Chapter 13
Developmental Assessments

Key Terms:

Functional Analysis	ABLLS-R®
Preference Assessments	VB-MAPP
Reinforcer Assessments	Curriculum-Based Assessment
Skills-Based Assessments	Curriculum-Based Measurement
Developmental Assessment	Norm-Referenced Tests
Functional Living Skills	Social Skills Checklist

Functional Living Skills Assessment

Key Points:

* Assessment should be a thorough process that is integrated into instruction and ultimately drives instruction.

* The Assessment of Basic Language and Learning Skills Revised® (ABLLS) and the Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP) are skills assessment tools based on Skinner's analysis of verbal behavior. They are an assessment, curriculum guide, and an ongoing skills-tracking system that allow for periodic updates.

* Curriculum-based Assessment (CBA) or Curriculum-based Measurement (CBM) protocols are assessment procedures that gain their information directly from a student's performance on skills that comprise his or her current instructional program.

Developmental Assessments

Chapters 10 through 12 were concerned with *how* to teach young children with autism. The focus of the remaining chapters is on *what* to teach, and possibly more importantly, on *what to teach first (In my opinion, one of the most important concepts that need to be understood and implemented).*

When a behavior analyst first starts working with a child with autism, a functional assessment interview takes place. During this initial interaction, the behavior analyst probes to discover both deficits and excesses in behavior. A clear picture must be obtained so that he or she can identify behaviors targeted for acquisition, reduction, or eventual elimination.

By way of review, the opening portion of this chapter briefly summarizes the process of functional analysis of problem behavior, as well as the related topic of reinforcer assessment. This is followed by a more extensive discussion of skills assessment instruments used to identify behaviors targeted for improvement or acquisition.

What this chapter will *not* do is present a summary of every type of assessment available for children with autism. There are countless commercially available assessments that measure skill acquisition from a developmental and sensory deficit perspective; however, I have found that children with autism have specific needs that are not addressed by most of them. Further, it has been my experience that very few "off-the-shelf" standardized assessments are sensitive enough to provide information that can be incorporated into daily instructional sessions. Therefore, this discussion will be limited to assessment methods and instruments I believe will help fill the void.

It may also appear that I am presenting a bias toward behavioral assessments, as well as assessment of verbal behavior. To keep this in perspective, it is important to consider the core deficits associated with autism spectrum disorders including impairments in communication, social interaction, and patterns of behavior.

In my opinion, most communicative issues can be addressed by an assessment of the learner's verbal behavior repertoire. In addition, a well-developed assessment of a verbal behavior repertoire can account for many of the skills typically considered under the "social" domain. Finally, I believe that the field of behavior analysis has offered several viable ways of assessing functions of problem behaviors, as well as reinforcer preference.

A note regarding other types of assessments: reading or math assessments that are appropriate for typical children are also appropriate for children with autism who display the prerequisite skills to learn academic skills. Also, assessments of physical abilities, such as motor assessments associated with occupational and physical therapy, are not and do not need to be autism-specific. Finally, I am not presenting information on assessment of sensory integration or auditory integration, because there is not yet strong enough research-based evidence to support that these approaches benefit children with autism.

If you are in search of academic or sensory skills assessments, information can be found in the general assessment literature. Salvia and Ysseldyke's *Assessment* (2001) is recommended for its comprehensive treatment of general considerations and issues, as well as plenty of specific examples of assessments across domains.

Finally, I want to stress that assessment is most powerful when it is viewed as a process, not as a specific activity. There is a tendency for instructors to focus almost single-mindedly on purchased assessments that are conducted on an annual or semi- annual basis. These assessments may be a great starting point,

but the most powerful form of assessment that can be employed is ongoing, day-to-day assessment within the skill programs that are implemented. This will be part of our later discussion of Curriculum Based Assessment.

Before beginning an in-detail discussion on developmental assessments, I feel it is important to review additional assessment procedures that are an essential part of any instructional program or behavior plan. These include functional analyses, preference assessments, and reinforcer assessments.

Functional Analysis

When a child displays problematic behaviors that often interfere with their learning, the process of conducting a functional behavior assessment should be conducted. Initially implemented is the functional assessment interview, often followed by Antecedent-Behavior-Consequence (ABC) data collection. This information combined can be used to formulate a hypothesis of the function of behavior.

In addition to this, baseline data is collected to obtain an accurate frequency count of target behavior(s) over a period of time. Baseline data are collected for as long as it takes to establish stability. Once a stable baseline is in hand and a hypothesis as to why the problem behavior is occurring is formulated, we can confidently move ahead and begin planning and implementing the functional analysis.

During the planning stages of the functional analysis, the behavior analyst uses information obtained from the initial interview and data collection to identify potential reinforcers that might be controlled and manipulated during experimental analysis. Following the implementation of the functional analysis, the behavior analyst will have a clear indication as to the function of the child's problem behavior. Development of an effective behavior plan based on the results can then take place.

Remember that the success of any experimental manipulation of behavior is based first on identifying meaningful reinforcement for the child. For this reason, we spend a good deal of time and effort before and during analogue functional analysis identifying potent reinforcers. This allows us to set up and test the greatest number of reinforcing contingencies to get the clearest results.

When going through this process, it is best not to rely solely on the opinions of parents or caregivers. The information they provide is often second-hand and subjective in nature, which can lead to reinforcer misidentification. It is often beneficial for preference and reinforcer assessments to be implemented initially during the functional assessment process, but also as an on-going assessment due to the ever-changing motivation our children with autism display.

Next, I will provide a brief review of the preference assessment and the reinforcer assessment and highlight the key points when conducting these assessments.

Preference Assessment

When working with a child with autism, preference assessments are often useful at the beginning of the instructional session. As noted before, motivation shifts are very common; what is reinforcing at one moment may not necessarily be reinforcing an hour later. In addition to the beginning of instructional sessions, preference assessments should be conducted prior to any type of intervention that is based on reinforcement.

Preference assessments can be as simple as arranging the environment so that many potential reinforcers are available and observing the child's interaction with each, or by conducting more formal assessments such as the single-stimulus presentation, paired-stimulus presentation, or multiple-stimuli presentation, etc.

Reinforcer Assessment

Reinforcer assessments can then be implemented with the items identified during the preference assessment. The question that the reinforcer assessment will answer is whether the item that was identified in the preference assessment is going to be a strong enough motivator so that the child will be willing to work for it. Several types of reinforcer assessments were presented, including the concurrent schedule of reinforcer assessment, multiple schedules of reinforcer assessment, and the progressive-ratio schedule of reinforcer assessment.

Regardless of the type of preference and reinforcer assessment used, the goal is to identify those items and activities that are of high value to the child that can be used to increase compliance and skill acquisition.

Section A – Skill-Based Assessment

As I have discussed, children with autism typically show deficits in behavioral repertoires related to language, cognition, and social skills. When addressing behaviors that may be lacking or in need of improvement, the behavior analyst must enlist the help of a systematic, organized means of assessing the child's present skill level. This is accomplished through the use of an assessment and curriculum that addresses the child's specific skill deficits.

There are two main categorizations of assessments: **developmental assessments** and **functional living skills assessments**. The question is, "which one should I use for the child I am working with?" Developmental assessments and curricula are designed for young children, usually up to eight years old. These children have significant language delays, language disorders, autism, etc. This type of assessment and curriculum are based on typical language and social skill development in young children and are designed to help children with autism to "catch up" to their typically developing peers.

Functional living skills assessment and curricula are designed for children with moderate to severe intellectual disability. These children possess limited repertoires in language, social, daily living, and tolerating skills. They have difficulty with learning matching or imitation skills, and generalization of skills is challenging. Functional living skills assessment and curricula are appropriate for a child of any age, but essential between the ages of six and eight. I will discuss functional living skills curricula in more detail in Chapter 15.

Carbone (2019) presents a chart to assist clinicians in determining which path to take when deciding what to teach, and which assessment to use (Figure 13.1). As will be discussed in this chapter and in chapter 15, the VB-MAPP (listed in the chart) is a developmental assessment where the EFL is a functional skills assessment.

