Proposal for the Nonverbal Literacy Assessment (NVLA):
An Assessment of Early Literacy Skills for Students with Significant Developmental
Disabilities Who Are Nonverbal

Lynn Ahlgrim-Delzell
Diane Browder
Claudia Flowers
Josh Baker

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Overview

Our work has described how NCLB (2001) and the subsequent reauthorization of IDEA

(2004) requirements for students with disabilities to be included in large scale assessments and

school accountability for adequate yearly progress has changed the field of special education

particularly for students with severe disabilities who had heretofore been excluded from such

accountability (e.g., Browder, & Cooper-Duffy, 2003; Browder, Wakeman, & Flowers, 2006;

Browder, Ahlgrim-Delzell, Courtade-Little, & Snell, 2006; Browder, Courtade-Little,

Wakeman, & Rickelman, 2006; Browder, Ahlgrim-Delzell, Courtade, Gibbs, & Flowers, in

press; Browder, Gibbs, Ahlgrim-Delzell, Courtade, Mraz, & Flowers, 2007). This controversial

legislation created a void in the understanding of what to teach, how to teach and how to connect

instruction for these students to the general curriculum. Researchers in the field of severe

disabilities have responded with a flurry of research attempting to fill this void.

Purpose, Rationale and Scope

The Nonverbal Literacy Assessment (NVLA) measures the early literacy skills of

students with significant developmental disabilities and was developed under the auspices of

Project RAISE: Reading Accommodations and Interventions for Students with Emergent

Literacy. The NVLA addresses two needs for this population. First, an exhaustive review of

available literacy and reading skill assessments at the onset of this grant found no instruments

available that included skills identified by the National Reading Panel (NRP, 2000) as necessary

for learning to read that was accessible to students with significant disabilities who were also

nonverbal. Second, the NVLA incorporates a theoretical basis for providing literacy instruction as proposed by the RAISE team.

The NRP (2000) identified five essential components of reading instruction: (a) phonemic awareness, (b) phonics, (c) fluency, (d) vocabulary, and (e) comprehension. Yet, a comprehensive review of research on reading for students with significant cognitive disabilities (Browder, Wakeman, Spooner, et al., 2006) found that the majority of studies for this population focused only on one of the skills identified by the NRP, sight word acquisition (i.e., vocabulary). A small number of studies included comprehension of these words. The other three components identified by the NRP (phonemic awareness, phonics and fluency) have historically received little to no attention in special education research.

Our conceptual foundation for early literacy skill instruction for students with severe disabilities considers students who are either nonverbal or verbal who may use need augmentative communication systems to demonstrate what they know (Browder, Gibbs, et al., 2007). This conceptual foundation targets both skills that promote independence in reading (e.g., phonemic awareness), but also the development of skills for the shared reading of literature. It may be that some students may never become independent readers, but can still gain skills to interact with others through read alouds of age-appropriate reading materials. The NVLA is developed to capture student's current skills in these two strands- skills that lead to decoding text and conventions of reading demonstrated during a read aloud.

The NVLA is designed to be an individually administered assessment of early literacy skills for students with significant developmental disabilities. Although initially designed for students in grades K through 5th grade, it may also be considered for students in middle and high school if early reading instruction is designated as an individual goal. This assessment is also

appropriate for children with developmental disabilities in early childhood (pre-K) who can sit

an respond to a picture-based assessment.

The NVLA uses a receptive response format with answers provided in 4-choice arrays. To

be responsive to students with physical and attentional challenges, the standard administration

guidelines provide a prescreening to determine one of four options for procuring consistent

responding. The four selection responses can be used in a standard administration including: (a)

finger pointing with a response book, (b) eye gazing with responses affixed to a plexiglass board, (c)

pulling the response with cards attached with velcro to the response book, or (d) pulling the

response with responses affixed to sticks displayed in the tester's hand like a fan. In addition, the

response book is adaptable to a computer format which adds the additional option of responding

using a touch screen or scanner switch. Correct verbal answers are also accepted when they occur.

The scripted directions across three administration sessions accommodate for attention difficulties

and variability of responding frequently observed in this population.

Target Population

The NVLA is designed to be an individually administered assessment of early literacy

skills for students with significant developmental disabilities who may be nonverbal. It is

designed for students diagnosed with moderate to severe-profound intellectual disability and/or

Autism, students who typically require alternative forms of communication. Although initially

designed for students in K through 5th grades, it should also be considered for students in middle

and high school as long as reading instruction is designated as an individual goal or where level

of symbolic communication is in question.

Theoretical Constructs

The NVLA has two major sections, Conventions of Reading and Phonological Skills. The

Conventions of Reading section is based on the conceptual model of literacy proposed by

Browder, Gibbs, et al. (2007). In this conceptual model, students with significant developmental disabilities are to be given the opportunity to learn reading skills in elementary school as their nondisabled peers, but also an avenue to interact with and learn from modified grade-appropriate literature that is read to them in case they do not learn to read themselves. It assesses the ability to interact with reading materials during a shared story experience including such skills as opening a book and turning the pages, completing a repeated story line, and listening comprehension. The second section, Phonological Skills, includes aspects of word study, phonological awareness, alphabetic principal, and beginning phonics skills. It is based on four of the five components of reading identified by the NRP (2000), excluding fluency. Given the processing difficulties and physical disabilities often associated with this population, fluency as a measure of speed may produce bias.

Additionally, the NVLA is based on a framework of levels of symbolic communication described by Browder, Ahlgrim-Delzell, Courtade-Little, and Snell (2006). Some students with significant developmental disabilities have not acquired abstract (symbolic) communication skills that use letters and words. They may require pictures to support understanding of written and spoken words. Pairing objects and pictures with words for communication is a common practice for students with significant developmental disabilities.

