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Assessing Indicators of Early Reading Skills

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Assessing Indicators of Early Reading Skills

(TITLE)

BY

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THESIS

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Abstract

Measures that assess pre-reading skills were examined. The measures included a typical informal kindergarten inventory for Initial Consonant Sound Identification, and Good's (1997) DIBELS measures that include: Letter Naming Fluency, Onset Recognition Fluency, and Phonemic Awareness Fluency. Participants included 50 kindergarten students from three different classrooms from two elementary school buildings in the same school district. Results demonstrated that the four measures were highly correlated with each other, and that the Onset Recognition Fluency measure best predicted the classroom teacher' predictions of at-risk students for reading difficulties. The four measures together were moderately to highly predictive of the teachers' ratings of at-risk students. In addition, means, standard deviations, ranges, and cut off points were established for the group of participants in this study.

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Indicators of Early Reading Skills

Adams and Henry (1997) introduced their discussion on current "myths and realities" about learning to read and the instructional implications with this statement, "Reading is the first of the three R's. And well that it should be, for being educated depends integrally on reading. It depends on being literate," (Adams and Henry, 1997, p.425). The statement that reading is a skill necessary for children to be successful in school and all throughout life is well-documented (Anderson, Hiebert, Scott, & Wilkinson, 1984; Deno, 1989; Kaminski & Good, 1996). Yet for all that is known about reading and teaching reading, large numbers of children continue to show minimal progress in learning to read (McGuiness, 1997). Children who get off to a poor start in reading skills are very likely to progress much more slowly than their peers who are doing well in first grade reading instruction (Stanovich, 1986), and often remain at the primary level of reading skills (Adams & Henry, 1997; McGuiness, 1997). Poorer readers are exposed to less text than their peers and are often exposed to reading materials that are too difficult for them. This leads to unrewarding early reading experiences that further result in less involvement in reading-related activities, which in return delays the development of automaticity and speed of word recognition that is critical for reading comprehension. This "cycle" for poor readers leads to a situation in which the "poor get poorer and the rich get richer". This phenomenon is known as the Matthew Effect (Stanovich, 1986) and is a primary reason why the identification of children who are at risk for reading problems is critical if we are to prevent future reading problems (Kaminski & Good, 1996).

Research has consistently found that letter naming and phonemic awareness skills (skills in the analysis of sounds in words) are the best predictors of reading achievement as noted in the extensive research reviews of Adams (1990), and Kaminski and Good (1996). However, despite these clear findings, questions continue regarding how best to assess these skills, what skill levels require intervention and how best to provide instructional intervention before the reading instruction of first grade (Teale, 1998).

Phonemic awareness refers to an awareness of and ability to manipulate the phonological components in spoken words (Blachman, 1991). Without phonemic awareness, patterns of letter-sound correspondence will seem strange and arbitrary (Wagner & Torgesen, 1987). The understanding that letters represent sounds in words has been argued to be the key insight required to learn to read (McGuinness, 1997) and currently approximately 25% of first graders lack this insight (Adams & Henry, 1997). Phonemic awareness refers to a cluster of skills, including rhyming skills, onset (initial sound in words), and rime (sounds after the onset) recognition, phoneme blending (e.g., /m/ /a/ /t/, mat) and the ability to segment a word into its component phonemes (e.g., mat, /m/ /a/ /t/) (Teale, 1998; Adams, 1990). The research literature on the relationship between phonological awareness and learning to read is sizable and consistently indicates that tasks measuring phonemic awareness are moderate to strong predictors of the speed with which children acquire reading skills in the early grades (Bradley & Bryant, 1978; Calfee, Lindamood & Lindamood, 1973; Jorm & Share, 1983; Liberman & Shankweiler, 1985; Stanovich, 1986). Phoneme segmentation skills, the ability to segment words into its component phonemes, has been shown to be the subskill most predictive of reading

achievement (see McGuinness, 1997). However, phoneme segmentation skills often develop in conjunction with beginning reading instruction and questions remain regarding what kindergarten levels of performance of these skills indicate the need for additional instruction (Teale, 1998).

