developmental problems for most other infants.

Screening tests have been devised to provide a relatively quick and inexpensive identification of infants who may need further assessment. As Fewell (1983a) notes, however, it is important to be aware of the theoretical perspective that each instrument reflects. The Denver Developmental Screening Test, for example, was based on items from the Gesell Developmental Schedules and so reflects a maturational developmental perspective. Other reviews (e.g. Sheehan, 1982) of behaviour checklists used with infants show that many lack reliability and validity information and rely on norms derived from other tests and checklists. Such strategies, therefore, must be recognized as inappropriate for children from different cultures or different developmental experiences to the children in the normative group; as reflecting a maturational rather than transactional (interactive) model of development; and as providing data that may be overvalued because they have the spurious 'scientific validity' that publication sometimes seems to confer on tests.

THE ASSESSMENT OF INFANT COGNITION

Practitioners working from a developmental testing perspective have had only limited success with their attempts at global evaluations of infant development and intelligence. Psychologists interested in human cognition have developed alternative approaches which attempt to access infant cognitive skills. Two important contributions are noted, first that of the Piagetian cognitive approach and second Zelazo's information processing model

The Cognitive Perspective

Assessment strategies derived from a cognitive perspective have focused on specific concepts (e.g. object permanence, conservation) rather than general abilities that reflect age-related maturation and learning. The ordinal scales developed by Uzgiris and Hunt (1975) were designed to assess an infant's current functional level within the sensori-motor period of intellectual development (two weeks to two years of age). These scales are based on Piaget's theories which stress a uniform sequence of development through successive stages. The interpretation of such scales need not rely on norms because a concern with age-related levels is secondary to a qualitative description of the child's characteristic behaviour

Anastasi (1976) suggests that ordinal scales are similar to criterion-referenced tests in providing information on what the child is actually able to do. Information from such testing is often seen as more relevant for intervention than the data derived from normative comparisons. From this perspective, it might seem that tests such as the Uzgiris and Hunt scales should indicate what it is that the child should learn next in the theoretical sequence toward intellectual competence. Yet the theoretical notion that sensori-motor intelligence is reflected through gross and fine motor actions in infants and young children has been challenged by Zelazo (1982). This researcher argues that motor actions need not be a reflection of cognitive attainments or of central nervous system integrity, and that impaired motor skills in infants who have disabilities would make the interpretation of testing on the Uzgiris and Hunt scales of questionable validity. Zelazo supports his case from research on infant memory which shows that learn-

ing does occur independently of gross and fine motor performance in the sensori-motor period. From this perspective, Zelazo suggests that an information processing approach may be a valuable alternative assessment strategy that could indicate intact or impaired information processing ability within the first three years of life.

An Information Processing Perspective

Zelazo's perceptual-cognitive assessment procedures involve establishing infant expectancy by presenting and repeating an event (a toy car rolls down a slope and knocks over an object) and then introducing a 'moderately discrepant variation of the standard' (the object does not fall over when the car runs into it - Zelazo, 1982, p. 110). Observational and heart rate measures indicate the child's anticipation of the discrepant event. If the child shows such anticipation then it is inferred that 'elicited behaviours reflect the matching of an external event to an internal representation of that event' (p. 116).

Zelazo's research is a creative response to his criticism of infant tests such as the Bayley and the Uzgiris and Hunt scales which emphasize motor items and imitation of motor performances. Zelazo argues that while intact neuromotor functioning may validly imply intact intellectual ability, 'the problem is that a poor neuromotor performance need not announce impaired intellectual ability' (Zelazo, 1982 p. 108). Zelazo also suggests that children who have language delays or behaviour difficulties that limit their compliance with testing are at risk of being labelled as having lowered intellectual functioning through an inappropriate comparison with a nonhandicapped normative group. Such labelling may result in lowered parental and teacher expectations and so contribute to the origins of 'iatrogenic retardation' (Zelazo, 1982 p. 109).

Zelazo's assessment strategies might show that an infant with physical or communication handicaps is, nevertheless, achieving normal cognitive development at the time of assessment. Such a finding may have implications for the design of an early intervention programme. On the other hand, where a 'delay' in central

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processing ability is indicated by these testing procedures, there may still be an unwarranted negative outcome in terms of a poor prognosis for future development and related lowered expectations by those responsible for planning an intervention programme.

