Using Individual Growth and Development Indicators to Measure Early Language and Literacy

Kristen N. Missall, PhD; Judith J. Carta, PhD; Scott R. McConnell, PhD; Dale Walker, PhD; Charles R. Greenwood, PhD

Learning to read is founded on the acquisition of oral language, phonological processing, print awareness, knowledge, and comprehension skills acquired before school entry. Practitioners who work with very young children have limited means of knowing whether interventions in these areas are helping children make progress toward important language and early literacy outcomes. As a result, reporting of child outcomes in these areas is usually insufficient at the program, state, and national levels. Child performance measures are needed that are easy and repeatable so that estimates of child growth can be obtained and used to inform intervention decisions. Individual Growth and Development Indicators are emerging as a robust approach to assessment particularly well suited to these challenges. This article describes 5 Individual Growth and Development Indicators for measuring progress in young children’s early language and literacy. A brief overview of theoretical and empirical background information is provided demonstrating the reliability, validity, and feasibility of this approach for measuring growth in these critical areas of child development. Examples illustrate how these measures are used in early intervention programs for evaluating the progress of children as well as for program evaluation. Key words: language, early literacy, early childhood, general outcome measurement, Individual Growth and Development Indicators, IGDI

LONG before children enter formal school and begin to read, they develop many important language and early literacy skills that contribute to their reading achievement. Learning to read is dependent on the foundation skills of oral language, phonological processing, print awareness, knowledge, and comprehension, which are acquired in the years prior to school entry (Whitehurst & Lonigan, 1998). These early language and literacy skills are distinct but interrelated, and they develop in increasingly complex ways as children age (Snow, Burns, & Griffin, 1998). Children start to develop some of these skills (eg, oral language, receptive vocabulary) as early as infancy (Kuhl et al., 1997). Then, as children grow to be toddlers and preschoolers and finally enter school, early language and literacy skills directly contribute to actual reading skills. For example, infants communicate first using gestures and vocalizations, then spoken words, and finally phrases. Young children learn that oral language is composed of words made of letters that have individual sounds, then blended sounds. Soon after, children recognize and sound out
printed letters and combinations of letters in words and start to identify sight words and decode. Although some language and literacy skills develop simultaneously and others are acquired in a more structured and hierarchical fashion, all are prerequisites for reading.

Research on these reading precursors indicates that intervention for young children should be language-rich, providing frequent opportunities for children to hear diverse and complex vocabulary (Hart & Risley, 1995); present opportunities for shared book reading and conversations (Snow, Tabors, & Dickinson, 2001); and provide literacy-rich environments (eg, Payne, Whitehurst, & Angell, 1994). Throughout life experiences at home, in child care and in school, exposure to and engagement in language and early literacy contribute to a developing reader’s array of skills.

In recent years, research has increased dramatically in the areas of language and literacy development, driven in part by findings that early skill development in these areas is critical to later academic and school success (Scarborough, 1998; Snow et al., 1998; Walker, Greenwood, Hart, & Carta, 1994). As a result, public demands are growing for more early interventions that are effective in promoting early language and literacy. Yet, the measures to document the effectiveness in children’s growth in these areas have not kept up with the increased demand for greater accountability of programs for young children. Although some progress has been made, significant gaps still exist in the array of available tools for assessing the continuum of language and literacy development of preschool children and in relating growth in these skills to earlier development and later achievement.