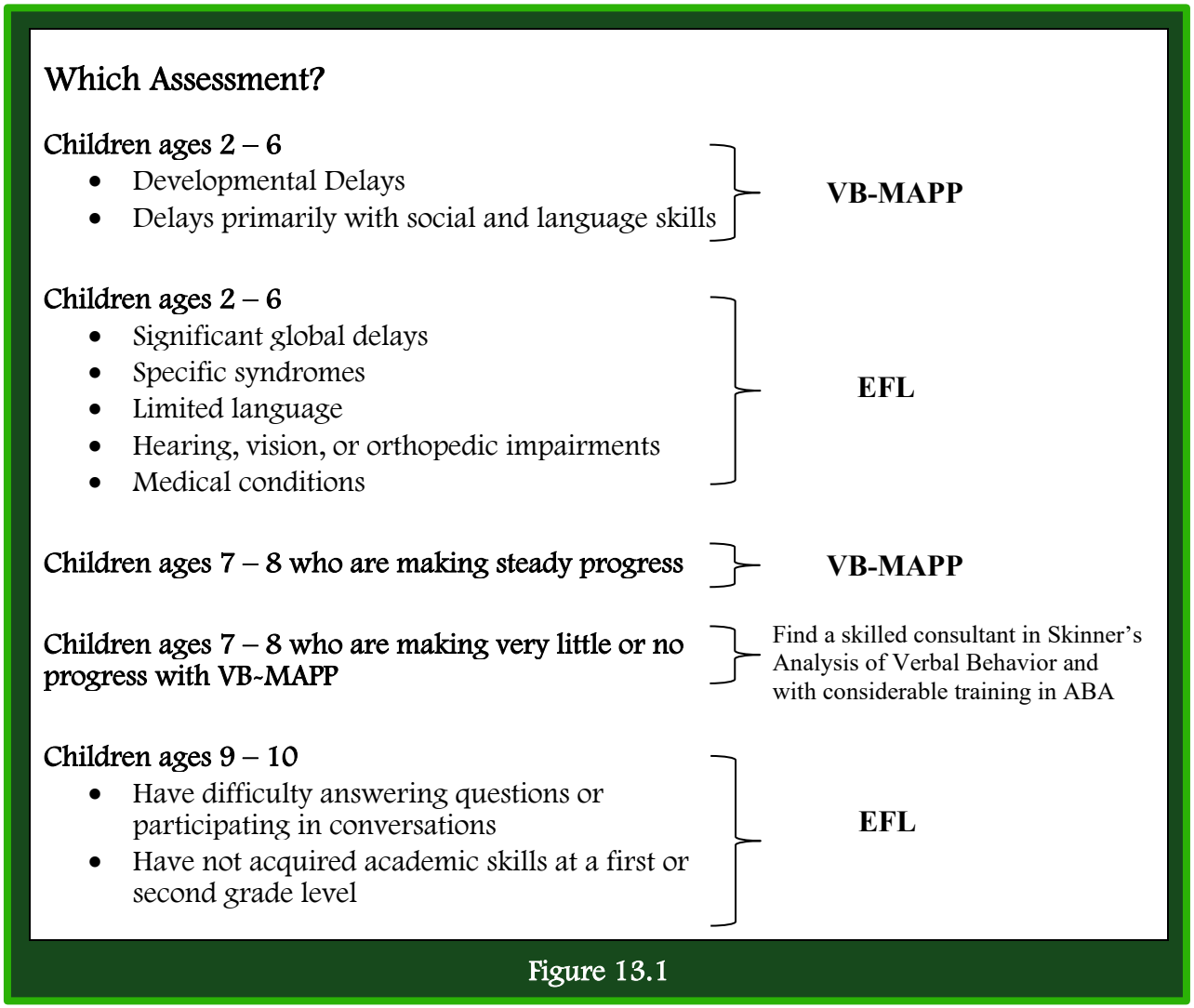
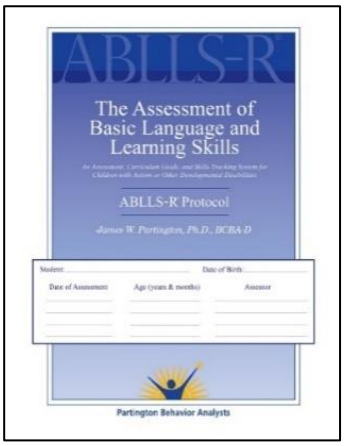


Figure 13.1

When considering developmental assessments and curricula, a myriad of instruments exist for evaluating language, cognitive, and social skills. However, there are two well-known assessment tools designed by behavior analysts, the Assessment of Basic Language and Learning Skills – Revised, and the Verbal Behavior Milestones Assessment and Placement Program. These assessments provide excellent starting points when assessing a child's skills.

Assessment of Basic Language and Learning Skills (ABLLS®)



Originally developed by James Partington and Mark Sundberg in 1998, the **Assessment of Basic Language and Learning Skills (ABLLS®)** is unique, primarily because it is based on B.F. Skinner's analysis of verbal behavior. In 2010, Partington revised the assessment (ABLLS-R®) to include several new task items and to provide a more specific developmental progression of tasks within each of the various skill areas.

As a quick review, Skinner's analysis viewed language as behavior, and in doing so, functionally analyzed how humans use language differently given different environmental contexts. This led Skinner to develop different types of language, referred to as the verbal operants. Utilizing this unique view of language can often yield a finer analysis of a child's deficits than standard language assessments, which consider many of these verbal operants merely as "expressive language."

The ABLLS-R® is designed as an ongoing skills-tracking system that allows for periodic reviews and updates. It is comprised of two texts including The ABLLS-R® Guide and the ABLLS-R® Protocol. The guide includes an introduction to the ABLLS-R®, instructions on how to score the tasks, how to determine educational priorities, and strategies on how to develop Individualized Education Plan (IEP) goals. The protocol consists of criterion-referenced information pertaining to the child's skills. The protocol also includes a set of grids that once completed, provide the user a quick means of assessing the child's current strengths and areas of deficit.

The ABLLS-R® is divided into 25 domains that assess a total of 544 skills. The skill areas focus on language development, social interaction, self-help, academic, and motor skills that children without disabilities learn before they begin kindergarten.

This assessment is designed to consider the motivational conditions (MOs) that are in effect when a child demonstrates a particular behavior. It assesses skills in both naturally occurring and contrived motivational situations, which creates a better picture of a child's performance across a variety of motivational contexts.

In addition, the ABLLS-R® addresses the tendency for children with autism to display learning difficulties when presented with stimuli in a variety of sensory modalities (auditory versus visual). Task items are designed to evaluate the child's response when instructional stimuli are presented in solely auditory or visual modes, as well as in complex combinations of auditory and visual stimuli that more realistically portray how language is perceived in natural settings.

Generalization and spontaneity of language are also evaluated throughout the ABLLS-R®, with complete sections of Basic Learner Skills devoted to *spontaneous vocalizations* and *generalized responding*. Assessment of generalization is built into each domain, including how skills are described relative to when they are displayed, with whom they are displayed, where they are displayed, and with what materials they are displayed. Spontaneity of language skills is also assessed for each of the specific verbal operants.

The initial ABLLS-R® assessment is usually conducted informally over a period of a few weeks; an abbreviated version that can be completed in a few hours is also available. Scores are tracked on a graphic system of grids that provides a visual analysis of the child's skill profile. Deficits are clearly identifiable on the graphic display, and updates allow for a visual tracking of the child's progress over time as intervention programs are implemented.

Let's take a closer look at the components of this assessment.

Because children with autism typically have the greatest deficits in language, cognition[1], and social skills, most of the focus of our ABLLS-R® discussion is on the first category of Basic Learner Skills. Deficits in these rudimentary areas seriously hinder any child's progress in academic, self-help, and motor skill acquisition. In fact, the prerequisite nature of these basic learning skills led Partington to describe them as "critical skills that are in need of intervention in order for a child to become more capable of learning from his everyday experiences" (Partington & Sundberg, 1998, p. 2).

Scoring the ABLLS®

The ABLLS-R® is designed simply as a task analysis instrument, with the complex behaviors that comprise human language and social interaction broken down into measurable steps that can be easily evaluated in a systematic manner.

Its user-friendly nature allows it to be completed by parents, teachers, behavior analysts, psychologists, speech and language therapists, or other professionals. The information gathered typically comes from three sources:

1. Parents, teachers, or others who are well acquainted with the child, and who can offer information about specific task items to their best recollection.

2. Direct observation of the child in particular situations, which yields information pertaining to specific task items.

3. Direct, formal presentation of task items, which provides specific performance information.

The ABLLS-R® scoring system is consistent across all domains. The following section presents some instructions and example graphics regarding scoring. However, these instructions will make the most sense if you can review them alongside an actual ABLLS-R® Protocol, so that the examples are viewed within the context of the assessment.

Each task item is presented as a row on a table that includes:

* A task number
* A range of scores
* Task name
* Task objective
* A question to ask about the child's skill
* Examples of responses
* Scoring criteria
* A section for notes

[1] Cognitive impairments are not a core impairment, but rather a co-occurring condition in many children with autism.