PROBLEMS IN TESTING INFANTS

The work of Zelazo addresses directly some of the problems of assessment of infants who have disabilities. Whereas tests such as the Bayley scales and Piagetian based scales were designed around the development and skill capabilities of infants without disabilities, Zelazo takes into account the fact that infants and young children who have disabilities cannot be thought of as if they had the same developmental experiences and response capabilities as their non-handicapped peers.

Nevertheless, Zelazo's work retains some of the problems associated with the testing strategies reviewed in the present chapter. Essentially, all of these tests focus assessment on the child. A focus on the child may reflect various developmental theories but does not clearly address human learning and development from a transactional perspective. For example, predicting future development or intelligence from a normative model requires the assumption of 'approximately equal opportunity for learning' (Hunt, 1974, p. 127), an assumption that cannot be supported from research on families, from research on the development of infants who have disabilities, or from a perspective of common sense.

It is difficult, therefore, to see what value there is in normative, static, 'psychometric snapshots' (Messick, 1983). It is not so difficult to suggest that a collateral outcome of such assessments may involve identification of developmental and learning problems as primarily existing within the child. Simply labelling the organism as abnormal or as damaged or as having a limited capacity for learning seems unlikely to encourage detailed examination of contextual environmental issues or even to motivate the planning and implementation of intervention programmes.

As an assessment strategy, infant testing represents measurement based on a very few responses obtained in a specific (usually constrained) setting. Such data may be of some value if the user

does not intend to predict beyond the test setting. In assessment, however, it is almost certain that test data, often obtained in one session with the child, will be used as the basis for making inferences about the child's likely performance in other settings at other times. Given what is known about the significance of the environment and setting events for child behaviour (e.g. Kendall, Lerner and Craighead, 1984), making such inferences from test performance can no longer be justified.

BEHAVIOURS CHECKLISTS AS AN ASSESSMENT STRATEGY

Observation checklists of infant and young children's behaviour have increasingly become a part of 'assessment battery' type evaluations and of behavioural assessment. In principle, assessing a child against a list of behaviours and skills usually acquired within certain chronological time-frames could indicate both the child's achievements and deficits. Also, such an assessment would appear to have direct implications for intervention, identifying skills and understandings that need to be taught to 'fill in' or 'catch up' with normal developmental achievements. However, many of the problems that apply to standardized testing apply equally to checklist measures, with the result that there are similar difficulties in translating the assessment data into intervention goals and practice.

Sailor and Guess (1983), for example, note that checklist assessments like the Adaptive Behavior Scales have been used extensively as the basis for instructional objectives. These authors suggest that such assessment systems, available to teachers of children who have severe disabilities, fail because they do not contain relevant, functional and therefore teachable items, and they do not provide sequences of items that translate into meaningful long-term goals (p. 117). The main reasons that these checklist assessments are of such limited value for instructional design is seen by Sailor and Guess as arising from the fact that they are constructed without a knowledge of how the development of children who have disabilities differs from patterns of normal development upon which most standardized assessment systems

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are based. A further problem is that these assessment systems are presented as if skills are developed in isolation, when in fact skills are usually interrelated and reflect the demands of different environments. Sailor and Guess record an experience that will be familiar to many practitioners. This involved making visits to a classroom for children who have severe disabilities, with a lengthy period between each visit, and noting that the pupils were working on the same tasks each time with no discernible gains in performance.

The tasks are usually the preschool type items represented in assessment checklists, and it is increasingly recognized that programmes based on such a developmental approach frequently involve tasks that are neither age appropriate nor functional for children who have disabilities (Guess and Noonan, 1982).

Sailor and Guess propose that a more appropriate strategy is 'to generate a curriculum for each student that is relevant, functional and unique to the individual needs of that student' (p. 117). This is achieved by establishing educational goals and short-term objectives with a task analysis for achieving sequential steps toward that goal. Assessment in such a model involves systematic behavioural observations to establish basal levels and to evaluate current performance levels within the teaching programme.