Description of the NVLA

The NVLA uses a receptive response format with answers provided in 4-choice arrays. Four selection responses can be used in a standard administration including: (a) finger pointing with a response book, (b) eye gazing with responses affixed to a plexiglass board, (c) pulling the response with cards attached with velcro to the response book, or (d) pulling the response with responses affixed to sticks displayed in the tester's hand like a fan. Correct verbal answers are also accepted

when they occur. Scripted directions across three administration sessions accommodate for attention difficulties and variability of responding frequently observed in this population.

Subtests and Item Description

The NVLA consists of 221 items in two broad sections designed to capture four of the five NRP essential components of reading. Tables 1 and 2 list the subtests and number of items for each section of the assessment. The first section of the NVLA, the Conventions of Reading (CVR) Scale with 41 items, measures the ability of the student to interact with reading materials. An additional Shortened Story Comprehension subtest given during the third administration session is not included in the total score, but may be used to obtain additional information about comprehension, if needed. The second section, Phonological Skills (PhonSk) with 180 items, is further divided into five subtests that include (a) Word Study (63 items), (b) Alphabetic Principal and Beginning Phonics (36 items), (c) Phonological Awareness (24 items), (d) Phonemic Awareness (39 items), and (e) Blending (18 Items). Raw scores can be obtained for each of the subtests, the two broad areas and for the total test.

The CVR section is administered during the reading of age-appropriate literature selected by the student. These skills were initially based on a task analysis of a story-based lesson described in Browder, Gibbs, Ahlgrim-Delzell, Courtade, & Lee (2007). This section is intended to mimic a natural interaction of literature reading with increasing level of difficulty of responses. The reading materials are age-appropriate original stories (*Jack Got Lost*, *Sam's Best Day Ever*). The story is supplemented with clipart images, objects and a repeated story line that defines the theme of the story. The student selects a book to be read from two presented which is really the same story, but with different cover pages. The readability of these stories was estimated at grade 2 using the readability graph and procedure described by Burns, Doe, & Smith

(2002) and consultation of the Dolch Sight Word List (Dolch, 1948; Gurskey, 2003). Use of Lexile analysis may have produced a differing level of readability.

An important component of the CVR section is listening comprehension of the reading material. As can be seen in Table 1, ten questions of varying comprehension strategies are asked either during or after reading the materials. Three levels of comprehension are addressed with the recall of facts, classifying and categorizing, and making inferences and predictions. Additionally, very early comprehension strategies such as CLOZE (completing a repeated story line) and picture/object exchange are included.

The response options for the comprehension items of the CVR proceed over three sessions from simple pictures to pictures paired with words, then finally words/phrases alone. One item (Comprehension Question II) uses an object where the student selects and exchanges a picture of the object in order to obtain the actual object (e.g., a stuffed animal of a dog after selecting the picture of the dog). Some items (e.g., Comprehension Questions III, IV, and V) are administered multiple times progressing from pictures to words in order to identify the symbolic level of understanding of the student.

Table 1 Item Description of CVR

Item (Number of Repetitions)	Description
Chooses book (1)	Two books with the same content but two different covers are presented to the student. Student is to select a book to read.
Orients book I & II (2)	Present book backside up with binding toward student. Student orients book right side up with binding to left or indicates book is not ready to be read using response cards.
Locates title (1)	Student identifies the title of the book using finger or response cards.
Locates author (1)	Student identifies the author of the book using finger or response cards.
Predict I (3)	Student predicts what the book will be about from four options while looking at the front cover.
Opens book (1)	Student opens book to read or indicates that book is not ready to be read using response cards.
Turns page (1)	Student turns page at appropriate time or indicates when it is time to turn the page using response cards or Voice Output Device (VOD).
Point to words (1)	Student follows words left to right on a page with finger or eyes.
Point to lines of text (1)	Student follows lines from top to bottom on a page with finger or eyes.
Displays appropriate affect (1)	Student displays an appropriate affect any time during the reading of the story.
Produce repeated Line (1)	Student produces repeated story line using VOD.
Comprehension I - literal (1)	Student answers literal question from four options immediately after line is read.
CLOZE I & II (4)	Student completes missing word of the repeated line from four options.
Predict confirm (3)	Student confirms or corrects the prediction made about what the story was about from four options.
Predict next (3)	Student predicts what might come next in the story from four options.
Comprehension II - picture/object exchange (1)	Student selects picture of named object and receives named object.
Comprehension III - literal (3)	Student answers literal question from four options immediately after line is read.
Comprehension IV - inference (3)	Student infers how the main character feels after he gets lost from four options after the book is finished.
Comprehension V - classify (3)	Student classifies forms of transportation based on plot in the story from four options after the book is finished.
Identify characters (3)	Student selects main characters in the story from four options after the book is finished.
Sequence events (3)	Student sequences events in the story from four options after the book is finished.

The five subtests of the Phonological Skills (PhonSk) section are further divided into subskills. Table 2 describes each of the subskill areas. Some items are repeated in subsequent sessions as a measure of response stability. Variable responding is a common characteristic of children with significant developmental disabilities. Administering the same item more than once provides an estimate of the reliability of the student's responses.