Letter Naming: A strong positive relationship between accuracy of letter naming and later reading achievement has also been a consistent finding in the literature. Knowledge of letter names in kindergarten entry correlates strongly with later reading achievement (Dermott, Pinzari, Dodd, & McIntire, 1980; Gibson & Levin, 1975; Muehl & Di Nello, 1976). Although letter naming has been found to positively correlate with reading achievement, the relationship between letter naming and reading is complex. Studies have failed to demonstrate that teaching letter names facilitated the acquisition of reading (Gibson & Levin, 1975). Adams (1990) explained this finding by suggesting that letter naming is a "tip of the prereading iceberg" and an indicator of a wide range of familiarity with print including print concepts and often phonemic awareness, as well as letter-name knowledge. Tunmer, Herriman, and Nesdale (1988) found evidence supporting an interaction between letter-name knowledge and phonological awareness skills. According to Tunmer (1991), some level of phonological awareness must be achieved by children before letter-name knowledge can facilitate reading instruction. In addition, the accuracy of letter naming alone may not be enough to facilitate reading. Studies have shown that fluency of letter naming may be important. Correlations between early letter-naming fluency and later reading have consistently been positive (Biemiller,

1977-78; Blachman, 1984; Speer & Lamb, 1976; Stanovich, Feemn, & Cunningham, 1983; Walsh, Price, & Gillingham, 1988).

As school psychologists addressing the issue of preventing early reading failure, Kaminski and Good (1996) established through literature review that the early reading skills of fluent letter naming (e.g. Dermott, et. al., 1980) and phonemic awareness skills (e.g. Share, Jorm, Maclean, & Mathews, 1984) have the best predictive validity and are necessary prerequisites for success in early reading acquisition. Kaminski & Good (1996) developed tasks measuring letter naming fluency, phonemic segmentation fluency, and onset recognition fluency and named the three measures together the Dynamic Indicators of Basic Early Literacy Skills (DIBELS).

Kaminski & Good (1996) developed the DIBELS to be used as a problem-solving model to link assessment information and educational decisions through four phases: 1) Problem Identification, 2) Problem Validation, 3) Exploring Solutions and 4) Evaluation Solutions. These steps are to be followed in order to intervene early and prevent serious reading difficulties later. Kaminski & Good (1996) report that the DIBELS measures provide valid and reliable assessment procedures to measure performance on early literacy skills before children begin to learn to read. These measures identify children who are not making progress in acquiring early literacy skills and allow for ongoing evaluation of the effectiveness of interventions for at-risk students. They are easy to administer and are capable of repeated and frequent administration. However, they are not intended to be exhaustive of all important skill areas for young children and low

performances should not be expected to identify all problem areas, but would indicate that teachers should be concerned about the child's progress.

The rationale, procedures, and criteria for the DIBELS measures are similar to Curriculum Based Measures (CBM), except for the fact that the DIBELS measures are not based directly on kindergarten curricula. They are based on skills that are prerequisite for reading, and should, in some form, be included in kindergarten curriculum. Also, as Kaminski and Good (1996) suggest, the DIBELS approach requires developing local norms to help identify students most in need of additional instruction because the criterion for performance may differ according to a particular school's expectations. Good (1997) suggests using the bottom 10% to 25% to identify the lowest performers of a norming sample and to calculate cut off points for at-risk students. Although the 10% to 25% range seems unclear to estimate the exact performance level, Good (1997) states that this range is necessary because individuals collecting the normative data must determine the criterion level of performance according to the data they collect. In addition, he suggests using the middle or the median performance as the goal for performance by students that have been identified as at-risk.