Although Sailor and Guess do not see standardized assessment instruments as a useful source of instructional objectives, they do see them as a useful source of assessment ideas. Similarly, Voeltz and Evans (1983), while rejecting the 'test-train' approach associated with developmental checklists see some value in using checklists as general benchmark measures that allow programme assessment over time.

An assessment which suggests that the next item in the checklist sequence should be the teaching goal is not well founded in theory or practical experience. Such an assessment is essentially out of context. It is out of context in developmental terms because there is insufficient research on the development of children who have disabilities on which to base assessments. More importantly, standardized assessments are out of context in that they fail to address the uniqueness of each child and the uniqueness of their circumstances. By contrast, behavioural observation strategies represent an approach to assessment that focusses on the individual child within the various, specific contexts of home and preschool that the child is involved in.

BEHAVIOUR OBSERVATIONS: LINKING ASSESSMENT TO TEACHING

Behavioural observation comprises what infants and children do in natural contexts with parents and other significant persons. In addition to a concern for data that evaluates behaviour in relation to naturally occurring response antecedents and consequences, behavioural strategies emphasize the need for repeated measures across time and across settings. This multiple measures strategy reflects the theoretical premise that behaviour is largely controlled by environmental events and that, given the complexity of behaviour-environment interactions, a single measure will fail to indicate both variable and stable patterns of responding.

Where repeated measures of the same responses show a variable response frequency and/or topography, then this provides an opportunity for evaluating functional relationships between the environmental conditions that pertain when particular responding patterns are evident. From such data, stimuli that are associated with desirable responding (e.g. attention, smiling, vocalization, manipulation of objects) and with less desirable responding (e.g. resistance to food ingestion, screaming, self-stimulation) may be identified. Intervention may then involve changes to the physical and social features of the infant's environment that may promote adaptive responding.

Where repeated observation measures show stable response patterns that indicate non-adaptive behaviours then this assessment data will form the baseline against which to measure the effectiveness of an intervention designed to teach a new skill. Ballard and Medland (1986), for example, report such data from their work with a two and a half year old girl who showed developmental delays and autistic-like behaviours. They showed the child's parents and teachers strategies for helping the child interact appropriately with toys. Baseline measures in the home and in the preschool setting were at zero levels whereas following the intervention programme the data showed appropriate child responses in both settings.

Behavioural researchers, teachers and psychologists have consistently worked with, and successfully taught, infants and children who have the severest of physical, cognitive, social and

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multiple disabilities (e.g. Haring and Bricker, 1978; Sailor and Guess, 1983; Vincent *et al.*, 1980). Their theoretical model has emphasized the power of the environment, requiring assessment within the contexts that the child has to learn from and optimism that children will learn if we can only design their environments to meet their special needs. This conceptual position, together with the direct relation of assessment strategies and data to intervention strategies and evaluation data, offers positive features for assessment for early intervention. At the same time, behavioural approaches have some features that are potentially limiting factors for both assessment and intervention.

A major direction taken by the behavioural approach has been to develop an instructional technology for teaching skills to children and adults who have severe handicaps (Guess and Noonan, 1982). This instructional technology has emphasized task analysis, which involves a breakdown of skills into specific, component behaviours. Guess and Noonan agree with the observations of Liberty and Wilcox (1981, p. 1), who report on teachers 'trained to perform countless acts of reductionism on a variety of tasks' resulting in the '42-step analysis of shoe tying' and related, complex, technical approaches to instruction that are inappropriate, inoperable and unnecessary in many educational settings.

Such behavioural instruction has also tended to show greater concern with predetermined goals and task hierarchies than with the characteristics of the individual learner (Ballard, 1987). One result of this highly structured approach to instruction has been tight stimulus control resulting in the failure of newly learned responses to generalize to complex natural settings, a problem that has been particularly salient in behavioural language programmes (Spradlin and Siegel, 1982).