The **task number** is a code that is always comprised of a capital letter and a number. The letter corresponds to the domain (e.g., Cooperation and Reinforcement Effectiveness is domain "A," Visual Performance is domain "B," etc.), while the number indicates where the task item falls within the task analysis of the domain. For example, **A1** refers to the first skill in the Cooperation and Reinforcement Effectiveness domain, while **A10** refers to the tenth skill in the same domain.

The scoring column for each of the task items involves four rows of numbers. The numbers in the "Score" column correspond with the possible scores in the "Criteria" column, which range from zero to the highest score possible. A score of zero indicates that the child does not meet the lowest criterion specified for that task item as defined in the "Criteria" column. The number on the far right of the "Score" column represents the highest score possible for that task item.

Depending on the task, the scoring column will have four rows with the numbers 0 1; 0 1 2; or 0 1 2 3 4. The top row of scores for each item represents the initial assessment scores while the remaining three rows are reserved for updates of the ABLLS-R®. Figure 13.2 represents the scoring column for a four-criteria task:

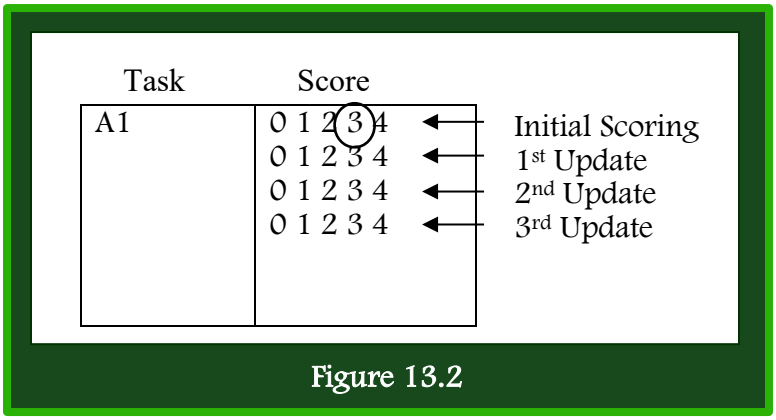


Figure 13.2

The ABLLS-R® is scored by reviewing and assigning a number for each task item within each domain and assigning a number to each item. The score is assigned by circling the number that best represents the child's skill level at the time of the assessment.

Tasks that the child is unable to do, or for which the child is unable to meet the lowest criterion (score of 1), should be scored "zero." Also, if the child's deficits are so severe that they prevent him or her from participating in particular levels of activity (e.g., group instruction), a score of "zero" should also be given.

The information used to determine the score for a task item should come from one of the three sources described earlier. If the information is derived from parents or caregivers, care should be exercised to ensure that the respondent is very familiar with the child. Guessing should be avoided at all costs. If the parent or caregiver is unsure of the child's skill level, arrangements should be made to either observe performance of the skill in the natural environment or in a contrived, instructional situation.

It is also important for ABLLS-R® respondents to consider the child's skill level *at the time of the assessment*. An emerging skill, or a skill that has been observed in the past but is not presently being reliably demonstrated in the child's natural environment, should not be rated as meeting the criterion for mastery.

Partington (2010) suggests that it is better to underestimate a child's skill levels than to overestimate the level of performance. Especially when working with a child with limited skills, it is common for the instructor to want to give the child credit for something and may tend to give credit for some skills, even if they are not fully developed. Early skills, such as basic imitation, are the foundation of learning. Failure to intervene on these relative deficits can cause them to remain as weak spots in the child's language repertoire and can cause problems in the future when more complex skills are being taught.

Figure 13.3 is an example of one task item from the ABLLS-R®:

TASK	SCORE	TASK NAME	TASK OBJECTIVE	QUESTION	EXAMPLES	CRITERIA	COMMENTS
C13	0 1 2 3 4 0 1 2 3 4 0 1 2 3 4 0 1 2 3 4	Follows instructions to select one of two common objects.	Upon request, the student will be able to select an object named by the instructor from an array of two common objects held or placed in any position in front of him.	Can the student select a specified object from a selection of two common objects?	When a cup and a shoe are held in front of the student, the student will select "shoe" upon request.	4= receptively identifies 50 or more objects and can identify several different examples of most of those objects, 3= identifies at least one example of 25 objects, 2= 10 objects, 1= identifies at least 2 objects	See Appendix 3: Receptive and Label List Note that objects selected should be ones that the student hears the names of and interacts with on a frequent basis.

Figure 13.3

In this example, the assessor first asks the respondent if the child can select a common item when requested from a field of two common items. If the respondent is confident that the child can make the selections unprompted, the assessor must determine the extent, quantitatively, to which the child can make them. If, in this manner, the child can select for 50 or more common objects, he or she receives a score of 4; assessor circles 4. If the child's receptive selection is limited to less than 50 objects but more than 24, a 3 is circled. A score of 2 is earned if the child can select between 10 and 24 objects, and a score of 1 is earned if between 2 and 10 objects can be selected.

Skills Tracking System

Once the scores for the initial assessment have been completed (see Figure 13.4), they are transferred to the graphic display located near the front of the ABLLS-R® booklet.

The boxes on the grid are filled in to correspond to the score received for each task item. A colored pencil or marker is preferred, so that successive updates can be graphed in different colors to provide a clear visual representation of the child's progress. Scores of zero for any task item are left blank.

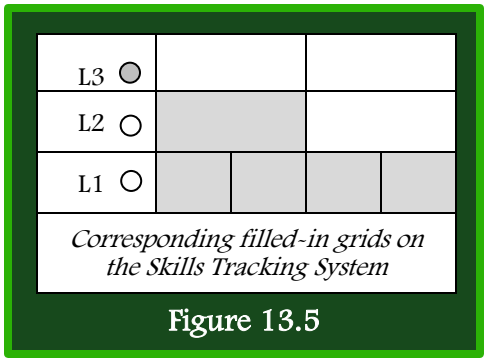
L1	0 1 2 3 (4) 0 1 2 3 4 0 1 2 3 4 0 1 2 3 4
L2	0 (1) 2 0 1 2 0 1 2 0 1 2
L3	(0) 1 2 0 1 2 0 1 2 0 1 2

Sample ABLLS-R Scores

Figure 13.4

Figure 13.5 represents the transfer from ABLLS-R® scores to the Skills Tracking System:

Note: the small circle to the left of the task number on the grid should be filled in for any task item scored zero. This will indicate that the entry was scored zero, and not merely missed in the assessment process



Corresponding filled-in grids on the Skills Tracking System

Figure 13.5

Once the grid has been completed, you will have a clear and efficient way of analyzing the results and determining what skills need to be addressed within the child's programs. Figure 13.6 presents a section of a completed ABLLS-R® grid. Note the different colors used for each update and quick review that can be conducted to determine the progress in acquisition of skills over time.