Table 2 Subskill Description of PhonSk

Subtest & Subskill (Number of Items)	Description
Word Study Subtest	
Word Matching (15)	Match written word to one presented visually and orally.
Picture-Word Identification (15)	Match picture to word presented visually and orally.
Sight Words (18)	Select written word to one presented visually and orally.
Vocabulary Comprehension (15)	Select picture representation of words/phrases read.
Alphabetic Principal & Beginning Phonics	
Letter Identification, part 1 (12)	Select named letters from choice of four letters.
Letter Identification, part 2 (12)	Select named letters presented as beginning letter in words.
Letter Sounds (12)	Select letter sounds presented as beginning letter in words.
Phonological Awareness	
Syllabication, part 1 (15)	Produce movement illustrating number of syllables in a word.
Syllabication, part 2 (6)	Select word with "more" syllables.
Phonemic Awareness	
Point to First & Last Letters in Words (9)	Select first and last letters in words.
Point to First & Last Sounds in Words (12)	Select first and last letter sounds in words.
Locate Pictures of Same & Different Beginning Sounds (18)	Select picture of same and different initial sounds.
Blending	
Blending with Pictures (9)	Select picture of segmented word.
Blending with Words (9)	Select word of segmented word.

Administration and Scoring the NVLA

Administration begins by determining the response mode of the student if it is not already known. A brief response survey using each of the four response formats can be administered, if needed. An example is supplied with these NVLA materials. The assessment is currently designed for four response modes that include eyegaze, point, grab and pull off. Eyegaze response options are placed on a clear plexiglass board. The assessor sits in front of the student in order to see the eye movement of the student. The grab response options are placed on sticks and held in one hand fanned out so the options do not touch each other. The student reaches and grabs one of the response cards. This system mimics a common practice of classroom teachers to hold response options out for the student. Holding the cards in one hand prevents the correct answer from being held out in a different position from the others. The pull-off version consists of laminated cards velcroed to the page so that the student must pull off one card and hand it to the examiner. This mode is particularly useful for students with Autism or other students who imitate the actions of the examiner by pointing to all four options. Once the response is determined, the materials are arranged for maximum accessibility for the specific response mode. For example, if the student requires an eyegaze board, pictures of the response options that can be attached to the response board are necessary. If a student uses a Voice Output Device (VOD), it needs to be programmed to the items for which it will be used. Although not part of our current research applications of this instrument, the NVLA response boards could easily be provided on computer software for use with a touch screen window or scanner switch.

The NVLA is given in three administration periods to avoid fatigue and maintain the attention. Due to the extended response time of many students who will use the NVLA, none of the subtests are timed. The assessor waits 5 seconds for a student to <u>begin</u> initiation of a response

and as long as it takes for the student to complete the response if needed. This may extend the total time it takes to administer the assessment. So although the assessment is divided into three sessions, it is acceptable to break the sessions into smaller segments to accommodate for the time spent in the testing situation. This would also apply to students with a shortened attention span. There are no basal or ceiling rules at this time. Demonstration items for each of the skills provide the student with a model of what responses are expected from them.

The NVLA begins with reading of a story with items related to the student participating in the story. The student responds to the items as the book is being read. The items within the Phonological Skills section are presented individually by the administrator. Specific directions for each of the subtests are provided in the scoring booklet.

Student responses are recorded in the NVLA record booklet as correct or incorrect. Each item scored correct is assigned one point. A total raw score is obtained by adding the number of correct response over the three sessions. Raw scores can also be obtained for the two sections (Conventions of Reading and Phonological Skills), as well as, for each of the subtests. Additional data needs to be collected in order to provide scoring profiles. Considering that these students are not expected to perform as their age- and grade-level peers, use of age and grade equivalent scores are most likely not meaningful. Profiles for level of symbolic communication and instructional needs across differing disabilities would be more meaningful.

Administrator Qualifications

The NVLA is designed to be administered by any professional who is understands and is capable of following standardized procedures. It is also necessary for the individual administering the NVLA to be familiar and comfortable with students with significant developmental disabilities. This may include, but it not limited to, special educators, school

psychologists, school counselors, paraeducators, speech/language pathologists and literacy facilitators.

The individual administering the NVLA should study the administration procedures and response systems thoroughly. Practice is essential especially with the Conventions of Reading section before administering the NVLA for instructional purposes. If the individual administering the NVLA is not familiar with the specific student, it may be necessary to consult the special educator in determining the method of communication typically employed by the student, fatigue levels, and effective reinforcers.

Obtaining interrater reliability of responses is important. Teachers sometimes report responses by their students not observable to others. It is common for students with significant developmental disabilities to learn skills in specific situations and not generalize these skills to other people, places or activities. Therefore, it is important that the responses by the student are interpretable and observable to others. Verifying a student response with another individual observing can serve to confirm the response.

Differences From Other Tests in This Area

The major differences between the NVLA and other tests in this area are (a) the population of interest and (b) allowance for nonverbal responding of the test respondents. As previously mentioned, an exhaustive search for a commercially available instrument to measure the literacy skills of students with significant developmental disabilities who are nonverbal proved futile. Given NCLB and IDEA 2004 mandates for these students to be included in the general education curriculum and state/district/school accountability systems, there is a need for such an assessment.

Reliability and Validity Information

Characteristics of the Current Sample

Twenty three students participated in the RAISE study in the first year and 39 students were added in the second year. A description of student participants by group assignment is reported in Table 3. The 62 students were enrolled in elementary schools in grades K through 4 and attended 18 schools in 17 self-contained special education classrooms and one inclusive kindergarten classroom. Fifteen students were included in general education classes ranging from 30 minutes to 7 hours per week with a mean of 2.65 hours per week. IQ scores were obtained for 43 of the participants from school records. These scores were derived from a number of different psychological tests, some of which only provided a mental age equivalent. In cases where a mental age equivalent was provided in place of an IQ score, a deviation IQ was calculated by dividing the mental age by the chronological age and then multiplying by 100. Three students (4.8%) qualified for English as A Second Language.