THE EMERGING INFLUENCE OF ECOLOGICAL APPROACHES

The behavioural focus on specific responses for assessment and instruction allows for precise, reliable measures and focused teaching goals. At the same time, behavioural assessment has often

ignored the fact that a single response or behavioural skill is only a part of a child's complex repertoire, while behavioural interventions have often focused on teaching isolated skills without attention to the integrated and interrelated nature of human behaviour (Voeltz and Evans, 1982; Willems, 1974). Also, the technology of instruction derived from behavioural principles does not include a rationale or systematic guidelines on what to teach children who have disabilities.

Closely related to the issue of what to teach is the issue of what to assess. Important developments in planning the curriculum content for persons who have disabilities have come from the concept of the 'criterion of ultimate function' (Brown, Nietupski and Hamre-Nietupski, 1976) which represents strategies for determining the skills and understandings that a specific individual will need in order to function as independently as possible in mainstream settings. As Guess and Noonan (1982) note, these strategies identify the important skills necessary for age-appropriate, functional interactions in the natural settings of home, school and community. They therefore represent an 'ecological inventory approach' (p. 8) that stresses the relationship between the child and the requirements of specific settings.

For the infant and preschool child, this ecological inventory approach focuses on 'the criteria of the next educational environment' (Vincent *et al.*, 1980) by providing ecological assessments of what should be taught for successful placement in mainstream preschool and subsequent school settings. This model emphasizes social and behavioural 'survival skills' such as compliance, attention, social interaction and following directions (Guess and Noonan, 1982, p. 8). For example, Rietveld (1983) planned to involve children from her early intervention project in mainstream preschool settings. She first assessed the mainstream setting and observed that selecting an activity was a significant skill relevant to effective engagement in these settings. She therefore taught the children in her project how to make choices between alternative preschool activities.

ASSESSMENT AS AN ECOLOGICAL SYSTEMS ANALYSIS

Bronfenbrenner's (1979) ecological model of human development suggests that assessment of the child should include evaluation of the family and consider issues such as the value system of the community (e.g. attitudes to children who have disabilities) and the impact of political-resource factors (e.g. government support and provision for mainstreaming). Such an ecological systems perspective also represents a transactional model of development in which biological impairment is not seen as a static impediment to developmental progress (Guralnick, 1982). A transactional approach stresses that development proceeds through reciprocal interactions between children and environments so that both the individual and their settings experience change.

One implication of a transactional model is that planned changes in the child's family, educational and related environments may radically alter interaction patterns with significant implications for child development and learning. Changed interactions may minimize or even overcome biologically based disabilities. Such a possibility brings into question the relevance of intelligence testing and related attempts to predict a child's future developmental achievements. A transactional model also casts doubt on the value of other forms of assessment that involve measuring behaviours away from the natural contexts in which child responses occur. Instead, a transactional perspective emphasizes assessments of children in the settings in which they live and with the persons with whom they interact. Such assessments include collecting information on how the participants in the child's family and related ecological systems perceive their own and the child's world. As Scott (1980) suggests, the term 'ecology' refers to the total context of behaviour. This not only includes the physical characteristics of the environment but also requires attention to attributes such as roles and social rules. Roles and social rules are subjective culture-bound perspectives, as are parent and teacher expectations, which also form part of the ecology of child development and learning (Wallace and Larsen, 1978).

If we are to include subjective data in assessments then there is need to address issues in the area of phenomenologically oriented knowledge. These issues include the idea that there is no

final, objective 'truth' because reality differs from person to person, from parent to professional, and from administrator to teacher. Heshusius (1981) suggests that attempting to understand the perspectives of significant others is extremely practical because it increases awareness of alternative views and options for action, and can lead to clearer communication. Clear communication should be a major focus in assessments of infants and young children. This is because the infant's well-being is dependent on a range of others, in particular parents, mediating between the child and his or her social environment. Therefore, any planning designed to enhance developmental opportunities through early intervention programmes requires that parents, teachers and other professionals understand one another's expectations and goals.

The idea that an individual's expectations and assumptions are important aspects of the infant's environment has implications for the role of the psychologist or other person who is primarily responsible for assessment. Clearly, if a psychologist thinks mainly in terms of the factors limiting a child's development their assessments are likely to be predictive and pessimistic. On the other hand, if a psychologist rejects a 'test and predict' perspective and is oriented toward optimism and effective programming then enthusiasm is likely to be generated for developing responsive environments for the child.