Good (1997) has focused on phonological awareness skills as a separate skill from letter-sound correspondence and has developed his measures accordingly. However, not all researchers agree with this approach. Some researchers argue that the two skills are not separate, but interact in that phonological awareness is needed for letter sound identification and that skills in letter sound identification in return develop phonological

awareness skills (Hatcher, Hulme, and Ellis, 1994). Tunmer (1991) stated that training phonemic awareness in the presence of print can significantly hasten later reading and spelling growth. Adams, Treiman, and Pressley (1998), point out that gains in early reading skills have been more robust and consistent when phonemic awareness has been trained together with letter-sound correspondence than when it has not. An advantage of training the letters and sounds together is that the letters serve to anchor the phonemes perceptually and that letter-sound parings persuade children that words must be treated differently from other visual patterns (Adams et. al., 1998). Because the development of phoneme awareness skills has been shown to develop with letter recognition (Lundberg, et. al., 1988), a measure of initial consonant sound recognition may provide an additional useful measure of phonemic awareness (McCormick, Stoner, and Duncan, 1994).

The purpose of this study is to investigate the effectiveness and efficiency of the Dynamic Indicators of Early Literacy skills (DIBELS) measures and a more typical kindergarten consonant sound identification inventory. This study will investigate the applicability of these measures in identifying mid-year kindergarten children likely to have problems with learning to read as indicated by their teacher at the end of kindergarten. Also, it serves as an investigation to examine the relation of the letter-sound task to the DIBELS. This study also serves as an investigation to determine to what degree the different measures are related to each other and which measure(s) are most predictive of at-risk status at the end of kindergarten. In addition, cut-off scores will be established and recommended for the schools participating in this study to identify performance levels for children who are not adequately developing early reading

skills. By identifying the "at risk" students, extra instruction can be given to prevent, or decrease the extent of future reading problems. The specific research questions to be addressed in this study are as follows: 1) What are the means and standard deviations for each of the three DIBELS scores and the consonant sound identification task midway during the kindergarten year? 2) What are the correlations among the four measures? 3) Which measure(s) best predict(s) teachers' ratings of low preparedness for reading instruction at the end of the kindergarten year in these classes? 4) What level of performance on the measures at mid-kindergarten indicates the need for additional instruction in these classes?

Method

Participants

Fifty kindergarten students (26 girls and 24 boys) from two K-6 elementary schools participated in this study. Both elementary schools were located in rural communities in the midwestern part of the country. The majority of the students were of middle socioeconomic status and were predominately Caucasian. One elementary building contained a kindergarten class with 23 students, while the second elementary school contained two kindergarten classes with 13 students in one class and 14 students in the other.

Materials

The Dynamic Indicators of Basic Early Literacy Skills (DIBELS) measures along with a separate measure to identify initial consonant sounds were administered to each

student individually. The Initial Consonant Sound Identification task is an example from a typical informal kindergarten inventory (McCormick, et. al.,1994) (see Appendix A).

The Initial Consonant Sound Identification (ICSI) was a separate, informal instrument. On this task, students were shown 21 stimulus pictures and were asked to identify the first letter in the word. For example, the child was shown a picture of a pig and asked "What letter makes the sound you hear at the beginning of the word "pig"? Each item was scored zero or one with 21 possible points (McCormick, et. al., 1994). Reliability of this measure was not documented prior to this study.

The DIBELS measures were developed by a team of researchers at the University of Oregon and consists of three brief, measures of key early literacy skills. They are: 1) Letter Naming Fluency (LNF), 2) Onset Recognition Fluency (ORF), and 3) Phonemic Segmentation Fluency (PSF) (Kaminski & Good, 1996) (see Appendix A).

For the Letter Naming Fluency (LNF) measure, students were presented with a probe that lists random letters of the alphabet (both lower and upper case). Students were asked to name as many letters as they could in one minute. The number of correct letter names per minute was recorded. Eighteen alternate forms of the letter naming fluency task were developed. Using alternate forms of the measures less than one-week apart tested reliability of the measures. A different form was administered each time the students were tested. For kindergartners, the alternate-form reliability of LNF was .99 and the reliability of the average of ten alternate forms administered over ten weeks was .93 (Kaminski & Good, 1996). The concurrent, criterion-related validity of LNF ranged

from .59 with the McCarthy Scales of Children's Abilities, to .90 with a teacher rating scale of reading achievement, readiness, progress and risk (Kaminiski and Good, 1996).