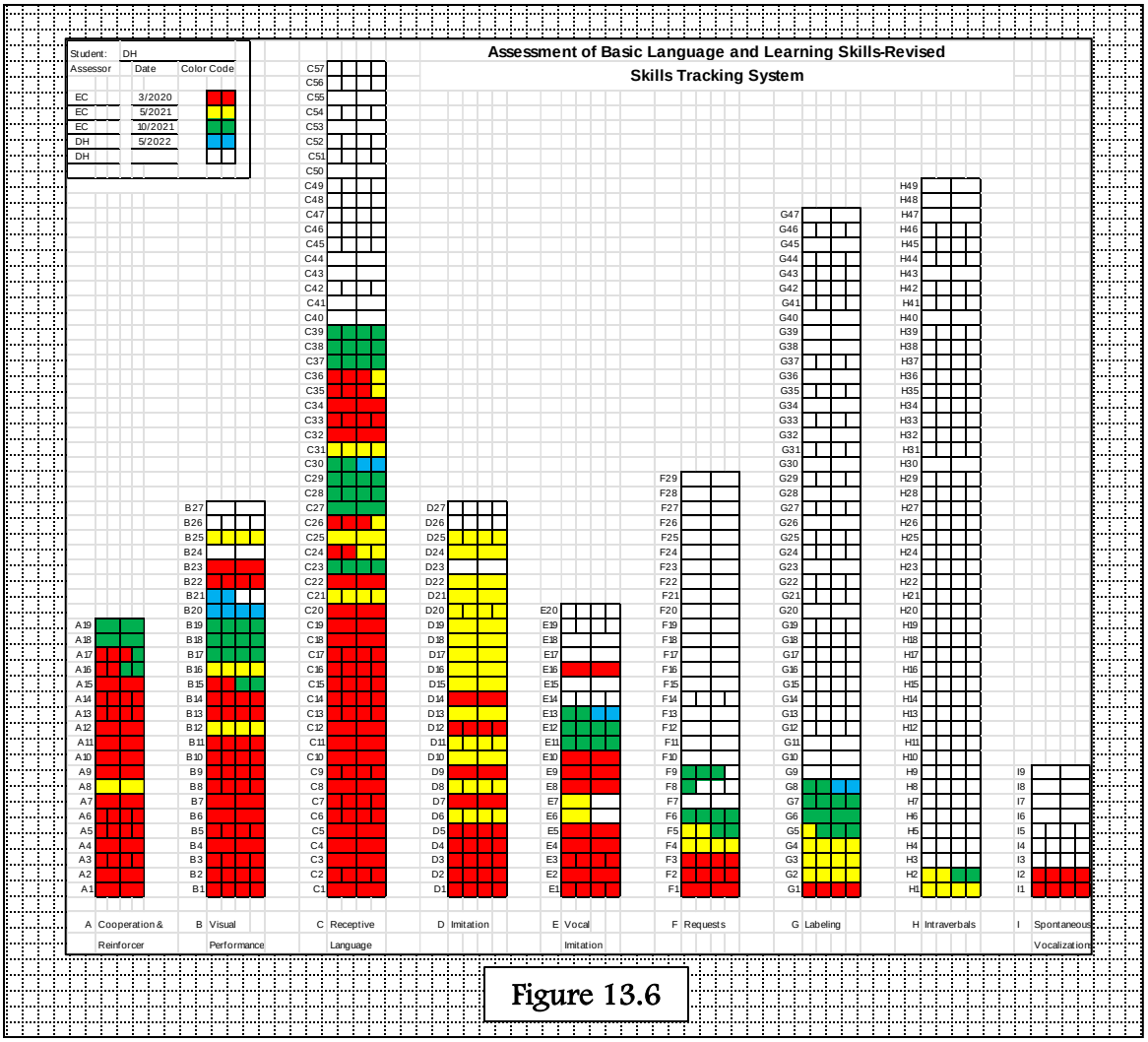


Figure 13.6

Developing Goals from the ABLLS-R®

Once the ABLLS-R® protocol has been completed and the Skills Tracking System has been filled in, a visual inspection of the child's skills within and across domains will help prioritize needs. In most cases, skills are arranged in a prerequisite hierarchy from bottom to top on the Skills Tracking grids. By moving from the bottom to the top of the grid, one can easily identify target skills in the order they should be addressed and can devise intervention programs to teach each target skill.

The Basic Learner Skills that encompass the first 15 domains of the ABLLS-R® are fundamental to developing a child's skill as a learner. For this reason, I will briefly examine several of these domains, and will also discuss the child with autism's typical deficits and programmatic needs in these areas. By describing the domains in general terms, you will be able to see the types of skills that should be assessed when developing programming for a child with autism.

While the ABLLS-R® is first and foremost an assessment tool, it also serves double-duty as a tool that drives curriculum. So, while much of this discussion can also be applied to curriculum development (covered in Chapter 14), I include it here so that you will understand the integral link between the two processes. Assessment and curriculum development exist in a symbiotic relationship, in that they are dependent upon one another. While I present the skill domains here, specific details of the skill-building programs associated with them are presented at greater length in the next chapter.

Cooperation and Reinforcer Effectiveness

Our children usually come to us with very little experience sitting still and tolerating long periods of instruction. As a result, a good portion of our initial interaction with them is spent establishing ourselves as secondary reinforcers, so that compliance and cooperation are not such hard-won objectives. Making the work area and time spent with the therapist seem like "fun" to the child and engineering the work environment to successfully compete with existing reinforcement in the home or classroom are critical first steps in this process.

Visual Performance

I have found that skills requiring visual discrimination such as matching, sorting, or block imitation generally come quite easily to most of our children with autism. Even so, this domain should not be neglected during early programming. Visual performance tasks can provide a respite from the remainder of a child's curriculum, which might be heavily weighted with more formal language tasks. Moreover, we can build on the child's strengths and bring more complex visual skills under instructional control.

Receptive Language

Receptive language (also referred to as Listener Response), which relies heavily on the ability to attend and respond to auditory stimuli, is generally one of the more difficult areas for children with autism. Receptive language (Listener Response) is also a pivotal skill that governs how a child will progress with more complex instruction, because most conventional teaching of more advanced skills relies on verbal direction as the primary means of guiding the student. In this domain, instruction often starts with teaching the child to identify labels of functional objects based on a verbal request to do so and teaching the child to perform actions also based on a verbal request to do so. Quite often, it is necessary to build from motor imitation skills that must be taught first.

Motor Imitation

As discussed in Chapter 7 on stimulus control, a child's ability to imitate is a necessary prerequisite for the use of modeling prompts to teach new skills. Our children usually start out on an Action/Object Imitation drill that teaches them to imitate simple actions with common objects. This activity is usually successful due to the presence of the objects, which eventually serve as visual prompts for the action. From Action/Object Imitation, we typically move to Nonverbal Imitation also referred to as Motor Imitation (imitating gross then fine motor movements without objects).

Mands

One of the most powerful methods of teaching early language is to tie the child's responding to a strong MO by teaching mands. Teaching mands as functionally equivalent behavior can also significantly reduce reliance on a repertoire of aggressive, self-injurious, or tantrum behavior.

Tacts

A tact program is often enhanced by an existing echoic and listener response repertoires. For this reason, combining the development of echoic response with early listener response skills can result in a solid tact repertoire. However, because many of our children embrace tacts, care must be exercised early on to move these beyond the scope of the "walking dictionary" and into functional conversational use.

Intraverbals

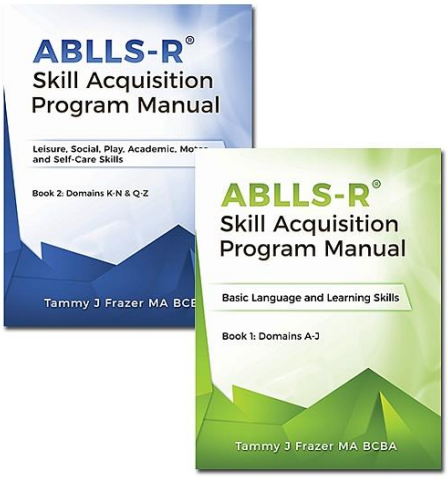
How a child responds to our language with his or her own is often difficult to establish without correct preparation. Instructional control, however, can be transferred relatively easily from established listener response and tact responses to simple fill-in-the-blank intraverbal responses. These early conversational building blocks are critical for our children, and shouldn't be neglected or passed over too quickly. A firm foundation of fill-ins will make future work on more complex reciprocal conversation much easier for the child.

Other Domains

Programs in the remaining Basic Learner Skills domains address syntax and grammar, play/leisure skills, social interaction skills, group instruction, classroom routines, spontaneous vocalizations, and generalized responding. These programs are developed as needed once the basics of cooperation and the rudimentary verbal operants are under way.

ABLLS-R Skill Acquisition Program Manual – Basic Language and Learning Skills

An additional two-part manual was developed by Frazer (2018) to serve as a supplement to the ABLLS-R®. Within these manuals, each task found in the ABLLS-R® has a skill acquisition teaching plan where a teaching objective is provided, needed materials, how to set up the work environment, data collection procedures, the suggested S^D, teaching steps, recommended prompting hierarchy, and error correction procedures. The teaching plan is designed to aid instructors with setting up programming based on the results of the ABLLS-R®.



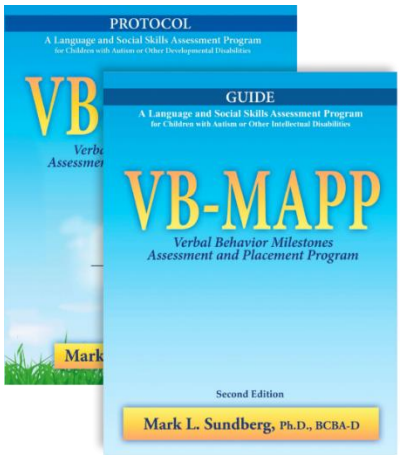
An online version of the ABLLS-R® is also available, the WebABLLS-R. Key features of the WebABLLS-R is that it assesses 544 skills across 25 domains, the ability to manage and share information with colleagues (IEP team members, etc.), and the production of customizable reports of the results.