An ecological perspective requires, therefore, that the psychologist examine his or her assumptions, concepts and cultural perspectives and attempts to evaluate how those ideas will impact on each child they work with. Such critical evaluation acknowledges that the psychologist becomes part of the child's and the family's ecological surroundings. The influence that the psychologist's cultural understanding and related ideas might have on the child's development, therefore, demands ongoing professional self-evaluation.

Assessment that is guided by such an ecological model is a process that recognizes the need to understand infant development and infant environment as interdependent. Ecological assessment is driven by an intention to change child behaviour and experiences rather than to simply compare a child's performance with a normative model. Ecological assessment, therefore, involves more than test responses and objective behaviour observa-

tions, and includes the perceptions and interpretations of the psychologist and of significant others in the infant's life. As Haywood (1977) suggests, it is 'time to return the intelligent observer to psychology, and to stop trying to reduce the psychologist to a mere recorder of data that can then be referred to a computerized set of comparison norms' (p. 17).

Intelligent observation requires involvement with families across time. This means that the psychologist's work resembles participant observation (Smith, 1978; Jacob, 1987) and must include recognition that empirical strategies provide only one kind of scientific data (Astman, 1984). Accepting both qualitative and quantitative as valid assessment data is, therefore, an important step toward ecological assessment. The techniques and skills required for such an approach to assessment would include observational strategies similar to those used in ethnography. Wolcott (1982) describes the ethnographer as a 'research instrument' with a commitment to spending an adequate amount of time in the field, to gathering information using multiple strategies, and to describing and interpreting rather than rendering judgements. For example, parent and teacher views form part of the ecosystem of home and preschool which includes affect, physical arrangements, daily activities and surrounding social conditions. To access some of this information, Voeltz and Evans (1983) recommend simple anecdotal notes in the form of a daily teacher and parent diary or home-school notebook that would monitor behaviours across time and settings. Such notes include objective records of behaviour and also notes on the child's, parents' and teacher's overall reactions (such as mood, compliance, enjoyment) to ongoing programmes. From such information, the psychologist, parent and teacher together may develop and test hypotheses to explain both positive and negative changes in a child's responding.

Zigmond and Silverman (1984) refer to such assessment strategies as 'informal' processes which are situation-specific and non-standardized. They suggest that they are more likely to contribute to programme planning and evaluation than are tests that are unrelated to the child's experiences or curriculum. For some psychologists the term 'informal' is interpreted as meaning less 'scientific'. Tests, on the other hand, are more likely to be viewed as properly scientific. Such a view ignores the fact that

infant tests are largely lacking in construct validity and lack norms for children who have disabilities (Fuchs *et al.*, 1987). On the other hand, there is an extensive research base in psychology that would allow the psychologist to design and interpret alternative assessment strategies using observation methods, interview data and self-report data from parents, teachers and others. When carefully, systematically and explicitly based on appropriate theory and research, such assessment can have both construct and ecological validity and will therefore be more 'scientific' than so-called 'formal' testing.

Having reviewed various approaches to assessment for infants who have disabilities, the present chapter suggests that ecological theory can guide the development of assessment strategies that acknowledge the transactional nature of infant development and address the complexity of infant learning in social contexts. The final section of this chapter will outline procedures that would contribute to such an assessment. Before undertaking such a summary it is relevant to comment on the team approach to assessment as one strategy for coping with the varied and complex needs of infants who have disabilities.

THE ASSESSMENT TEAM FOR MULTIPLE DISABILITIES

Sailor and Guess (1983) suggest that because infants and children who have severe disabilities display delicate health conditions and a number of developmental, sensory and motor delays, then assessment and early intervention must include a coordinated effort by professionals and parents. Sailor and Guess advocate a transdisciplinary approach which integrates programme goals and objectives from various disciplines and professionals. The essence of this approach is that each team person willingly shares information and skills so that various interventions with the child can occur simultaneously. To achieve this it is necessary for team members to educate one another from the perspective of their information and skills and to accept that they can teach others (including parents) to implement procedures and skills that have usually been the responsibility of particular professionals. Coordination of this multiple effort (with pediatrician, nutritionist,

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physical therapist, psychologist, parents etc.) is through one team member who becomes programme facilitator. Sailor and Guess suggest that as the teacher is the professional who has most contact with the child, this person would often take on the facilitator role. They also emphasize that the transdisciplinary team model should be a flexible approach that responds to the needs of individual children and their families. For example, not every team member may be needed for every case.