**CURRENT STATUS OF ASSESSMENT IN LANGUAGE AND LITERACY**

Researchers and practitioners who work with very young children have had limited means of knowing whether their teaching practices are helping children make progress toward important language and literacy outcomes. Available assessment tools (eg, Bayley Scales of Infant and Toddler Development [Bayley, 2005], Battelle Developmental Inventory [Newborg, 2004]) used in early education settings are typically cumbersome, lengthy, specialized, norm-referenced tests that provide information about child development at one point in time, but not necessarily in response to environmental experiences such as instructional practices or caregiving interactions. To know whether children are making individual progress toward important outcomes and responding to specific interventions, researchers and practitioners need measures of child performance that can be repeated often, using comparable conditions and scoring procedures that produce information about rate of growth (eg, results akin to standard height and weight curves that provide reliable estimations of overall health based on quick assessments). To be able to examine progress toward an outcome, we need an easy way of examining rate of growth toward this outcome. This type of assessment stands in contrast to typical assessment practice (the use of infrequent, time-consuming, global measures of development), but it serves a different purpose. Although traditional assessment methods are beneficial for peer comparison and are quite useful for identification of special education services, they offer relatively limited information about developmental growth in response to environmental experiences. Other types of assessments also target the development of individual children but focus on skills mastery rather than rate of growth (eg, curriculum-based assessments like the Assessment, Evaluation, and Programming System for Infants and Children [Bricker, 2002]). A different type of assessment is needed that can help practitioners monitor children’s growth toward outcomes of interest (eg, language, literacy) and in response to intervention (Greenwood, Carta, & Walker, 2004). Unfortunately, few of these assessments that permit ease of progress monitoring have been developed for young children.
This shortcoming of available assessments to monitor growth greatly restricts reporting of child outcomes at the program, state, and national level. Stakeholders know very little about practices in the classroom as well as about child outcomes, and practitioners have limited information to inform their future practice and communicate to parents. There is a need for assessment tools that allow teachers and parents to use results to determine child progress and improve intervention services while allowing program managers, state departments, and federal offices to assess impact, continuously improve services, and document effects of early childhood education.

INDIVIDUAL GROWTH AND DEVELOPMENT INDICATORS

Individual Growth and Development Indicators (IGDIs) are a new approach to assessing young children that have been developed to address these needs. IGDIs are a psychometrically sound family of measures designed to monitor children’s progress toward socially validated early childhood outcomes (Greenwood, Carta, Walker, Hughes, & Weathers, 2006; McConnell, McEvoy, & Priest, 2002) (see Table 1 for psychometric information). They are different from existing assessments currently used for young children in that they feature brief measurement of a few key skill elements that are used repeatedly to chart a child’s rate of growth (progress) toward a general outcome over time (Fuchs & Deno, 1991). IGDIs produce assessment data that allow parents and teachers to monitor child progress over time, identify the need for changes in intervention, and then continue to monitor children’s progress once an intervention has been implemented or modified. IGD data can be used to examine the progress of an individual child (Greenwood, Dunn, Ward, & Luze, 2003; Phaneuf & Silberglett, 2003); an entire classroom or program; (Missall, McConnell, & Cadigan, 2006); or a large group of children (e.g., children from an entire state) (Greenwood et al., 2006). In addition, IGDIs have the following desirable assessment features: (1) quick and relatively easy to administer, (2) low cost, (3) appropriate for use with diverse populations, (4) sensitive to growth and intervention, and (5) developed to meet high standards of reliability, validity, and feasibility.

IGDIs are derived from the general outcome measurement (GOM) approach to assessment, an approach that has been used successfully to monitor older children’s progress in reading for more than 20 years (e.g., Shinn, 1989). GOM is the continuous, frequent, and standard assessment of child progress toward a long-term desired goal or outcome. Central to the content development of a GOM is the repeated measurement across time of the same key skill elements (a set of skills that represent the entire set of skills in an outcome). Thus, a child’s increasing proficiency on a GOM is indicated by improved performance on the same key skill elements repeatedly measured over time. In GOM, measurement is focused on just a few key skill elements and not on the universe of possible age-appropriate skills. The most researched and robust of GOMs is a measure of reading aloud often referred to as Oral Reading Fluency (ORF; Deno, 1985; Fuchs & Deno, 1991). ORF can be used as soon as students can read. ORF is assessed by asking a child to read aloud from a grade- or developmental-level reading passage for 1 minute. The score is the number of words read correctly in 1 minute. The measure has standard administration rules and directions, but the quick administration and easy scoring make the measure quite simple. Yet, a 1-minute ORF score is highly correlated with measures of reading comprehension (Fuchs, Fuchs, & Maxwell, 1988; Hintze, Shapiro, Conte, & Basile, 1997; Shinn, Good, Knutson, Tilly, & Collins, 1992) and both individual- and group-administered tests of reading achievement (Baker & Good, 1995; Tindal & Marston, 1996). ORF scores have been used as a screening and benchmarking tool to identify lower-performing or “at-risk” students (Good, Gruba, & Kaminski,
Table 1. Reliability and validity of language and literacy IGDIs