The Onset Recognition Fluency (ORF) task provides a measure of phonological awareness skills. It consisted of 16 items. For 12 items on the probe, children were asked to point to a picture that begins with a target sound. On 12 of the 16 items, a recognition response was required. The child was told, "This is a sink, a cat, gloves, and a hat, [Examiner pointed to pictures] which picture begins with /s/?" On four items, the child was asked to produce the initial sound of a target word. An example was "what sound does 'can' begin with?" Each item was scored correct or incorrect with a possible range for a total score of zero to 16. Stimulus pictures for this task were black and white line drawings. Twenty alternate forms were available, each an alternate form constructed by random sampling from a pool of items. (Kaminski & Good, 1996). The alternate form reliability of ORF was found to be .65 . The reliability of the average of five probes was found to be .90. The concurrent validity with the Phonemic Segmentation Fluency measure form DIBELS ranges from .40 to .60 (Good, Simons, & Smith,1998).

For the Phonemic Segmentation Fluency (PSF) DIBELS measure, children were presented with ten words and asked to segment a spoken word into its component sounds. For example, if the spoken word was "fish", a child would say the sounds /f/ /i/ sh/. The child received credit for each correct sound segment of the word produced. For example, if the child said /f/ /ish/, they would have received credit for two correct sound segments. Complete segmentation received credit for three sound segments. The task was timed, and the number of sound segments identified correctly were calculated and recorded.

Twenty alternate forms of the PSF task were available. The task consisted of 10 words and took about three minutes to administer and score. For kindergartners, the alternate-form reliability of PSF was .88 and the reliability of the average of 10 alternate forms administered over 10 weeks was .99 (Kaminski & Good, 1996). The concurrent, criterion-related validity of PSF ranged from .43 with the Rhode Island Pupil Identification Scale to .73 with the Metropolitan Readiness Test (Kaminski & Good, 1996). The one-year predictive validity with reading outcome measures ranged from .73 to .91 (Good, et. al., 1998). The PSF measure is most appropriate for the middle of kindergarten to the beginning of first grade.

In addition, a questionnaire was developed by the author of this study to collect demographic information and information regarding the reading instruction being used in the classroom (see Appendix B). This was used as a nomination form for teachers to identify students at the conclusion of kindergarten who were having difficulties with pre-reading skills and who they identified as being at-risk of future reading problems. For example, teachers were asked to identify students who were referred for special education services, students who will repeat kindergarten, and students who they thought will probably receive extra reading instruction in first grade. The teachers were also asked their opinion about the DIBELS measures and the Initial Consonant Sound Identification measure.

Procedure and Analysis

Midway through the school year in January, a one-week time period was used to collect information in the three kindergarten classes. Individual students were tested by

this investigator in a quiet area, outside of their classroom. Each student was given the four described scales, which took approximately 15 minutes to administer. Every student received the four probes in the following order: 1) Initial Consonant Sound Identification 2) Letter Naming Fluency 3) Onset Recognition Fluency and 4) Phonemic Segmentation Fluency. All probes were scored by this investigator to generate the number of correct responses for each scale. In addition, the total amount of time for the given timed tasks (PSF and ORF) was calculated and recorded. The DIBELS measures were scored according to Good's (1997) directions and the ICSI was scored according to directions from McCormick et. al., (1994). In May, the teachers completed the questionnaires to identify students they nominated as having difficulties with pre-reading skills (see Appendix A). Children were placed in the at-risk group if their teachers indicated they were repeating kindergarten and/or likely to experience difficulty with learning to read in the first grade (questions seven, eight, and nine on the Teacher Questionnaire).