This latter point is important as Fewell (1983b) has cautioned against the notion that 'more is better' in a team approach, citing research that suggests no superiority for a coordinated team over less formal arrangements. Nevertheless, there may still be value in one person ensuring that the various professionals involved in a case relate effectively with the parents and with one another.

ASSESSMENT FOR EARLY INTERVENTION: SOME BASIC REQUIREMENTS

From the preceding review a number of issues emerge that may be used to guide thinking about the kind of assessment strategies most likely to contribute to an intervention programme.

Assessment should focus on adaptive behaviour

Assessment that is relevant for teaching should evaluate actual performance on tasks relevant to an intervention programme. This involves recording data on children as they engage in actual motor, social, communication and language tasks, rather than scoring their performance on psychometric tests. Using tests to make inferences about potential performance cannot be justified when a more ecologically valid assessment can be achieved by observing actual performance in the area of interest. Assessment, therefore, must move away from diagnostic testing in the psychologist's office to measures of actual infant performance in meaningful social contexts. This would involve a move away from normative comparisons to evaluating the kinds of behaviours actually involved in teaching.

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A developmental checklist such as the Portage Guide to Early Education (Bluma *et al.*, 1978) can provide a guide to the skill areas that require evaluation through observation, and can be a useful summary device for recording a general overview of skill levels (e.g. Ballard and Sinclair, 1981). Nevertheless, such guides are neither precise enough (Brown and York, 1974) nor conceptually appropriate (Sailor and Guess, 1983, and earlier discussion in this chapter) for designing a curriculum for individuals. Instead, assessment of each child and of the settings they live in requires a detailed observation using various observation strategies (e.g. Genishi, 1982; Irwin and Bushnell, 1980; Sackett, 1978). The focus of observational assessment should be guided by current research in each relevant area such as communication (e.g. Barnett, 1987; Peck and Schuler, 1986) or social skills (e.g. Donnellan and Neel, 1986; Guralnick, 1982; Guess and Siegel-Causey, 1985).

Assessment Should Be Based On Repeated Sampling Of Behaviour

If a child fails to respond to a test item it may mean that the concept or action is not part of their response repertoire. However, it may also mean that the child has the action or information but cannot recall it at that time. It may also be the case that, in the particular circumstances such as the language or communication style used, the setting, or the persons involved, the child may fail to use a strategy that in other settings is used effectively. This is an experience that parents have been telling psychologists about for years.

Assessment of performance on a single occasion is generally a poor predictor of behaviour at other times in other settings (Epstein, 1980; Clarke and Clarke, 1973). Assessment should, therefore, involve repeated measures in order to adequately and reliably sample infant skills. Ballard and Crooks (1984), for example, showed that the social interactions of both randomly selected and socially withdrawn children in a preschool setting varied considerably from day to day, so that assessment on one occasion did not provide accurate data on level of social behaviours.

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Repeated measures assessment can form the baseline against which to evaluate a teaching intervention. Observational assessment as an ongoing, day-by-day activity provides detailed information on a child's response to intervention and can ensure that unsuccessful teaching or other intervention strategies are promptly identified and changed.

Assessment Should Be Ecologically Valid

An ecological approach stresses the complex interrelationships and interdependencies between children and their environments (Gump, 1975; Carlson, Scott and Eklund, 1980). Ecological assessment involves 'data taken across environments, persons, curricular areas and instructional conditions' (Bradley and Howe, 1980 p. 9) so that the infant's responses are evaluated across various stimulus conditions and social circumstances. The concept of ecological assessment is basically concerned with how meaningful particular assessment data are in terms of the child's real life experiences and needs. This must include recognition of the child's cultural background and experience.