<table>
<thead>
<tr>
<th>Measure(s)</th>
<th>Type of reliability</th>
<th>Type of validity</th>
<th>Correlation</th>
<th>Citation</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECI</td>
<td>Test-retest</td>
<td>Concurrent</td>
<td>0.89</td>
<td>Greenwood, Carta, and Walker (2004)</td>
</tr>
<tr>
<td>ECI and PLS-3</td>
<td>Concurrent</td>
<td>0.62</td>
<td>Greenwood et al. (2004)</td>
<td></td>
</tr>
<tr>
<td>ECI and PN</td>
<td>Predictive</td>
<td>0.65</td>
<td>Greenwood et al. (2004)</td>
<td></td>
</tr>
<tr>
<td>PN and PPVT-III</td>
<td>Criterion</td>
<td>0.56–0.75</td>
<td>Priest, McConnell, McEvoy, and Shin (2000)</td>
<td></td>
</tr>
<tr>
<td>PN and PLS-III</td>
<td>Criterion</td>
<td>0.63–0.79</td>
<td>Priest et al. (2000)</td>
<td></td>
</tr>
<tr>
<td>PN</td>
<td>Alternate form</td>
<td>0.44–0.78</td>
<td>McConnell, Priest et al. (2002)</td>
<td></td>
</tr>
<tr>
<td>PN</td>
<td>Test-retest</td>
<td>0.67</td>
<td>Missall and McConnell (2004)</td>
<td></td>
</tr>
<tr>
<td>PN and AL</td>
<td>Concurrent</td>
<td>0.43</td>
<td>Missall (2002)</td>
<td></td>
</tr>
<tr>
<td>RH and PPVT-III</td>
<td>Criterion</td>
<td>0.56–0.62</td>
<td>McConnell, Priest et al. (2002)</td>
<td></td>
</tr>
<tr>
<td>RH and CAP</td>
<td>Criterion</td>
<td>0.54–0.64</td>
<td>McConnell, Priest et al. (2002)</td>
<td></td>
</tr>
<tr>
<td>RH and TOPA</td>
<td>Criterion</td>
<td>0.44–0.62</td>
<td>McConnell, Priest et al. (2002)</td>
<td></td>
</tr>
<tr>
<td>RH and PN</td>
<td>Concurrent</td>
<td>0.46–0.73</td>
<td>Missall (2002)</td>
<td></td>
</tr>
<tr>
<td>RH and DIBELS LNF</td>
<td>Concurrent</td>
<td>0.48–0.59</td>
<td>McConnell, Priest et al. (2002); Missall (2002)</td>
<td></td>
</tr>
<tr>
<td>RH and DIBELS OnRF</td>
<td>Concurrent</td>
<td>0.44–0.68</td>
<td>McConnell, Priest et al. (2002); Missall (2002)</td>
<td></td>
</tr>
<tr>
<td>RH</td>
<td>Test-retest</td>
<td>0.83–0.89</td>
<td>Missall and McConnell, 2004</td>
<td></td>
</tr>
<tr>
<td>AL and PPVT-III</td>
<td>Criterion</td>
<td>0.40–0.57</td>
<td>McConnell, Priest et al. (2002)</td>
<td></td>
</tr>
<tr>
<td>AL and CAP</td>
<td>Criterion</td>
<td>0.34–0.55</td>
<td>McConnell, Priest et al. (2002)</td>
<td></td>
</tr>
<tr>
<td>AL and TOPA</td>
<td>Criterion</td>
<td>0.75–0.79</td>
<td>McConnell, Priest et al. (2002)</td>
<td></td>
</tr>
<tr>
<td>AL and DIBELS LNF</td>
<td>Concurrent</td>
<td>0.49–0.71</td>
<td>McConnell, Priest et al. (2002); Missall (2002)</td>
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<td>AL</td>
<td>Test-retest</td>
<td>0.62–0.88</td>
<td>Priest et al. (2000)</td>
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<tr>
<td>SB and PPVT-III</td>
<td>Criterion</td>
<td>0.49</td>
<td>McConnell, Priest et al. (2002)</td>
<td></td>
</tr>
<tr>
<td>SB and CAP</td>
<td>Criterion</td>
<td>0.35</td>
<td>McConnell, Priest et al. (2002)</td>
<td></td>
</tr>
<tr>
<td>SB and TOPA</td>
<td>Criterion</td>
<td>0.47</td>
<td>McConnell, Priest et al. (2002)</td>
<td></td>
</tr>
<tr>
<td>SB and DIBELS LNF</td>
<td>Concurrent</td>
<td>0.28</td>
<td>McConnell, Priest et al. (2002)</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: AL, Alliteration IGDI; CAP, Concepts About Print (Clay, 1985); DIBELS, Dynamic Indicators of Basic Early Literacy Skills (Kaminski & Good, 1996); ECI, Early Communication Indicator; IGDIs, Individual Growth and Development Indicators; LNF, Letter Naming Fluency; OnRF, Onset Recognition Fluency; PLS-3, Preschool Language Scale—third edition (Zimmerman, Steiner, & Pond, 1992); PPVT-III, Peabody Picture Vocabulary Test—third edition (Dunn & Dunn, 1997); RH, Rhyming IGDI; SB, Segment Blending IGDI; TOPA, Test of Phonological Awareness (Torgeson & Bryant, 1994).