Table 3: *Description of Participants*

Characteristic		N	%
Gender			
	Male	37	59.7
	Female	25	40.3
Ethnicity			
	African American	37	59.7
	Caucasian	20	32.3
	Other	5	8.0
Verbal Status			
	Verbal	31	50.0
	Non-Verbal	31	50.0
Class Type			
	Moderate ID	33	53.2
	Autism	21	33.9
	Severe/Profound ID	8	12.9
Grade			
	K	11	17.7
	1	23	37.1
	2	17	27.4
	3	8	12.9
	4	3	4.8
Free/Reduced Lunch			
	None	19	30.6
	Reduced	1	1.63
	Free	22	35.5
	Did Not Answer	20	32.3
		M	Range
Age		8.23	6-11
IQ		39.11	18-55

ID = intellectual disability

Constructing the Database

The database for the following statistical analyses was combined from the first two years

of the RAISE study. Each item was scored as correct/incorrect on all 6 subtests of the NVLA.

Item responses of all sessions were entered into SPSS 14. Each complete NVLA assessment was

treated as independent, increasing the analytical power. This strategy is permissible when a study

has more than two test times separated by long intervals (Rogosa & Willet, 1985; Willet, 1980).

The NVLA was administered to 23 students in September/October of 2005-2006 as a pretest,

January/February of 2006 as a midyear test, and April/May of 2006 as a posttest. During the

second year these students only took a posttest in April/May of 2007. Students who entered the

RAISE study in the first year have had 4 administrations of the NVLA. Students who entered the

RAISE study in the second year have had 3 administrations of the NVLA (pretest, midyear test,

& posttest). Table 4 discusses the number of participants per each testing occasion. Combining

these administrations produced a database of 207 administrations of the NVLA to be analyzed.

Table 4: Number of Participants in Each Testing Session

Year	Testing Session	Number of Participants
2005-2006	Fall 2005	24
	Winter 2006	23
	Spring 2006	23
2006-2007	Fall 2006	39
	Winter 2007	39
	Spring 2007	59*
Total		207

* 21 participants from the Year One cohort and 38 participants from the Year Two cohort

Reliability

Test-retest reliability was conducted by readministering one session of the NVLA within one

week of the first administration for 16 students (25.8%). Test-retest Correlation Coefficients for the

total test score of the NVLA was statistically significant ($p < .001$) at .970. The test-retest

Correlation Coefficients for all seven of the subtests were statistically significant ranging from .722

for Blending to .936 for Word Study (see Table 5). Table 5 also displays the correlation coefficients

for the subtests and total test scores. The Correlation Coefficients for all seven of the subtests were

statistically significant ranging from .689 for Blending to .970 for Word Study.

Fidelity of administration of the NVLA was conducted by a second observer recording the

demonstration of proper administration procedures. Fidelity of administration is an important

instrumentation analysis due to the nature of the varying types of student abilities to respond and

ability of the instrument and materials to access student engagement. The fidelity was calculated by

an item-by-item agreement percentage. The mean fidelity of administration was 96.5% with a range

of 93.1% to 100%. Inter-rater reliability of scoring the NVLA was conducted by a second observer

independently scoring the student responses as correct/incorrect. Again, inter-rater reliability was

calculated by an item-by-item agreement percentage. Inter-rater reliability was also high with a mean

of 97.3% and a range of 92.3% to 100%. Internal consistency is high with Cronbach's Alpha at .979.

Table 5: Test-retest, Total Score Correlation Coefficients and Significance of NVLA Subtests

Subtest	Test-Retest Correlation Coefficient	Correlation Coefficient with Total Score
Conventions of Reading	.886*	.804*
Word Study	.936*	.970*
Alphabetic Principal	.876*	.813*
Phonological Awareness	.929*	.772*
Phonemic Awareness	.758*	.778*
Blending	.722*	.689*
Total Score	.970*	NA

* p<.01, **p<.05

Descriptive Statistics of the NVLA

Currently, only certain descriptive statistics of the NVLA assessment items (i.e.,

skewness, kurtosis, item-to-total score correlation, difficulty coefficients, & factor loadings) have

been examined. These descriptive statistics are based on the 207 independent student cases

shown in Table 4.

To examine the item-to-item correlations the average of responses of each individual item

based on its subtest were calculated. Six multiple regressions in SPSS were conducted to find the

zero-order correlations between each individual item to the mean of the total items in each

component. The six regressions were based on the NRP components (i.e., comprehension,

phonics, vocabulary, and phonemic awareness) and components of the Model for Literacy for

Students with Significant Cognitive Disabilities (i.e., listening comprehension & text awareness; Browder, Gibbs, et al., 2007). Correlations between the items per literacy component are located in the Appendix A. Most of these correlations fall in the moderate to high range.

The difficulty coefficients were found by finding the mean of each individual item on the NVLA. The difficulty percentages ranged between .1 to 1 with a mean of .32. The easier items appeared to be items located in the Conventions of Reading subtest. The harder items appeared to consist of more abstract skills such as sequencing, blending, and locating first and last sounds.

Content Validity by Expert Panel

The NVLA was reviewed by a national panel of experts in June 2006. The expert panel consisted of six researchers in the fields of literacy, severe disabilities and assessment (Dr. Asha Jitendra, Dr. Howard Goldstein, Dr. Chris Schatschneider, Dr. Ann Kaiser, Dr. Roland Good, and Dr. Patricia Mathes). The panel agreed that items reflected the range of early literacy skills. Suggestions included renaming sections to better reflect the construct, adding verbal response sections, adding additional items, ensure systematic use of distrators and establishment of basal and ceilings. Section names were changed with the assistance of another expert in literacy. Verbal response sections were not added because available published assessments are already accessible to students with verbal ability. The nonverbal format is a major premise behind the NVLA. Use of distractors was applied in a systematic fashion from pictures to words with pictures to words only. In the Conventions of Reading subtest, the distractors are also progressively more difficult in each session in their connection to the question. For example when identifying characters in the story, session one includes one character picture from the story with distractor pictures of objects and session three has two character names from the story with distractor names. Adding items and establishing a basal and ceiling were not addressed for

this measure while in use for the research study, but intend to be addressed as work on the instrument progresses.