The WebABLLS-R also includes a Toolkit which provides access to over 200 video demonstrations, language lists, guidelines on what to teach once the assessment is completed, and research conducted by Dr. Partington of typically developing children.

The Verbal Behavior Milestones Assessment and Placement Program

Another skills assessment based on Skinner's analysis of verbal behavior is the Verbal Behavior Milestones Assessment and Placement Program (VB-MAPP). Originally developed by Dr. Mark Sundberg in 2008 and updated in 2014, the VB-MAPP consists of two texts including the Instructor's Guide and the Protocol.

The VB-MAPP Guide provides an introduction to verbal behavior, reviews definitions and examples of the verbal operants, provides general administration guidelines, gives scoring instructions on each of the three levels, and suggests curriculum, placement, and IEP goals for each level of the assessment.



The VB-MAPP Protocol contains five components that are designed to measure a child's skills across the verbal operants, guide instruction, and address deficits in verbal behavior. The five components include:

1) VB-MAPP Milestones Assessment
2) VB-MAPP Barriers Assessment
3) VB-MAPP Transition Assessment
4) VB-MAPP Task Analysis and Skills Tracking
5) VB-MAPP Placement and IEP Goals.

The VB-MAPP Milestones Assessment

This section of the assessment includes 170 measurable learning and language milestones. Each milestone is sequenced across three developmental levels from 0-18 months, 18-30 months, and 30-48 months. The skills evaluated include mands, tacts, echoics, intraverbals, listener, motor imitation, independent play, social and social play, visual perceptual skills, linguistic structure, group and classroom skills, and early academics. Also included in the Milestones Assessment is the Early Echoic Skills Assessment (EESA) subtest. Developed by Barbara Esch, this portion of the assessment analyzes the child's ability to repeat a speech model. Articulation, prosody, intonation, and various syllable combinations are assessed to ensure that the child's spoken language is clear and can be understood by unfamiliar adults.

Scoring the VB-MAPP Milestones Assessment

The Milestones Assessment is divided into three different levels as noted before (Level 1 = 0-18 months; Level 2 = 18-30 months; Level 3 = 30-48 months). Under each level are specific operants and areas that are assessed. For example, under Level 1, areas include Mand, Tact, Lister Responding, Visual Perceptual Skills and Matching-to-Sample, Independent Play, Social Behavior and Social Play, Motor Imitation, Echoic, and Spontaneous Vocal Behavior.

Each area (or operant) has five milestones to be assessed. Based on either direct testing (D), observation (O), either direct testing or observation (E) or timed observation (TO), the milestone is assigned a score of either a 0, ½, or 1 point (see Figure 13.7).

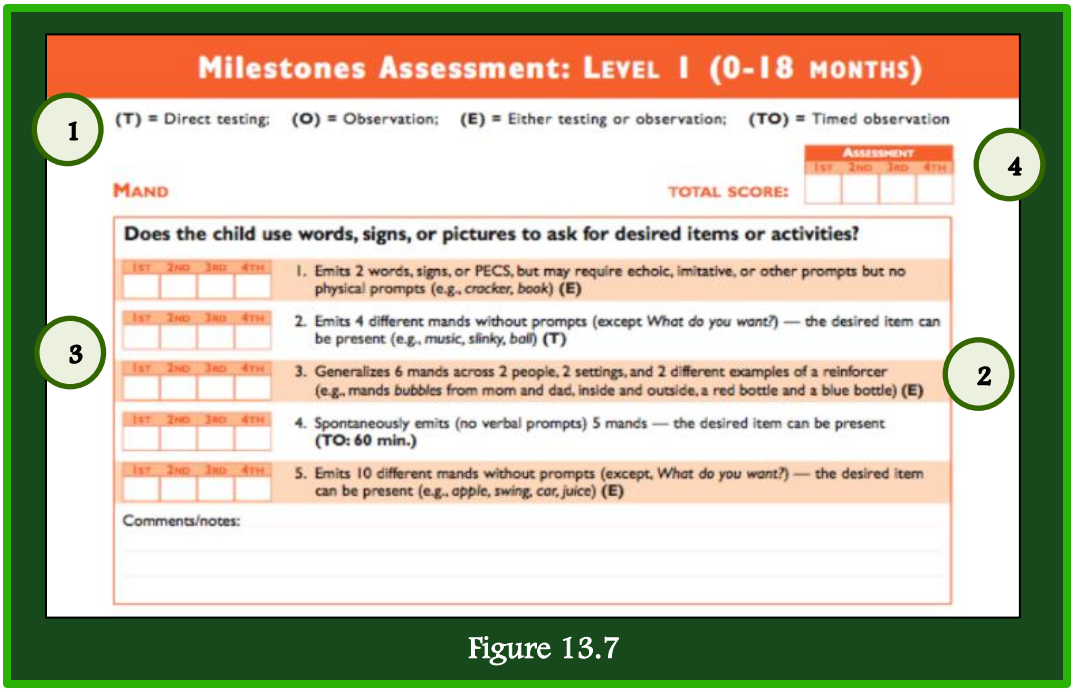


Figure 13.7

Steps to score (see Figure 13.7):

1. Determine which method of assessment you will use. Direct testing refers to implementing the task with the child and recording his or her responses. Observation is directly watching the child to see if a specific skill is displayed. Either testing or observation allows you to select which method is appropriate for the child. Last, timed observation refers to a set amount of time that you are required to observe the child to see if a specific skill is displayed. Within each milestone, it will indicate which method must be implemented in order to score that particular milestone.

2. The milestone is stated in observable and measurable terms. Allowed prompts (if any) are indicated within the milestone.

3. When scoring, you will see four boxes, each labeled 1st, 2nd, 3rd, and 4th. This allows you to update and score the assessment a total of four times using this protocol. When you are initially giving the assessment, you will enter your score in the first box. When you update it, you will enter the new score under the 2nd box, and so forth.

   The milestone is assigned a score of either 0, ½, or 1 point. The guide provides specific criteria that the child must meet in order to receive a score of either 1, ½, or 0 (see Figure 13.8). The score is written in the box next to the corresponding milestone assessed.

4. When each objective is completed, add together each score given per milestone. This number should be entered in the Assessment box, next to "Total Score."

MAND - LEVEL 1

Mand 1-M	Emits 2 words, signs, or icon selections, but may require echoic, imitative, or other prompts, but no physical prompts (e.g., cracker, book). (E)
Objective:	To determine if a child mands with echoic prompts. For a child using sign language or a child selecting icons, can the child mand with imitative or pointing prompts? If early manding is weak, limited, or typically requires physical prompting, a more careful assessment of the child's exact level will be necessary.
Materials:	Gather items or plan actions that function as reinforcement for the child.
Examples:	A child says "cookie" when he wants a cookie, but he needs an echoic prompt in order to respond. For a signing child, he signs "cookie" when he wants and sees a cookie, but he needs an imitative prompt and perhaps needs to hear the word in order to respond. For a child using icons, he selects an icon of "cookie" when he wants and sees a cookie, but he needs a pointing prompt in order to respond. A mand for a push on a swing would be an example of a mand for action.
1 point score:	Give the child 1 point if he responds when an adult provides an echoic prompt, such as "say cookie" when a cookie is present, for 2 desired items or activities. For a child using sign language, give him 1 point if he responds when the adult provides an imitative prompt, or speaks the word (intraverbal prompt). For a child using an icon system, the adult may point to the target picture and verbally prompt the child to pick it up. Do not give the child any points if physical prompts are required for signing or selecting a picture or icon.
½ point score:	Give the child ½ point if he only emits 1 mand.

Figure 13.8

VB-MAPP Scoring Form

In the beginning of the protocol, you will find the Master Scoring Form (see Figure 13.9). Once the assessment has been scored, you enter the results on this grid. Notice the corresponding colors to each Level (Level 1 is orange, Level 2 is green, and Level 3 is blue). Start at the bottom of the form; this is where you will find Level 1.