Approximately 15 years ago, development began on GOMs, which we now know as Dynamic Indicators of Basic Early Literacy Skills (DIBELS), for children in kindergarten and first grade (Good et al., 2002; Kaminski & Good, 1996). DIBELS are a set of group-administered and individually administered measures of early literacy that are sequenced and aligned with instruction in early 2002), create school and district norms, and predict performance on state high-stakes assessments (Crawford, Tindal, & Steiber, 2001; McGlinchey & Hixson, 2004). In short, a very simple ORF measure (e.g., quick, easy to administer and score, inexpensive, and repeatable) has great utility for monitoring the reading progress of individual student and groups of students.
elementary school. In 2004–2005, DIBELS were widely used across the nation and implemented with more than 3.7 million children (DIBELS, 2005).

IGDIs are the most recent extension of the GOM approach to young children. To date, IGDIs have been developed to assess the progress of infants and young children in language, literacy, social development, movement, and cognitive outcomes (Carta, Greenwood, Luze, Cline, & Kuntz, 2004; Greenwood, Luze, Kuntz, Cline, & Leitschuh, 2002; McConnell, Priest, Davis, & McEvoy, 2002). The Early Communication Indicator (ECI; a measure of expressive communication) is a language IGDI developed for children from birth to 3 years of age (Luze, Linebarger, Greenwood, Carta, & Walker, 2001). IGDIs developed for children aged 3 to 5 years include Picture Naming (a measure of expressive language) and a suite of phonological awareness measures including Rhyming, Alliteration, and Segment Blending (McConnell, McEvoy, & Priest, 2002; McConnell, Priest et al., 2002). For each IGDI, research has demonstrated reliability and validity, and sensitivity to growth by age, disability status, and level of risk.

**LANGUAGE AND EARLY LITERACY INDIVIDUAL GROWTH AND DEVELOPMENT INDICATORS**

The research and development process for creating IGDIs began by identifying a set of socially valued general outcomes for children between birth and 8 years of age. Through a national survey of more than 1000 parents and professionals in early childhood and early childhood special education, a list of 15 of the most socially valued outcomes statements for young children was identified (Priest et al., 2001). The most highly rated outcome describing proficiency in expressive communication was Child uses gestures, sounds, words, and word combinations to express meaning to others. Following the survey and the identification of valued outcomes, domain-specific literature reviews of conceptual frameworks for development as well as empirical reports on precursors and antecedent skills were conducted to identify key skill elements for each outcome statement (eg, Luze et al., 2001; see Table 2). Upon identification of key skill elements for each outcome statement, IGDI development and evaluation began (Table 3).

**Early Communication Indicator**

The ECI provides information about the number of communication behaviors an infant/toddler exhibits during a 6-minute semistructured play setting with a familiar adult. The role of the adult is to engage the child with a specified toy or set of toys and follow the child’s lead. A second adult observes the interaction and records the child’s communication behaviors in 1 of 4 categories: (1) gestures (the child makes a physical movement during attempts to communicate), (2) vocalizations (the child utters nonwords), (3) single-word utterances (eg, “help,” “mine”), or (4) multiword utterances (eg, “My do it.”). At the end of 6 minutes, the frequencies in each of the 4 communication behavior categories are summed and then collapsed into a Total Communication score. The “rate per minute of total communication” score is calculated by dividing the Total Communication score by 6 (the number of 1-minute intervals).