Concurrent Validity

The *Test of Early Reading Ability* (*TERA 3*) and the NVLA was administered to the 23 participants in January 2006 as a measure of concurrent construct validity. The Pearson Correlation Coefficient for the total test scores of the *NVLA* and *TERA 3* was significant at .770. This implies that these two instruments measure similar constructs. A review of the items in each assessment reveals that there are a number of items that are similar, but there are also a number of items included in the *TERA 3* that are not within the scope of the *NVLA*. Some examples of similar items include word matching, sight word and picture identification, pointing to letter sounds in words and syllabication. Some examples of items included in the *TERA 3* that are not within the scope of the *NVLA* include word tense, capitalization, identification of different types of written materials, and categorizing words (i.e., finding one word out of four options that is not a color word). Additionally the *TERA 3* contains items that require verbal responses to which many of the participants could not respond.

<div align="center">Recommendations</div>

I order to provide evidence that the NVLA is a reliable and valid instrument for the described purpose additional data needs to be collected. The estimates provided in this report include only individuals participating in a research grant in the Charlotte-Mecklenburg Schools (CMS) in Charlotte, NC. While the pool of participants increases each year, the diversity of the student population of the CMS, may not be representative of the population of students with significant developmental disabilities within the United States.

Additional validation studies need to be conducted. Currently a Confirmatory Factor Analysis (CFA) using our theory of literacy for students with significant disabilities (Browder, Gibbs

et al, 2007) is in progress which can add to the validity evidence. An investigation of the equivalence of the four response options should be conducted to ensure they are comparable is a particular need. An investigation into the performance of students with different diagnoses who may appropriate for this test may also be warranted. There are primarily three distinctive types of students involved to date (moderate intellectual disabilities, severe-profound intellectual disabilities, and Autism). Adequacy of measurement of the NVLA for the different populations may be an issue.

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Appendix A

Difficulty and Standard Deviation of the NVLA Conventions of Reading Subtest Items

NVLA item/subtest	Difficulty	SD	NVLA item/subtest	Difficulty	SD
Chooses books	1	0	Predict Confirm	0.32	0.46
Orients book I	0.87	0.33	Predict Confirm	0.27	0.44
Orients book II	0.84	0.36	Predict Next	0.22	0.41
Locates Title	0.60	0.49	Predict Next	0.24	0.42
Locates Author	0.58	0.49	Predict Next	0.15	0.35
			Comp II pic-obj		
Predict I	0.76	0.42	exchange	0.15	0.36
Predict I	0.64	0.48	Comp III literal	0.80	0.40
Predict I	0.59	0.49	Comp III literal	0.57	0.49
Opens book	0.91	0.28	Comp III literal	0.47	0.50
Turns page	0.89	0.30	Comp IV connection	0.34	0.47
Follows words across	0.67	0.47	Comp IV connection	0.23	0.42
Follow 2 lines of text	0.65	0.47	Comp IV connection	0.18	0.38
Displays approp affect	0.86	0.34	Comp V classifying	0.14	0.34
Produce repeated line	0.64	0.48	Comp V classifying	0.27	0.44
Comp I literal	0.43	0.49	Comp V classifying	0.14	0.34
CLOZE I	0.28	0.45	Identify characters	0.16	0.37
CLOZE I	0.27	0.44	Identify characters	0.34	0.47
CLOZE II	0.18	0.38	Identify characters	0.14	0.45
CLOZE II	0.18	0.38	Sequences story events	0.12	0.32
Predict Confirm	0.32	0.46	Sequences story events	0.15	0.34
			Sequences story events	0.12	0.32

Difficulty and Standard Deviation of the NVLA Word Study Subtest Items

NVLA item/subtest	Difficulty	SD	NVLA item/subtest	Difficulty	SD
Word Matching(McDonalds)	0.38	0.48	Sight Words(off)	0.19	0.39
Word Matching(me)	0.29	0.45	Sight Words(run)	0.19	0.39
Word Matching(school)	0.29	0.45	Sight Words(and)	0.23	0.42
Word Matching(cold)	0.22	0.41	Sight Words(look)	0.17	0.38
Word Matching(NAME)	0.48	0.50	Sight Words(school)	0.25	0.43
Word Matching(and)	0.28	0.45	Sight Words(cup)	0.22	0.41
Word Matching(stop)	0.25	0.43	Sight Words(NAME)	0.55	0.49
Word Matching(run)	0.32	0.46	Sight Words(cold)	0.16	0.37
Word Matching(me)	0.37	0.48	Sight Words(stop)	0.28	0.45
Word Matching(it)	0.28	0.45	Sight Words(all)	0.23	0.42
Word Matching(off)	0.31	0.46	Sight Words(fork)	0.15	0.36
Word Matching(all)	0.26	0.44	Sight Words(NAME)	0.50	0.50
Word Matching(walk)	0.23	0.42	Sight Words(big)	0.25	0.43
Word Matching(was)	0.19	0.39	Sight Words(run)	0.21	0.41
Word Matching(Coke)	0.31	0.46	Sight Words(car)	0.19	0.39
Picture Identification (McDonalds)	0.70	0.45	Pic-Word Matching(eat)	0.28	0.45
Picture Identification(car)	0.57	0.49	Pic-Word Matching(stop)	0.23	0.42
Picture Identification(cup)	0.61	0.48	Pic-Word Matching(big)	0.25	0.43
Picture Identification(stop)	0.63	0.48	Pic-Word Matching(a blue ribbon)	0.21	0.41
Picture Identification(walk)	0.59	0.49	Pic-Word Matching(a dog is out of the house)	0.20	0.40
Picture Identification(school)	0.64	0.48	Pic-Word Matching(cup)	0.20	0.40
Picture Identification(Coke)	0.58	0.49	Pic-Word Matching(run)	0.30	0.46
Picture Identification(Jell-O)	0.48	0.50	Pic-Word Matching(red)	0.26	0.44
Picture Identification(cold)	0.43	0.49	Pic-Word Matching(egg in the pan)	0.21	0.41
Picture Identification(big)	0.41	0.49	Pic-Word Matching(black bat)	0.25	0.43
Picture Identification(McDonalds)	0.74	0.43	Pic-Word Matching(fly)	0.17	0.38
Picture Identification(M&Ms)	0.67	0.47	Pic-Word Matching(open) 60	0.22	0.41
Picture Identification(fork)	0.65	0.47	Pic-Word Matching(ride)	0.18	0.38
Picture Identification(stop)	0.62	0.48	Pic-Word Matching(a cold man)	0.17	0.37
Picture Identification(eat)	0.66	0.47	Pic-Word Matching(a boy plays ball)	0.14	0.35
Sight Words(it)	0.25	0.43			
Sight Words(big)	0.29	0.45			
Sight Words(eat)	0.25	0.43			