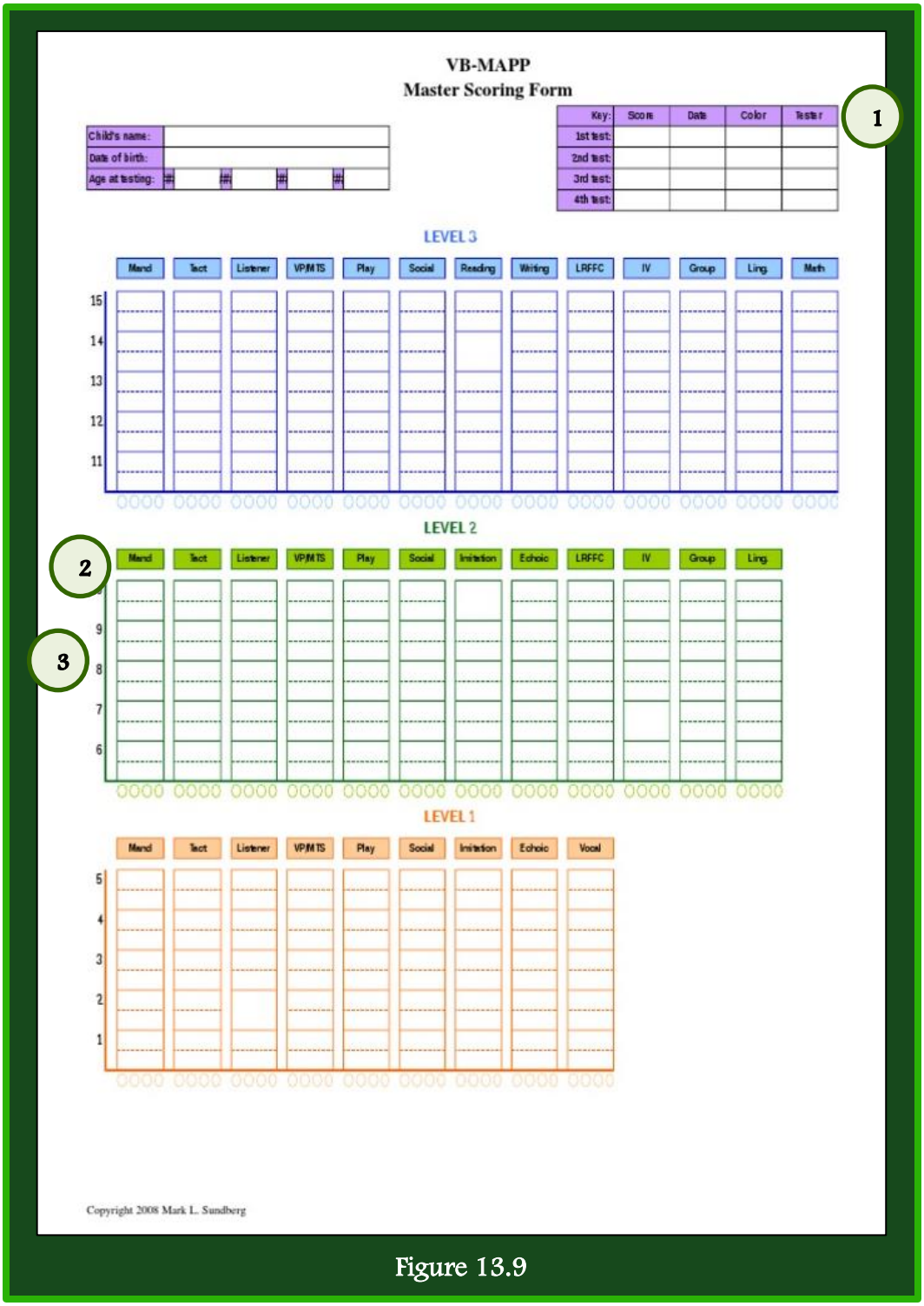


Figure 13.9

When completing this form (see Figure 13.9):

1. Enter in all information: the child's total score (total score for all areas/operants across all levels), the date the assessment was given (usually the month/year), the color used for the initial assessment or update, and who implemented the assessment (Figure 13.10).

Key:	Score	Date	Color	Tester
1st test: pre	68.5	10/2021		EC
post	74.0	5/2022		EC
2nd test: pre				
post				
3rd test: pre				
post				
4th test: pre				
post				

Figure 13.10

2. Next, at the top of each column within each level, you will find listed the operant that was assessed. When entering the score for M1 (Mand, Level 1), you will locate Level 1 on the grid, and go to the Mand column.

3. Start from the bottom and work your way up. Starting at the bottom of the grid, you will find the numbers 1 – 5. These correspond with each of the five milestones for that area/operant. If for M1, the child received 1 point, color in the entire box. Move to 2. If the child scored a ½ point for M2, color only to the dotted line (1/2 of the box). For M3, if the child scored 0, leave it blank. See Figure 13.11 for a completed grid for Level 1.

   Note: if you assessed the entire skill section, and the score was 0, fill in the corresponding bubble at the bottom of the column to indicate that you assessed the skill, but the child was not able to perform any of the milestones.

When the assessment and grid have been completed, through visual analysis, you will identify the child's strengths and the areas where intervention is warranted. Programs can now be developed to focus on skill acquisition.

It is important to understand, however, the gaps observed on the grid are the milestones that the child is missing. This does not mean that a program should be developed to address that specific milestone. More likely than not, there are prerequisite skills that the child is missing in order to achieve criteria of the milestone. In the Task Analysis component of the VB-MAPP, there is a breakdown of each milestone that can assist you to select appropriate programs. A more detailed description of the Task Analysis section is provided below.

Figure 13.11

Task Analysis and Supporting Skills

When completing the Milestones Assessment, it is important to keep in mind that these are exactly what they are called, *Milestones*. Milestones are different stages of development that children meet as they grow. As a child grows, he or she needs to learn a variety of steps before meeting the milestone.

For example, according to the Center for Disease Control (2022), in order to meet a language milestone at age 2, the child should be able to point to things in a book when you ask where specific items are, say at least two words together such as "more cookie," point to at least two body parts when requested, and use more gestures other than waving and pointing, such as blowing a kiss good-bye and nodding his or her head to indicate "yes." This is an important note to remember when completing this assessment. The scores indicate whether the child with autism has reached the *milestone*. If not, then a closer analysis needs to take place at the **prerequisite skills** that need to be taught in order to reach the milestone.

When looking at a specific milestone, the first thing that needs to be completed is a task analysis of that skill. What are the individual steps needed in order to reach that goal? The Task Analysis and Support Skills component in the VB-MAPP can assist with this process. Under a specific milestone, for example, Level 1 Mand (1-M), four different steps are listed that can assist with teaching the child the steps needed to be able to mand for two different desired items (see Figure 13.12). Programs can be developed addressing these steps to teach the child additional skills to assist them with reaching the milestone.

Skill	MAND – LEVEL 1	Met
1-a	Makes eye contact (gaze shift) as a mand for attention or other reinforcers 2 times (O)	
1-b	Moves close to a reinforcing item to indicate the presence of a MO 2 times (O)	
1-c	Pulls an adult to get access to a reinforcing item 2 times (O)	
1-d	Points or gestures towards a reinforcer in order to obtain it 2 times	
1M	**Emits 2 words, signs, or PECS, but may require echoic, imitative, or other prompts, but no physical prompts (e.g., cracker, book) (E)**	

Figure 13.12

The VB-MAPP Barriers Assessment

The Barriers Assessment is a tool that analyzes 24 learning and language acquisition barriers that can interfere with a child's progress. When working with a child with autism, there are several obstacles that can impede the child from learning new skills. Such obstacles can include the display of negative behaviors, escape behaviors, impaired repertoires in any of the verbal operants, prompt dependency, scrolling, generalization impairments, etc. Each of these obstacles as well as others are a part of the Barriers Assessment. When a specific barrier is identified, a functional analysis should be conducted so specific interventions can occur to help the child overcome these barriers, leading to more effective learning.

The VB-MAPP Transition Assessment

Due to the severity of deficits children with autism possess, they may need a more restrictive educational setting to meet their individual needs. Such settings may be an autistic support classroom within their home school, or as restrictive as an autism support program located outside of their home school district. The Transition Assessment can assist the professional with determining when the child may be ready for a less restrictive environment. It provides the instructor with 18 assessment areas that evaluate whether the child is making meaningful progress. This portion of the VB-MAPP is comprised of summaries from the Milestones Assessment as well as scores from the Barriers Assessment. Following the assessment, the IEP team can make informed decisions when deciding on the educational needs of the child.

VB-MAPP Placement and IEP Goals

Once the Milestones Assessment, Barriers Assessment, and Transition Assessment are completed, the outcome is a highly comprehensive overview of the child's current skills. These results can now be used to aid with designing an individualized education plan (IEP).

Within this component of the VB-MAPP (located in the guide), suggestions are made on how to interpret the results of the Milestones Assessment by each level and how to write corresponding IEP goals. For example, if the child's skill deficits lie in Level 1, it is recommended that the focus of intervention be on establishing mands, echoics, motor imitation, listener discrimination, and visual perceptual/matching skills (Sundberg, 2014). Sample IEP goals given include (Sundberg, 2014, p. 152):

* Charlie will emit 10 different mands without echoic prompts in the presence or absence of the desired item or activity (verbal prompts are okay such as, "What do you want?").