**Picture Naming**

*Picture Naming* administration is completed by presenting a child with pictures of objects commonly found in preschoolers’ natural environments, including the home (eg, cake, sink), classroom (eg, glue, book), and community (eg, rabbit, train). Children are asked to name pictures as quickly as possible for 1 minute. The number of pictures named correctly is the child’s score.

**Rhyming**

In *Rhyming*, the child is presented with a card that has 1 stimulus picture on the top of the card (eg, bees) and 3 pictures across
### Table 2. Expressive communication and literacy domains, general outcomes, and key elements

<table>
<thead>
<tr>
<th>Domain</th>
<th>General outcome statement</th>
<th>Key elements for 0- to 3-year-olds</th>
<th>Key elements for 3- to 5-year-olds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language</td>
<td>Child uses gestures, sounds, words, or sentences to convey wants and needs or to express meaning to others</td>
<td>Frequency of gestures Frequency of vocalizations Frequency of single words Frequency of multiple words</td>
<td>Production of discrete words (vocabulary) Production of word combinations or sentences Fluency in grammar and mechanics Recounting of events or experiences and telling stories</td>
</tr>
<tr>
<td>Literacy</td>
<td>Child will demonstrate conceptual and practical understanding of early literacy skills.</td>
<td></td>
<td>Phonological awareness skills Awareness of word segments (phoneme, syllable) Concepts about print Letter naming Letter sound correspondence Language/vocabulary Comprehension</td>
</tr>
</tbody>
</table>

the bottom of the card representing 1 correct and 2 incorrect responses (eg, house, pants, cheese). The examiner points to and names each picture and tells the child, “Point to the picture that sounds the same as the top picture.” Each administration continues for 2 minutes and a child’s score is the number of correctly identified rhymes.

**Alliteration**

Similar to **Rhyming**, **Alliteration** IGDIs depict 4 pictures: at the top is a picture of the stimulus word (eg, cake) and under the stimulus picture is a row of 3 other pictures (eg, cat, sink, bear) with 1 correct and 2 incorrect responses. The examiner points to and names each picture and tells the child, “Point to the picture that starts with the same sound as the top picture.” **Alliteration** is administered for 2 minutes and the score is the number of beginning sounds identified correctly.

**Segment Blending**

During **Segment Blending**, a random pool of words segmented at the word (eg, cowboy), syllable (eg, ap-ple), and phoneme (eg, c-a-t) levels are presented aloud to a child. The task continues for 2 minutes and the number of correctly blended words is the child’s score.

**USING IGDIs IN EARLY INTERVENTION PROGRAMS**

With the use of quick and technically sound GOMs of early language, literacy (ie, IGDIs), and reading development (ie, DIBELS), information about literacy development can be made available to make intervention
### Table 3. Summary of formats developed for language and literacy IGDIs

<table>
<thead>
<tr>
<th>Domain</th>
<th>Key element</th>
<th>IGDIs</th>
<th>Formats</th>
<th>Scoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Language 0 to 3</td>
<td>Frequency of gestures, vocalizations, single words, and multiple words</td>
<td>Early Communication Indicator</td>
<td>Observation of semistructured play between one infant/toddler and one adult familiar to the child</td>
<td>Communication behaviors are recorded in 4 categories (gestures, vocalization, single-word utterances, and multiword utterances) for 6 minutes. Frequencies are summed for a Total Communication score, which is divided by 6 for a &quot;communication per minute&quot; rate</td>
</tr>
<tr>
<td>Language 3 to 5</td>
<td>Production of discrete words</td>
<td>Picture Naming</td>
<td>5” × 7” cards with colored photos of singular items typically found in preschooler’s environment</td>
<td>Number of pictures named correctly in 1 minute</td>
</tr>
<tr>
<td>Literacy 3 to 5</td>
<td>Phonological awareness</td>
<td>Rhyming</td>
<td>5” × 7” cards with 4 colored photos: 1 target photo and 3 stimulus photos</td>
<td>Number of rhymes correctly identified in 2 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Alliteration</td>
<td>5” × 7” cards with 4 colored photos: 1 target photo and 3 stimulus photos</td>
<td>Number of alliterations correctly identified in 1 minute</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Segment Blending</td>
<td>Pool of words segmented at word, syllable, &amp; phoneme level presented aloud to child</td>
<td>Number of correct blends in 2 minutes</td>
</tr>
</tbody>
</table>

Abbreviation: IGDIs, Individual Growth and Development Indicators.
decisions for children across the early-infancy to early-elementary age spectrum. Because a primary tenet of GOM is growth toward an important outcome (eg, reading), as opposed to the comprehensive summary provided by many traditional assessments, IGDIIs were designed to demonstrate growth. IGDIIs can be thought of as indicators or screeners of more global development and as mentioned earlier, they are administered to individual child. After administration, IGDI data can be examined in different ways; regardless of the way, all interpretation should include both IGDI level of performance (ie, scores) and rate of growth (ie, change in skill over time).