Difficulty and Standard Deviation of the NVLA Alphabetic Principal & Beginning Phonics Subtest Items

NVLA item/subtest	Difficulty	SD	NVLA item/subtest	Difficulty	SD
Pointing to Letters(s)	0.44	0.49	Pointing to Words(G)	0.24	0.42
Pointing to Letters(L)	0.25	0.43	Pointing to Words(N)	0.29	0.45
Pointing to Letters(B)	0.23	0.42	Pointing to Words(S)	0.37	0.48
Pointing to Letters(E)	0.43	0.49	Pointing to Words(C)	0.21	0.41
Pointing to Letters(M)	0.40	0.49	Pointing to Words(B)	0.26	0.44
Pointing to Letters(S)	0.42	0.49	Pointing to Words(E)	0.34	0.47
Pointing to Letters(D)	0.31	0.46	Letter sounds(A)	0.28	0.45
Pointing to Letters(R)	0.41	0.49	Letter sounds(T)	0.29	0.45
Pointing to Letters(A)	0.36	0.48	Letter sounds(G)	0.21	0.41
Pointing to Letters(T)	0.41	0.49	Letter sounds(E)	0.34	0.47
Pointing to Letters(G)	0.34	0.47	Letter sounds(T)	0.26	0.44
Pointing to Letters(R)	0.42	0.49	Letter sounds(L)	0.25	0.43
Pointing to Words(M)	0.37	0.48	Letter sounds(B)	0.23	0.42
Pointing to Words(T)	0.26	0.44	Letter sounds(E)	0.34	0.47
Pointing to Words(D)	0.24	0.42	Letter sounds(M)	0.38	0.48
Pointing to Words(R)	0.26	0.44	Letter sounds(S)	0.26	0.44
Pointing to Words(A)	0.21	0.41	Letter sounds(D)	0.29	0.45
Pointing to Words(L)	0.31	0.46	Letter sounds(R)	0.26	0.44

Difficulty and Standard Deviation of the NVLA Phonological Awareness Subtest Items

NVLA item/subtest	Difficulty	SD
Breaking words into syllables(me)	0.33	0.47
Breaking words into syllables(today)	0.30	0.46
Breaking words into syllables(popcorn)	0.33	0.47
Breaking words into syllables(listening)	0.17	0.38
Breaking words into syllables(understanding)	0.10	0.30
Breaking words into syllables(now)	0.30	0.46
Breaking words into syllables(elephant)	0.21	0.41
Breaking words into syllables(candy)	0.37	0.48
Breaking words into syllables(wheelchair)	0.30	0.46
Breaking words into syllables(America)	0.11	0.32
Breaking words into syllables(teacher)	0.42	0.49
Breaking words into syllables(yes)	0.34	0.47
Breaking words into syllables(babysitter)	0.15	0.36
Breaking words into syllables(kangaroo)	0.21	0.41
Breaking words into syllables(hello)	0.35	0.47
Words with more syllables(hello, now, pet)	0.20	0.40
Words with more syllables(yes, alphabet, candy)	0.20	0.40
Words with more syllables(wheelchair, listening, popcorn)	0.16	0.37
Words with more syllables(computerize, kangaroo, schedule)	0.20	0.40
Words with more syllables(do, teacher, understanding)	0.27	0.44
Words with more syllables(Chocolate, inedible, today)	0.13	0.34