* Charlie will spontaneously emit (without a verbal prompt such as, "What do you want?") an average of 50 or more different mands per day (objects can be present).

In Summary

It is in my strong opinion that the most useful assessment tool to evaluate current abilities and areas of deficit is a skills assessment such as the ABLLS-R® or the VB-MAPP. I feel the same is true for older children with limited communication skills who are not considered to be at the highest end of the autism spectrum. In terms of tracking vital skills for success in social and learning environments for children with autism and other developmental disabilities, a skills assessment such as the ABLLS-R® or the VB-MAPP is second to none.

However, as useful as it may be, the ABLLS-R® or VB-MAPP cannot be the only approach to skills assessment for children with autism. Effective instruction is characterized by, in addition to other things, a process of *ongoing* assessment, strategizing, and modification. Once the assessment used has identified a starting point for skills that must be taught, instruction can commence. However, as an assessment tool, the ABLLS-R® or the VB-MAPP is generally not utilized more often than every six months. In the interim, there must be a way to gauge how well or efficiently our children are moving along in their instruction. This is where ongoing systems of assessment come into play.

Instructional decision-making allows the instructor to determine the answers to the following questions:

* Am I teaching the right things?
* Am I teaching these things well within the current program?
* Does the student know what I have been trying to teach?
* How well does the student know what I have been trying to teach?
* Should I make a change in the way I present instruction?
* If so, what kind of change should I make?
* Was my change effective?

Ultimately, data must be collected that will allow us to answer these questions with precision, efficiency, and confidence.

Section B – Curriculum-Based Assessment

Once instruction has begun, the objective is to establish procedures that monitor a child's progress within the curriculum. This is best accomplished through the use of **curriculum-based assessment** protocols (CBA), or **curriculum-based measurement** (CBM) protocols, which can be applied regardless of the child's skill ability, the nature of instruction, or the location of the instructional environment. While these are not necessarily interchangeable terms, CBA and CBM do share a defining feature: both assessment procedures gain their information directly from the student's performance on skills that comprise his or her current instructional program.

They differ in that CBA implies that the data collected will also help suggest specific interventions. On the other hand, CBM identifies the need for and effectiveness of interventions (Marston & Magnusson, 1988), but does not suggest any specific course of action.

Basically, curriculum-based means of assessment are any types of methods that aim to collect information on the learner's performance on skills that are part of curricular programming that is already in place. This can be as simple as a math test to assess student performance on current concepts, or a timed reading passage to determine whether or not the learner is decoding the material being presented in reading class. It can also be an oral demonstration of skills. There are as many ways to accomplish these assessments as there are to present instruction. How the actual procedures look depends on the type of skill being assessed, the methodology used to teach it, and the curricular materials themselves. Curriculum-based methods provide the instructor with objective data that will drive instructional decision-making.

Curriculum-based Assessment/Curriculum-based Measurement

* Assessment is conducted using materials and tasks from the student's instructional program.
* Can be fluency-based.
* Can be accuracy-based.
* Can compare student to past performance.
* Can compare student to performance of others.
* Curriculum-based measurement determines if intervention is necessary/effective.
* Curriculum-based assessment does the same, but also helps determine what intervention is necessary.

Take, for example, the skill of labeling items from an array. An assessment such as the ABLLS-R® can show us that a child is limited in his or her ability to label objects. Because of this, we know that we should begin instruction in this area. However, the ABLLS® will not help us determine whether or not we are going about this instruction in the right way. To make this determination, we utilize a form of CBA.

In this particular example, we can develop a measurement system that assesses accuracy alone (i.e., percentage correct vs. percentage incorrect), or one that addresses fluency (accuracy and speed). Given what we know about fluency and its ramifications on skill retention, endurance, application, performance, and stability, I lean toward CBM methods that measure fluency whenever possible.

In this case, a fluency assessment involves using materials in the presentation of instruction and conducting timings of 30 or 60 seconds, in which the child performs the targeted skill. Correct and incorrect responses are recorded during the timings. Afterward, the number of correct and incorrect responses are totaled and converted into a per-minute rate, and the resulting data are then graphed and compared to a frequency aim.

The frequency aim is essentially a performance standard to which the student's response frequency is compared. This comparison allows us to know whether or not progress is being made within the program, and at what rate. Frequency aims can be completely individualized, based upon the learning and performance characteristics displayed by the learner, or they can be based in some way on the average performance of a group of learners who also completed the task.

This type of approach can be applied to a great many skills or target behaviors. There are times, however, when accuracy alone will suffice as a measure of performance. In these cases, such as when the goal is compliant responding over development of new skills, or accurate production of targeted speech sounds, cold probes can be conducted in which responses to a set number of trials are recorded and then graphed. Similar to fluency data, these data are graphed and compared to both baseline and aims. Student progress toward the aim, or lack thereof, is an indicator of the effectiveness of the way in which the skill is being taught.

A Behavioral Model for Making Instructional Decisions

Progress measurements or assessments are only useful if they serve a purpose. For this reason, any curriculum-based assessment or measurement system must include a framework for using the information to drive decision-making. Going back to the example of teaching multiple labels from an array, suppose that a fluency probe has been selected as the preferred assessment protocol. The daily fluency assessment produces data that show no progress on the part of the learner. The assessment has done the first part of its job – it has identified the need for intervention or a change in intervention strategy. However, in order to be effective, this information must be used to determine the next step.

At this point, I would like to propose a model for instructional decision-making that takes into account the behavioral perspective. Antecedent conditions (conditions present *before* a behavior occurs), the behavior itself, and consequences to the behavior all play large roles in the establishment of new behavioral repertoires. Therefore, any attempt to deliver effective instruction should address all three.

The first step is to define the target behavior or skill itself, and it is important to do this with precision. If the assessment data shows no improvement, we can look to this component (the "B" – behavior) of the A-B-C sequence as a focal point of strategy change. Have we clearly defined the behavior or skill in question? If not, this could account for the poor assessment results. If one assessor has a set of criteria for correct or incorrect responding that differs from another's, the data will be skewed.

Another way in which the behavior itself can play a role in decision-making is by changing the nature of the response requirement to hasten success. Referring back to the concept of successive approximations, shaping a response with a lower response requirement can allow us to reach our terminal goal with greater efficiency. In other words, the target skill may be too difficult, and an intermediate step or steps may need to be acquired first.

In the same way, we may find that the behavior we are assessing is inappropriate given the student's mastery of prerequisite skills. In this case, we may change the target behavior and resulting program of instruction entirely to teach skills that are necessary prerequisites.

Decision-making should also take into account the antecedents to behavior. These are stimuli that are present prior to the exhibition of the behavior. In the case of skill instruction, antecedent stimuli can include the verbal S^D, the instructional materials used, the manner in which these materials are presented, or the ambient conditions of the environment itself. Interventions based on the antecedent to skill performance can include changing the materials used, altering the pace at which instruction is provided, providing stimulus or redundancy prompts, or changing the location in which instruction is provided, to name but a few.

Finally, the consequences that follow a behavior play the largest role in determining whether the future frequency of that or similar behaviors will increase or decrease. Because of this, our strategy for making instructional decisions should also include options for making changes in the delivery of consequences to behavior. In the case of skill instruction, consequences include error correction procedures, delivery of reinforcement, punishment, extinction, and consequence prompts. There are a number of possibilities for changing our approach based on the consequences we provide within instruction.

An example of a practical document that helps take into account each of these factors is the "Program Change Form" (see Figure 13.13). This form is based largely on a similar form developed by Vincent J. Carbone, Ed.D.

Program Change Form

Program: _____ Date: _____

Area One: Changes in S^D presentation

Review S^D – it is appropriate, and all staff are consistent in presentation. Change: _____	
Provide or alter S^D prompting (inflection, visuals, proximity, position, etc.). Change: _____	
Alter instructional pace.	
Alter field size.	
Alter ratio of target to mastered items. Change: _____	
Alter materials. Change: _____	

Area Two: Changes in consequent delivery

Provide or alter response prompting (physical, gestural, modeling, etc.) Change: _____	
Alter reinforcement schedule. Change: _____	
Alter reinforcement type. Change: _____	
Check for true differentiation of reinforcement – variety.	
Error correction has become lax for skills that have been demonstrated independently. Tighten up procedures. Change: _____	
Alter materials. Change: _____	

Area Three: General Considerations

Instructional control is not established. (Pairing issues, mand training, etc.) Change: _____	
Circle: Remove program Introduce new set or SD Move program to maintenance Change: _____	

Figure 13.13

Norm-Referenced Tests

An adequate approach to assessing a child with autism is multifaceted. The ABLLS-R® and the VB-MAPP are assessments that provide a high level of detail and curriculum-driving guidance for the practitioner or parent. However, as comprehensive as the assessment may be, its results are completely individualized. Similarly, curriculum-based methods of assessment and measurement tend to focus on an individual's contact with particular curricular content. This is not a bad thing, if there is one consistent theme throughout this manual, it is that an individualized approach is the best way to solve any behavioral or educational problem.