Once the DIBELS and the Initial Consonant Sound Identification data were collected, descriptive statistics, including the mean and standard deviation for each scale were calculated. Pearson correlations among the scales were conducted to measure the strength of the relationships among the measures. Discriminant analysis was conducted in order to determine if the reading measures could predict teachers' judgements of students with reading difficulties. To determine the nature of the degree of agreement between the tests and the teachers in predicting at-risk students, diagnostic efficiency statistics were conducted (Kessel and Zimmerman, 1993; Canivez and Watkins, 1994). The scores of

the groups of participants were examined to identify performance levels and cut points, which indicated likely problems with reading instruction.

In addition, the Kuder-Richardson formula (KR-20) was used to determine the internal consistency of three of the four measures including the ORF, PSF, and the ICSI measures. The Kuder-Richardson (KR-20) formula measures the degree to which items on a test are measuring one common trait or factor, (i.e. if a test is homogeneous). The internal consistency could not be calculated for the LNF because there was not a predetermined number of items, and was measured by the number of letters named in one minute. Also, because the ICSI measure had not been tested for reliability, a test-retest reliability correlation was conducted.

Results

Means and standard deviations (see Table 1) were calculated for the variables of the DIBELS measures (Letter Naming Fluency, Onset Recognition Fluency, and Phonemic Segmentation Fluency) and the Initial Consonant Sound Identification measures. Letter Naming Fluency (LNF) did not have a possible maximum total score, because the score is based on how many letters a student can name in one minute. For this reason, the LNF had the largest range of scores, and the largest standard deviation. Means of each of the measures, indicate that students received the highest percentage correct on the Onset Recognition Fluency measure (76%), and performed the weakest on the Phonemic Awareness Fluency measure (38%).

Pearson correlations among the four variables (see Table 2) show that all four measures were significantly intercorrelated ($p<.003$ for each comparison), suggesting that all measure a similar trait to some extent. The highest agreement ($p=.000$) was between the Initial Consonant Sound Identification measure, and the Onset Recognition Fluency task, while the least correlated measure ($p<.003$) was between the Letter Naming Fluency and the Phonemic Awareness Fluency task.

Stepwise discriminant analysis (see Table 3) was used to determine which variable(s) best separated placement in the at-risk and non at-risk groups for reading difficulties as determined by the teachers. The Onset Recognition Fluency was the only measure selected at step 1 for inclusion in the discriminant function. This measure, alone, accounted for 41% of the total variance (the squared canonical correlation) in the function explained by group membership. The other three variables (Initial Consonant Sound Identification, Letter Naming Fluency and the Phonemic Awareness Fluency) did not enter the function after step one.

Diagnostic efficiency statistics (see Table 4) were calculated in order to determine the combined measures' performance in terms of its sensitivity, specificity, positive and negative predictive power, and the absolute and chance-corrected level of agreement in predicting teachers' judgements of students with reading difficulties. Sensitivity (true positive rate), which refers to the tests' (the four measures combined together) ability to correctly identify the individuals in the at-risk group was 73%. This means the rate at which both the tests and the teachers' ratings of students to be in the at-risk group was

73%. The specificity, (the true negative rate) which refers to the percentage of students identified by the test and the teachers as not being in the at-risk group was 89%. The results suggested that the four measures together have a high rate of correctly classifying at-risk/not at-risk students in agreement with the teachers' predictions. However, 11% of the students were predicted by the tests but not by the teachers as being at-risk (the false positive rate) and 26% of the students were predicted by the teachers but not by the tests as being in the at-risk group (the false negative rate). These results demonstrated that there was not complete agreement between the teachers and the tests in predicting the at-risk students. The largest percentage of disagreement was the number of students that the test did not predict as being at-risk but that the teachers did. The overall correct classification (hit) rate was 84%. Kappa, which calculates the "hit" rate or overall level of agreement between classification procedures correcting for chance agreement, was .62, ($p<.000$).