Individual Level

By collecting IGDI data regularly for individual child, interventionists can literally create a picture of growth for each child (Figs 1 and 2). Data at the individual level are most often used for child-specific interventions to determine whether changes in service provision affect child skill development. IGDI data examined at the individual level can be particularly informative because most traditional assessments are completed infrequently and, as such, do little to inform ongoing educational modifications. Examining individual growth data allows an educator to be certain that a child is well-matched to his or her educational environment and is gaining skill. Because IGDI data are collected to determine rates of growth, and reliable rates of growth are dependent on the frequency of data collection, we recommend at least 3 assessment occasions to determine growth rates.

Application. Ms Lee has collected ECI IGDI data on all of the toddlers in her classroom on a monthly basis for more than 1 year. Several months ago, she implemented a new language intervention with one of her children, Olive (Fig 1). As Ms Lee compares Olive’s rate of growth from preintervention to postintervention, she notices an increase in Olive’s rate of growth after the intervention. Ms Lee can conclude that the intervention is helping increase Olive’s rate of communication skill growth.

Figure 1. Baseline and intervention monitoring of 1 toddler.
IGDI indicates Individual Growth and Development Indicator.

**Figure 2.** Seasonal monitoring of 1 preschool child in comparison with class aim line.

**Group or Classroom Level**

IGDI data may also be examined for a group of children (eg, classroom, demographic group, centers). When growth data are examined for a group of children, the growth rate reflects the average performance of the children in the group (eg, the class aim line in Fig 2). As a result, interpreting group data means that one must carefully consider who is represented in the group and make conclusions accordingly. Group data are used for comparison purposes and most often in 4 ways. First, one child’s growth can be compared with that of the norm line (see Fig 1). Second, one child’s data can be compared with that of the average performance of all the children in a program or classroom (see Fig 2). Third, 2 classrooms may be compared for 2 instructional models, for example, one program employing dialogic reading (Zevenbergen & Whitehurst, 2003) with some other approach to early literacy, and their impact on children’s rates of growth. Fourth, in larger educational organizations with multiple centers or locations, comparing growth rates across classrooms or even collapsing growth rates across centers for comparison may be informative for administrators and teachers.

**Application.** In addition to determining whether Olive is responding to intervention, Ms Lee wants to know how Olive’s performance compares with that of a larger group of same-age peers. Figure 1 shows that Olive’s rate of growth postintervention is actually more than that of her same-age peers; however, Olive’s performance is still within the average range ($\pm 1.5$ SDs) of performance. Ms Lee may conclude that with Olive’s current intervention, she is making progress similar to that of her peers. By looking at Olive’s ECI rate per minute scores, Ms Lee may also conclude that Olive is earning scores that are a bit more than her peers, but still in the average range.

Mr Song is preparing for spring conferences with the parents of his preschoolers. Throughout the year, he administered the Picture Naming IGDI each month to all of his children. Mr Song wants to use the Picture Naming data to compare Jordan’s rate of Picture Naming growth with the average of his class (Fig 2). The data show that Jordan’s rate of growth has steadily increased across the
year from fall to spring, but his overall language production (in terms of scores) may still be a bit lower than his peers. Mr Song may look toward more comprehensive assessments for additional information, but this graph presents a clear visual image of Jordan’s progress to share with Jordan’s caregivers.

Program Evaluation

Data may be examined on a group level for the purpose of program evaluation. IGDIs were designed to be sensitive to intervention (ie, show very quickly when an intervention is or is not working). Research shows that the measures are indeed sensitive to intervention effects including environmental changes related to the child and teacher or instructional changes (McConnell, Priest et al., 2002; Planeuf & Silbergliit, 2003). In a study of the ECI IGDI, children’s growth on communication trajectories covaried with implementation of caregiver training in the use of milieu and responsive communication teaching in child care as well as other interventions implemented by home visitors (Greenwood et al., 2003). Examining IGDI data on a program level allows for comparison of child performance across settings or classrooms and can suggest intervention needs in a way that evaluation of context-specific data might not.