Difficulty and Standard Deviation of the NVLA Phonemic Awareness Subtest Items

NVLA item/subtest	Difficulty	SD	NVLA item/subtest	Difficulty	SD
Pointing to Sounds(down)	0.22	0.44	Identifying Sounds(will)	0.25	0.43
Pointing to Sounds(sing)	0.22	0.41	Locating Pics-same first & last sounds	0.13	0.34
Pointing to Sounds(with)	0.22	0.41	Locating Pics-same first & last sounds	0.25	0.43
Pointing to Sounds(work)	0.25	0.43	Locating Pics-same first & last sounds	0.38	0.48
Pointing to Sounds(after)	0.17	0.38	Locating Pics-same first & last sounds	0.11	0.32
Pointing to Sounds(take)	0.29	0.45	Locating Pics-same first & last sounds	0.25	0.43
Pointing to Sounds(not)	0.23	0.42	Locating Pics-same first & last sounds	0.17	0.387
Pointing to Sounds(ran)	0.22	0.41	Locating Pics-same first & last sounds	0.38	0.487
Pointing to Sounds(sat)	0.26	0.44	Locating Pics-same first & last sounds	0.28	0.45
Identifying Sounds(let)	0.20	0.40	Locating Pics-same first & last sounds	0.31	0.46
Identifying Sounds(run)	0.20	0.40	Locating Pics-same first & last sounds	0.11	0.32
Identifying Sounds(sat)	0.20	0.40	Locating Pics-same first & last sounds	0.23	0.426
Identifying Sounds(man)	0.24	0.42	Locating Pics-same first & last sounds	0.22	0.41
Identifying Sounds(for)	0.28	0.45	Locating Pics-same first & last sounds	0.25	0.43
Identifying Sounds(but)	0.23	0.42	Locating Pics-same first & last sounds	0.24	0.43
Identifying Sounds(sun)	0.24	0.43	Locating Pics-same first & last sounds	0.16	0.37
Identifying Sounds(did)	0.15	0.36	Locating Pics-same first & last sounds	0.29	0.457
Identifying Sounds(now)	0.20	0.40	Locating Pics-same first & last sounds	0.35	0.48
Identifying Sounds(red)	0.31	0.46	Locating Pics-same first & last sounds	0.12	0.33
Identifying Sounds(come)	0.25	0.43			

Difficulty and Standard Deviation of the NVLA Blending Subtest items

NVLA item/subtest	Difficulty	SD
Blending with pictures(/f/ /a/ /n/)	0.31	0.46
Blending with pictures(/r/ /a/ /t/)	0.36	0.48
Blending with pictures(/l/ /i/ /p/)	0.31	0.46
Blending with pictures(/l/ /e/ /g/)	0.40	0.49
Blending with pictures(/m/ /a/ /n/)	0.34	0.47
Blending with pictures(/s/ /i/ /t/)	0.42	0.49
Blending with pictures(/n/ /e/ /t/)	0.33	0.47
Blending with pictures(/m/ /e/ /n/)	0.38	0.48
Blending with pictures(/r/ /e/ /d/)	0.39	0.48
Blending with words(/r/ /u/ /n/)	0.14	0.35
Blending with words(/s/ /a/ /w/)	0.10	0.30
Blending with words(/n/ /o/ /t/)	0.22	0.41
Blending with words(/l/ /oo/ /k/)	0.25	0.43
Blending with words(/m/ /e/)	0.21	0.41
Blending with words(/f/ /o/ /r/)	0.20	0.40
Blending with words(/s/ /e/ /e/)	0.23	0.42
Blending with words(/m/ /a/ /ke/)	0.14	0.35
Blending with words(/r/ /a/ /t/)	0.16	0.37

Appendix B

Zero-order Correlations of Text Awareness Items

Text Awareness	Correlations
Orients book I	0.38
Orients book II	0.33
Locates Title	0.53
Locates Author	0.49
Predict I	0.43
Predict I	0.53
Predict I	0.40
Opens book	0.36
Turns page	0.46
Follows words across	0.54
Follow 2 lines of text	0.53
Displays approp affect	0.35
Produce repeated line	0.43
Predict Confirm	0.46
Predict Confirm	0.45
Predict Confirm	0.30
Pointing to Letters(S)	0.59
Pointing to Letters(L)	0.50
Pointing to Letters(B)	0.52
Pointing to Letters(E)	0.55
Pointing to Letters(M)	0.56
Pointing to Letters(S)	0.48
Pointing to Letters(D)	0.52
Pointing to Letters(R)	0.63
Pointing to Letters(A)	0.52
Pointing to Letters(T)	0.56
Pointing to Letters(G)	0.63
Pointing to Letters(R)	0.60
Pointing to Words(M)	0.51
Pointing to Words(T)	0.50
Pointing to Words(D)	0.30
Pointing to Words(R)	0.54
Pointing to Words(A)	0.45
Pointing to Words(L)	0.53
Pointing to Words(G)	0.42
Pointing to Words(N)	0.54
Pointing to Words(S)	0.64
Pointing to Words(C)	0.49
Pointing to Words(B)	0.50
Pointing to Words(E)	0.59

Zero-order Correlations of Listening Comprehension Items

Listening Comprehension	Correlations
Comp I literal	0.45
CLOZE I	0.53
CLOZE I	0.40
CLOZE II	0.38
CLOZE II	0.37
Predict Next	0.47
Predict Next	0.35
Predict Next	0.47
Comp II pic-obj exchange	0.45
Comp III literal	0.47
Comp III literal	0.50
Comp III literal	0.47
Comp IV connection	0.26
Comp IV connection	0.45
Comp IV connection	0.31
Comp V classifying	0.29
Comp V classifying	0.34
Comp V classifying	0.34
Identify characters	0.52
Identify characters	0.49
Identify characters	0.44
Sequences story events	0.43
Sequences story events	0.30
Sequences story events	0.40

Zero-order Correlations of Vocabulary Items

Vocabulary	Correlations	Vocabulary	Correlations
Word Matching(McDonalds)	0.39	Picture Identification(big)	0.52
Word Matching(me)	0.44	Picture Identification(McDonalds)	0.56
Word Matching(school)	0.53	Picture Identification(M&Ms)	0.48
Word Matching(cold)	0.55	Picture Identification(fork)	0.54
Word Matching(NAME)	0.49	Picture Identification(stop)	0.53
Word Matching(and)	0.46	Picture Identification(eat)	0.59
Word Matching(stop)	0.50	Sight Words(it)	0.35
Word Matching(run)	0.51	Sight Words(big)	0.49
Word Matching(me)	0.58	Sight Words(eat)	0.35
Word Matching(it)	0.56	Sight Words(off)	0.41
Word Matching(off)	0.54	Sight Words(run)	0.45
Word Matching(all)	0.55	Sight Words(and)	0.42
Word Matching(walk)	0.58	Sight Words(look)	0.42
Word Matching(was)	0.45	Sight Words(school)	0.45
Word Matching(Coke)	0.52	Sight Words(cup)	0.38
Picture Identification (McDonalds)	0.51	Sight Words(NAME)	0.53
Picture Identification(car)	0.57	Sight Words(cold)	0.28
Picture Identification(cup)	0.62	Sight Words(stop)	0.49
Picture Identification(stop)	0.59	Sight Words(all)	0.42
Picture Identification(walk)	0.60	Sight Words(fork)	0.48
Picture Identification(school)	0.57	Sight Words(NAME)	0.51
Picture Identification(Coke)	0.55	Sight Words(big)	0.54
Picture Identification(Jell-O)	0.57	Sight Words(run)	0.41
Picture Identification(cold)	0.54	Sight Words(car)	0.55