Test- retest reliability analysis for the Initial Consonant Sound Identification (ICSI) resulted in a reliability correlation of .95. The Kuder-Richardson formula (KR-20) which was used to measure the internal consistency of the Initial Consonant Sound Identification, the Onset Recognition Fluency, and the Phonemic Segmentation Fluency, demonstrated a high level of internal consistency for each of the measures. The Initial Consonant Sound Identification task had the highest level of internal consistency (KR-20 = .94), followed by the Phonemic Segmentation Fluency task (KR-20 = .94) and the Onset Recognition Fluency task (KR-20 = .88). These results demonstrate that the items on each of the measures are measuring the same trait to a high degree.

When a frequency distribution of all 50 participants' scores on each of the measures was made, and those 15 in the at-risk group (30% of total group) identified, the lower performances of the at-risk group were readily noticeable. (The frequency distribution was useful in identifying possible cut-off points because the clustering of the at-risk scores was readily observable). On the Initial Consonant Sound Identification task, 70% of the at-risk group scored 8 or below and 100% scored 15 or below. On the LNF, 46% of the at-risk group scored 12 or below; the other scores in the at-risk group ranged from 19-48. For the Onset Recognition task, 85% of the at-risk group scored 10 or below and on the Phonemic Segmentation Fluency task, 85% of the at-risk group scored below 8. Suggested cut off points for these classes are the followng: Initial Consonant Sound Identification, cut off point was 8 out of a possible 21; Letter Naming Fluency cut off point was 12; The Onset Recognition Fluency cut off point was 10 out of 16; and the Phonemic Segmentation Fluency cut off point was 8 out of 21. These recommended cut-offs reflect performance at the 24th percentile for the Initial Consonant Sound Identification tasks, near the 25th percentile for Letter Naming Fluency task, the 26th percentile for the Onset Recognition Fluency and the 36th percentile for the Phonemic Segmentation Fluency task.

Discussion

The present study found that performance during mid-year kindergarten on these measures was highly predictive of children being rated at-risk/not at-risk by their teachers at the end of the year (overall correct classification rate = .84). Further, it was

demonstrated that the Onset Recognition Fluency measure, which is a phonological awareness task, was the single best variable which described the group difference between the at-risk/non at-risk category at the end of the year. These findings are consistent with the research consensus linking the importance of phonemic awareness skills to preparedness for first grade reading instruction. The results of this study indicate that the Onset Recognition Fluency measure was the best predictor of the teachers' nomination into the at-risk/non at-risk group; this is consistent with Good's (1997) time line for the use of the three DIBELS measures. Good (1997) has stated that the Onset Recognition Fluency measure be utilized as an indicator of phoneme awareness during the fall and winter months for kindergarten students. The Phonemic Segmentation Fluency is a more difficult task and should be used in the Spring of kindergarten and/or beginning of first grade, after children have better developed these skills. When examining the mastery performance level (average student score compared to the possible points possible) the students, on average, did perform better on the Onset Recognition Task (76% mastery level) compared to the Phonemic Segmentation Fluency (37% mastery level). These findings suggest that indeed the Phonemic Segmentation Fluency task may be too difficult for kindergarten students at mid year.

All four of the measures (ICSI, LNF, ORF, and PSF) were moderately to highly correlated (r=.42 to.76). These findings suggest that all are measuring a similar factor and any of the measures could be used as an indicator for phonemic awareness. Although, at midyear, either the Initial Consonant Sound Identification task or the Onset Recognition Fluency would be the best measures to use because the Phonemic

Segmentation Fluency measure is much more difficult. The Onset Recognition Fluency task was found to be the best predictor, and the Initial Consonant Sound Identification task correlated the highest with the Onset Recognition Fluency task (.76) out of the four measures. The Letter Naming Fluency task, although significantly correlated with the other measures, had the lowest correlation with the other phonemic awareness skills. Specifically, it had the lowest agreement with the Phonemic Segmentation Fluency measure (.415). The kindergarten students were found to be quite fluent on the Letter Naming Fluency task, and on average took less then two seconds per letter. However, this skill was not uniformly associated with the other measures. For example, 38% of the at-risk group had scores ranging from 26 to 48 on the measure (above the 48th percentile).