Ecological assessment requires that children are assessed where they normally live and with the people they usually interact with. The emphasis is on evaluating actual learning behaviours, rather than on making inferences and projections from tests, developmental checklists and interviews. This does not preclude the value of novelty – indeed, testing the child's reaction to a change in the environment, materials or persons can be a valuable procedure for developing new experiences for the child. However, undertaking such evaluation in natural settings provides additional data on parent and teacher reaction to such materials and procedures.

Ecological assessment involves a functional approach in which evaluation is made of what the child needs to know in order to adjust and learn in a present environment, or in an environment in which it is planned to involve the child at some future time (Zigmond and Miller, 1986). Such an approach involves assessment of the features and demands of specific environments and then assessment of what the child needs to learn in order to

function effectively in those settings. Assessment should also indicate what changes can be made to the environment (both physical and social arrangements) that may enhance child adaptation and experience. Assessment should proceed using repeated observations and anecdotal diary records, and psychologist and teacher-made curriculum-referenced assessments. Such assessment procedures allow adaptation to the unique characteristics of a particular child and family, and represent the first steps in promoting skills across various instructional domains.

Parents and Teachers Should be Meaningfully Involved In Assessment

Research to date suggests that the greatest gains in child development occur when intervention is initiated within the first two years of the child's life and where parents are meaningfully involved from the beginning (Sailor and Haring, 1978). Ecological assessment includes the psychologist developing a collaborative partnership with parents and teachers where the understandings, skills and preferences of each participant are equally valued and openly shared (Bailey, 1987; Russell, 1983). Involvement with parents and teachers must include sensitivity to cultural, ethnic, and value differences. Interactions with parents should also recognize that parents will differ in their views on the parental role. Some may resent 'professionalization' of their role if they perceive pressures to undertake teaching and advocacy as inappropriate for them and their approach to family interactions (Allen and Hudd, 1987; Voeltz, 1984).

Initial interviews should clearly tell parents and teachers that the information and perspectives they have on the child are respected and valued, and that they are viewed as part of the assessment team. Within such a partnership relationship, guidelines for identifying and prioritizing intervention goals are essential. Sulzer-Azaroff and Mayer (1977, p. 42) present useful procedures which require answers to such questions as the importance of the goal to the child and to significant others (parents, teacher), whether the goal is likely to be maintained in the client's natural settings, and evaluation of the time and effort required of the child

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and others to achieve the goal. Using such an approach can help the psychologist, parent and teacher make explicit their ethical, value and resource concerns during goal selection for early intervention.

ASSESSMENT SHOULD ADDRESS THE DYNAMIC NATURE OF INFANT DEVELOPMENT

Assessment for intervention must take into account the dynamic features of child developmental processes which include how children influence those who influence them; how intervention might correspond to the child's current developmental status; and how the child becomes an 'agent, shaper and selector', effectively fitting skills to setting demands or changing the setting to better meet personal attributes (Kendall, Lerner and Craighead, 1984). These authors emphasize that socialization is reciprocal and that, for example, children with different biologically determined temperaments interact differently with adults and may be perceived differently by them. A critical issue for assessment is the need to recognize such circular functions and to avoid identifying problems or strengths within only one part of a reciprocal system. For this reason a family systems perspective represents a valuable model for analyzing the needs of the family that has a child with a disability (Vincent and Salisbury, 1988).

Viewing the child as a processor involves understanding that at different times specific experiences have different meanings, depending on the child's current physical, cognitive, social and emotional development. Also, if the child is viewed as an interactive-reactive processor then it is equally important to assess what the child is processing and interacting with at various times. For example, the affective climate of the family varies according to internal and external circumstances (e.g. parental employment), and a child's responses must be evaluated in the light of such environmental contexts at different times. From this perspective, an understanding of variability in developmental processes evident in children, who do not have disabilities, and their families, would help ensure that assessment and intervention takes into account the usual range of experiences in age-associated cogni-

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tions, behaviours and developmental changes. It is often helpful for both parents and professionals to note that consistent child compliance and smooth learning curves are not realistic experiences or expectations for any child.