Zero-order Correlations of Picture Comprehension Items

Picture Comprehension	Correlations
Pic-Word Matching(eat)	0.43
Pic-Word Matching(stop)	0.55
Pic-Word Matching(big)	0.56
Pic-Word Matching(a blue ribbon)	0.57
Pic-Word Matching(a dog is out of the house)	0.41
Pic-Word Matching(cup)	0.50
Pic-Word Matching(run)	0.52
Pic-Word Matching(red)	0.47
Pic-Word Matching(egg in the pan)	0.47
Pic-Word Matching(black bat)	0.51
Pic-Word Matching(fly)	0.50
Pic-Word Matching(open)	0.50
Pic-Word Matching(ride)	0.43
Pic-Word Matching(a cold man)	0.46
Pic-Word Matching(a boy plays ball)	0.54

Zero-order Correlations of Phonics Items

Phonics	Correlations
Letter sounds(A)	0.62
Letter sounds(T)	0.59
Letter sounds(G)	0.46
Letter sounds(E)	0.65
Letter sounds(T)	0.65
Letter sounds(L)	0.60
Letter sounds(B)	0.52
Letter sounds(E)	0.65
Letter sounds(M)	0.61
Letter sounds(S)	0.63
Letter sounds(D)	0.40
Letter sounds(R)	0.60

Zero-order Correlations of Phonemic Awareness Items

Phonemic Awareness	Correlations	Phonemic Awareness	Correlations
Breaking words into syllables	0.59	Identifying Sounds(red) 40	0.50
Breaking words into syllables	0.56	Identifying Sounds(come)	0.39
Breaking words into syllables	0.60	Identifying Sounds(will)	0.40
Breaking words into syllables	0.41	Locating Pics same first & last sounds	0.28
Breaking words into syllables	0.40	Locating Pics same first & last sounds	0.32
Breaking words into syllables	0.59	Locating Pics same first & last sounds	0.47
Breaking words into syllables	0.37	Locating Pics same first & last sounds	0.27
Breaking words into syllables	0.62	Locating Pics same first & last sounds	0.28
Breaking words into syllables	0.58	Locating Pics same first & last sounds	0.31
Breaking words into syllables	0.41	Locating Pices same first & last sounds	0.41
Breaking words into syllables	0.56	Locating Pics same first & last sounds	0.44
Breaking words into syllables	0.56	Locating Pics same first & last sounds	0.43
Breaking words into syllables	0.48	Locating Pics different first & last sounds	0.15
Breaking words into syllables	0.50	Locating Pics different first & last sounds	0.39
Breaking words into syllables	0.59	Locating Pics different first & last sounds	0.44
Words with more syllables	0.35	Locating Pices different first & last sounds	0.28
Words with more syllables	0.25	Locating Pics different first & last sounds	0.36
Words with more syllables	0.28	Locating Pics different first & last sounds	0.28
Words with more syllables	0.24	Locating Pics different first & last sounds	0.34
Words with more syllables	0.55	Locating Pics different first & last sounds	0.44
Words with more syllables	0.21	Locating Pics different first & last sounds	0.20
Pointing to Sounds(down)	0.50	Blending with pictures(/f/,/a/,/n/)	0.46
Pointing to Sounds(sing)	0.45	Blending with pictures(/r/,/a/,/t/)	0.48
Pointing to Sounds(with)	0.45	Blending with pictures(/l/,/i/,/p/)	0.46
Pointing to Sounds(work)	0.48	Blending with pictures(/l/,/e/,/g/)	0.50
Pointing to Sounds(after)	0.41	Blending with pictures(/m/,/a/,/n/)	0.43
Pointing to Sounds(take)	0.58	Blending with pictures(/s/,/i/,/t/)	0.53
Pointing to Sounds(not)	0.49	Blending with pictures(/n/,/e/,/t/)	0.39
Pointing to Sounds(ran)	0.42	Blending with pictures(/m/,/e/,/n/)	0.51
Pointing to Sounds(sat)	0.39	Blending with pictures(/r/,/e/,/d/)	0.48
Identifying Sounds(let)	0.44	Blending with words(/r/,/u/,/n/)	0.42
Identifying Sounds(run)	0.48	Blending with words(/s/,/a/,/w/)	0.22
Identifying Sounds(sat)	0.33	Blending with words(/n/,/o/,/t/)	0.50
Identifying Sounds(man)	0.42	Blending with words(/l/,/oo/,/k/)	0.40
Identifying Sounds(for)	0.53	Blending with words(/m/,/e/)	0.35
Identifying Sounds(but)	0.37	Blending with words(/f/,/o/,/r/)	0.45
Identifying Sounds(sun)	0.32	Blending with words(/s/,/e/,/e/)	0.40
Identifying Sounds(did)	0.33	Blending with words(/m/,/a/,/ke/)	0.26
Identifying Sounds(now)	0.34	Blending with words(/r/,/a/,/t/) 78	0.27