In the field of education, however, there is a strong tendency for schools and professionals to provide some measures that compare student performance to standardized reference points. In the case of curriculum-based assessment, it is possible to make comparisons to a normative group, such as the performance of other students in a classroom, to establish frequency aims. However, these norms are not usually standardized.

Most educational systems solve this by relying on **norm-referenced tests** to provide part of the assessment picture. In a norm-referenced test, student performance is translated into a series of scores via statistical analysis and then compared with others who also took the test.

Norm-referenced tests are controversial because they are usually written so that a small group of students does very poorly, and a small group of students does very well. Consequently, most learners taking the test achieve an average score, and the resulting graphic display of performance data of the norm group creates a "bell curve."

Examples of these kinds of achievement tests include: the California Achievement Test (CAT); Comprehensive Test of Basic Skills (CTBS), which includes the "Terra Nova;" Iowa Test of Basic Skills (ITBS) and Tests of Academic Proficiency (TAP); Metropolitan Achievement Test (MAT); and the Stanford Achievement Test. Tests developed in the same manner are also used within the assessment protocols of speech-language pathologists (such as the Peabody Picture Vocabulary Test – R), school psychologists (a myriad of "IQ" tests), and physical/occupational therapists.

In a norm-referenced test, scores are usually reported in terms of percentile ranks, by which one student's score is compared to those of the norm group. The norm group is selected to represent all of the people taking the test – so the test-maker's scoring system estimates how well the learner performed in comparison to all of the students who took the test. For example, a percentile rank of 67 on a norm-reference test indicates (estimates) that the student performed better than 67 percent of similar students who took the same test.

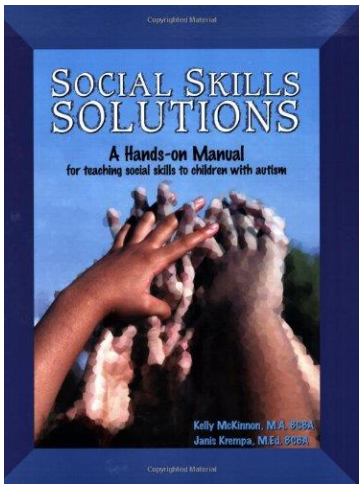
Some people find numerous problems with these kinds of assessment devices, many of which are valid. (A quick web search on the topic will produce a great amount of further reading.) Because of these concerns, most publishers of norm-referenced tests are quick to point out explicitly that these measures should not be used alone to make educational decisions. This seems to fly in the face of current policy-driven trends in education, where schools are held accountable for meeting standards based on norm-referenced testing alone.

Regardless of the controversy, these tools can be an important part of any assessment package, because they tell us how our work on isolated skills translates into improvement in skill development as compared to peers.

This can be especially valuable for people new to designing and managing instructional programs for children with autism, who often spend a great deal of time and effort teaching isolated skills that never translate into functional repertoires. Isolation of component skills is an absolute necessity, but progress within these skill domains is sometimes misleading. Improvement in scores on norm-referenced measures will likely not be seen if instruction is not geared toward generalization, if variations in stimulus conditions are not introduced appropriately, and if ongoing curriculum-based assessment is not well conceived or thorough.

Section C – Social Skills Assessment

One of the core deficits associated with autism spectrum disorders is impairment in social interaction. Despite this, many behaviorally based programs don't address social skills well enough. One of the reasons for this could be that there is not a great selection of practical and sound assessment tools available in this area. There are certainly many assessments that are targeted toward social skills, but few actually focus on observable, measurable behaviors that are associated with social interaction. However, there is one such assessment tool that I would like to share with you.



The tool is called "The Social Skills Checklist," developed by Janis Krempa and Kelly McKinnon (McKinnon & Krempa, 2005). As part of their book, *Social Skills Solutions*, it is developed not as a standardized assessment, but as a criterion-referenced assessment that presents a series of skills that its developers feel are important steps in the development of adequate social skills.

This assessment provides a detailed social skill sequence for very young learners, as well as a clear breakdown of each task to be assessed. The tasks are written behaviorally, and the person completing the assessment must determine whether or not the child being assessed demonstrates the listed behavior.

The assessment is broken into three levels, each consisting of 10 "modules," addressing different areas of social functioning.

Modules in Level 1 include:

* Module 1: Joint Attention/Attending
* Module 2: Greetings
* Module 3: Social Play
* Module 4: Self-Awareness
* Module 5: Conversations
* Module 6: Perspective Taking
* Module 7: Critical Thinking Skills
* Module 8: Advanced Language
* Module 9: Developing Friendships
* Module 10: Community/Home Life

Each module then lists several component skills. For example, under Level 1, Module 1 ("Joint Attention/Attending") includes items such as "looks when called/comes when called," "turns and orients toward person when making request," and "follows eye gaze, point or gesture by others." Level 1, Module 6 addresses perspective taking, and includes items such as "labels/imitates emotions in pictures" "states what makes child happy, sad, etc.," and "looks for/finds hidden objects and hides them."

As stated, the assessment is divided into three levels. Skills become more complex as the levels increase, and the names of some of the modules change from one level to the next. Regardless of level, each behavior is assessed in three contexts: 1:1 interaction/instruction, within a group, and in natural settings. This incorporates the idea of skill generalization and allows those who develop skill programming to know the contexts in which the greatest effort should be focused. For example, if a student is able to ask for things using pronouns when working with his individual instructor, but not able to use pronouns in a natural setting (such as on the playground), then pronoun use has clearly not been achieved.

Much like the ABLLS-R® and the VB-MAPP, The Social Skills Checklist seems to be of greatest value when used as a curriculum-driving tool. It is not scientifically developed, nor is it standardized, and therefore it cannot be used beyond the purposes of describing the existence or nonexistence of certain skills within a learner's repertoire. But by telling us whether or not these very important skills are intact, it gives us a direction for programming. We do not have to waste valuable time presenting instruction in contexts where skills are already being performed, and we can instead shift our focus to skills and environments that really need our attention.

Creating a Complete Assessment Package

A final consideration that should be addressed is the need to seek out assessment information from providers of related services. As we know, autism is often accompanied by issues with motor planning and development, speech production, and cognitive deficits. Calling upon professionals who have the specialized expertise to assess performance in all of these areas is necessary for a complete assessment package.

Procedures that they follow are likely to be similar to one or many of the procedures we have discussed, including observational, curriculum-based, and norm-referenced methods. However, these professionals have received a great deal of training to develop a keen eye for problems within their areas of expertise, and the information they provide can enhance an instructional program.

Always remember, though, that everything we do *is* behavior, and that behavior is subject to influence by our contact with the environment. Try to filter assessment information through this premise to use it in the soundest way possible.

In Summary

Before moving on to curriculum development, I must summarize some key considerations that pertain to assessment.

First, assessment is a process that is integrated into instruction. It has ramifications that will determine what skills to teach, how to teach them, and how to plan for changes in strategy when necessary. Assessment should never end, for it allows us to make the right decisions when it is time to take the next step, and there is *always* a next step.

Second, assessment should be thorough, and it should take advantage of the many resources that are available. Children with autism have an extraordinary number of instructional needs, so no one assessment or method of assessment will fit the bill. In this and previous chapters, ways of assessing reinforcer preference and skill performance have been presented, as well as problem behaviors and their functions.

Our ability to perform precise assessments in all of these areas will undoubtedly have a significant impact on the efficiency of interventions. In short, assessment that is done well prevents us from wasting our children's time.

Third, and most importantly, assessment alone is almost useless. It only serves a functional purpose if it provides information we can use to drive the instructional process.

In the case of functional assessment, our behavioral interventions are tailored around assessment results. Assessment of skill performance should serve the same purpose. The only reason we want to know how well a learner is doing within a particular skill domain is to determine what, if any, changes need to be made to our instructional strategy.

Assessment only serves a functional purpose if it provides information we can use to drive the instructional process.

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