Assessment Should Be Credible And Meaningful To The Consumer

Assessment data contributes to early intervention only to the extent that it is understood and valued by parents, teachers and others who are caring for the child and implementing teaching programmes. If assessment of the infant is undertaken in a clinical setting away from parents and teacher, and if the data differs from their experience or is presented in technical terms that they cannot understand, then such information is unlikely to be used by parents, caregivers or teachers in programme design or evaluation. Parents and teachers should be encouraged to assist with the assessment of infants and young children and to make their own judgments and comments on how sensible and relevant the strategies are for their child and their needs.

Assessment And Teaching Should Proceed Together

Parents and teachers want to know what they can do to help the child. Assessment outcomes are often not credible or meaningful to parents or teachers because assessment data alone does not provide adequate guidelines for action. Very often too much time is committed to assessment tasks which then require further time for translation into teaching goals and strategies. This suggests the need to rethink not just assessment data but also assessment processes. One solution is to see teaching as assessment. If we see teaching as a responsive, hypothesis testing, trial-and-error process, then setting out to actually teach the infant something may be an optimum assessment strategy. The goal of early intervention is to support parents and to assist each individual family to identify strategies which are acceptable to them and which will optimize developmental opportunities for their child. Working with par-

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ents in their home to actually teach the infant something will help reveal child skills and needs and will identify parent skills and related environmental supports for learning within the cultural, value and resource circumstances of the family. A careful analysis of running record type accounts of such teaching sessions, in which both parents and professionals show one another how they engage with the child, will provide quantitative, qualitative and ecologically valid data. At the same time such sessions contribute to the establishment of a genuine partnership between parent and professional. Such a partnership may help identify critical skills (Guess and Noonan, 1982) which are behaviours likely to have multiple positive collateral outcomes (Voeltz and Evans, 1982). For example, teaching a child to roll a ball may include cognitive, social, communicative and affective learning and involve parents, siblings and others in new interactions.

The Results Of Assessment Should Maximize The Chances Of Effective Intervention For Each Child

If parents, teachers and others are to commit themselves to an intervention programme it is important for assessment data to be communicated in terms which reflect optimism that learning will occur as a result of their efforts. Such optimism is unlikely to be engendered by predictive statements of 'potential' based on normative comparisons. On the other hand, repeated observation data and anecdotal records of meaningful behaviours in natural settings can indicate emergent skills and the contexts most likely to lead to repetition and development of functional adaptive behaviours. Such a record of learning is likely to encourage optimism regarding future learning. Also, showing a parent or teacher how their infant orients to specific sounds or to a novel stimulus will be more meaningful for them than reporting a test score or checklist summary. Listening to parents and helping them to evaluate and implement their own ideas can further extend support for their efforts while at the same time communicating belief in the plasticity and open-endedness of development.

SUMMARY: EVALUATING CHILD DEVELOPMENT AND LEARNING IN CONTEXT

This chapter has presented a case for assessing young children as they interact with parents and with related persons and environments in which they develop and learn. It has been suggested that assessment strategies can be derived from both quantitative and qualitative observation methodologies and that these observation procedures may be undertaken and interpreted from ecological and systems theory perspectives. These perspectives involve recognition of phenomenological issues including family culture and value identity. Detailed observation records of teaching undertaken by both parents and professionals have been suggested as an optimal assessment strategy with multiple outcome data that will help ensure that early intervention is undertaken with a minimum of delay.

A central theme for the chapter has been a belief in the plasticity of development, recognizing with Bloom (1982) that human potential is much greater than that shown in our assessments or realized by our educational methods. A transactional perspective on child development rejects the predictive outcomes of testing as representing an inappropriately static model and a futile enterprise. Instead, assessment efforts should be directed toward understanding each child's development as a complex, ongoing, reciprocal, interactional process that parents, teachers and psychologists can learn from and continue to influence.

To reiterate the main points developed in this chapter:

1. Assessment should focus on adaptive behaviours.
2. Assessment should be based on repeated sampling of behaviours.
3. Assessment should be ecologically valid.
4. Parents and teachers should be meaningfully involved in assessment.
5. Assessment should address the dynamic nature of infant development.
6. Assessment should be credible and meaningful to the consumer.
7. Assessment and teaching should proceed together.
8. The results of assessment should maximize the chances of effective intervention for each child.

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