Application. Mr Davis is an administrator of an infant and toddler program. Teachers in his center have been collecting ECI data for all children on a quarterly basis to monitor children’s individual progress and determining when children are falling below benchmark and may need additional support. In addition, Mr Davis is interested in tracking how children in the entire program are doing especially since initiating a new intervention program in April that focused on promoting children’s communication. Table 4 shows how Mr Davis collapses the data across age groups to create a profile of the percentage of children who are showing adequate communication levels on the ECI (ie, on-target each quarter). Mr Davis can look at the relative proficiency of the infants and toddlers over time and see that greater percentages of children are on-target beginning in the June quarter. Mr Davis concludes that teachers are identifying children in need of individual attention and serving them appropriately. Mr Davis also decides that his board of directors and funding agencies will be interested in this information and he prepares to write a report to share the findings.

Scalability

IGDIs are available for large-scale use through Web site access (http://www.getgotgo.net for Preschool IGDIs for ages 3 to 5 years and http://www.igdi.ku.edu for Infant/Toddler IGDIs for ages 0 to 3 years). These Web sites provide access to background materials and information, stimulus materials and administration formats, and ancillary materials (recording forms, consent letters) to support use of IGDIs in early

<table>
<thead>
<tr>
<th>Age group, mo</th>
<th>March</th>
<th>June</th>
<th>September</th>
<th>December</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-11</td>
<td>11 (100)</td>
<td>11 (100)</td>
<td>11 (100)</td>
<td>11 (100.0)</td>
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<tr>
<td>12-23</td>
<td>16 (94.1)</td>
<td>17 (95.9)</td>
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<tr>
<td>24-35</td>
<td>19 (90.5)</td>
<td>20 (95.5)</td>
<td>20 (95.5)</td>
<td>21 (100.0)</td>
</tr>
<tr>
<td>36-47</td>
<td>7 (77.8)</td>
<td>9 (100.0)</td>
<td>9 (100.0)</td>
<td>9 (100.0)</td>
</tr>
<tr>
<td>Overall</td>
<td>53 (91.4)</td>
<td>57 (97.9)</td>
<td>57 (97.9)</td>
<td>58 (100.0)</td>
</tr>
</tbody>
</table>

aProgram began extensive training in language intervention for 2- and 3-year-olds in April.
Using Individual Growth and Development Indicators

childhood settings. Once children have been assessed, teachers or others can enter individual child’s data into Web site databases and produce high-quality reports of child performance. All child and teacher identification and child performance data are password protected, with procedures for aggregating data by classroom, school or program, and district and transferring access to child files to other teachers.

Currently, 18,597 children are registered in the “Get it, Got it, Go!” Preschool IGDIs Web site and 2,789 children are registered at the Infant/Toddler IGDIs Web site. A number of early intervention and preschool programs have used the measures and the Web sites for more than 2 years and have continued using these tools. Satisfaction appears to be a function of both the uses of the data for intervention decision making for specific children and as a component of quarterly program and state-level accountability reports. One study explicitly evaluated the feasibility of the Preschool IGDI’s and teachers reported that the measures were “easy to use, accurate indicators of the intended skill, and measured important developmental areas” (Phaneuf & Silberglitt, 2003, p. 121). In addition, preschool and early intervention programs around the country have been successfully taught to use the measures to high standards of reliability in large numbers. This is carried out through a trainer-of-trainers design in which 1 staff member from each program attends a workshop training conducted by the developers where he or she learns to administer and score protocols and uses the Web site services, and then return to his or her local program and trains additional staff.

CONCLUSION

With the changing landscape of prekindergarten education—higher enrollment and increasingly diverse children, accountability demands at every turn, and increased focus on the importance of early academic development—those who work with young children need to know whether the educational experiences they are providing for children are actually making a difference. Although traditional assessments have merits, they are not necessarily well-matched to this new terrain in early childhood. IGDI’s offer a positive alternative to conducting assessment to determine growth on both individual and group levels. For young children, assessment of language and literacy growth with IGDI’s is one innovative general outcome approach to measuring progress in young children.

REFERENCES