This study was consistent with prior research (Bradley & Bryant, 1978; Calfee, Lindamood & Lindamood, 1973; Jorm & Share, 1983; Liberman & Shankweiler, 1985; Stanovich, 1986) that has shown that phonemic awareness is a key element to learning to read. However, the issue of how to best teach phonemic awareness skills and how to best intervene when students are not learning these skills, still needs to be explored. Researchers and practitioners are now examining this issue, and several phonemic awareness curriculums are now widely available. Kaminski and Good (1996) suggested examples of curricula that can be used. However, Good (1997, p.14) has stated that "the methods of assessment do not suggest the methods of instruction". Future research needs to focus on better linking assessment to instruction.

A limitation of this study was using the teachers' predictions/recommendations of at-risk students in determining if the DIBELS measures were predictive of future reading problems. An objective measure of early reading skills at the end of kindergarten as well as teachers' grouping could have been used to corroborate teacher ratings. Also, it would be very beneficial to follow the participants in this study through first and second grade to determine which students developed reading difficulties in order to determine if the teachers' ratings and/or the four measures (or which of the four measures) truly were the best predictors. Specifically, it would be interesting to observe the students in this study whom were chosen by the teachers but not the tests, and the students whom were chosen by the tests but not the teacher as being at-risk. Utilizing the teachers' predictions of at-risk students may not have been a reliable source because subjectivity may influence their predictions. Further, in this study, the teachers were given the results of the DIBELS measures and the Initial Consonant Sound Identification task in January, before they made their predications of the at-risk group in May. The ramifications of this knowledge are unknown. Also, there are other variables that may have influenced children's performances on the different tasks. Indeed, the three classes used for this study did differ in their performances (means on the different tasks) and in the teachers' responses to the measures and predictions of "at-risk" students. The class with the largest class size (23 students) had the lowest average performance scores and the highest referral rate for at-risk. This suggests that class size may be influencing children's ability to acquire the measured skills. Also, although the three classes have similar goals and benchmarks established in reference to what the teachers teach, the teacher's

methods and use of curricula may differ and influence students' performances. These variables, need to be controlled for, and/or further investigated in future research. The last limitation of this study, is that the four different measures were not counterbalanced. It may have been useful to administer the four measures in an alternating manner to control the chance that administration order may have influenced students' performances. It would also be interesting and beneficial to collect a large norming sample of kindergarten students, to investigate the mean levels of performance for each of the measures, as well as to establish cut off points if the district were to implement assessment of phonemic awareness.

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Appendix A

Initial Consonant Sound Identification

Point to the picture of the pig and say "Tell me what letter makes the sound you hear at the beginning of the word 'pig'."

(If the child does not respond correctly, score as zero, then model the correct answer. Say "P-pig. P makes the sound at the beginning of pig." Model for first 3 pictures only.) Continue through pictures; go quickly if child does not catch on.

If child gives letter name, write the letter. If child gives initial sound(s) of word, put in "____".

1. pig _____
2. sun _____
3. tiger _____
4. monkey _____
5. balloon _____
6. cat _____
7. pear _____
8. fish _____
9. doll _____
10. zipper _____
11. goat _____
12. yoyo _____
13. jacks _____
14. rabbit _____
15. lion _____
16. witch _____
17. net _____
18. kite _____
19. violin _____
20. hands _____
21. bird _____

Total correct:_____

(1 pt. for each correct letter name)

D	l	l	v	X	Q	H	o	D	g
v	r	G	F	J	Q	u	o	Z	n
j	T	C	M	k	s	W	t	s	F
p	r	p	m	y	R	f	P	x	l
S	O	n	U	J	d	c	b	k	A
u	e	e	i	w	a	q	Z	U	K
g	c	E	W	j	l	f	X	R	T
B	E	N	O	V	y	b	V	L	q
z	z	Y	L	C	d	w	m	H	x
M	a	i	G	N	A	t	Y	B	P
h	h	S	K						

Child Identification #_____

Onset Fluency Baseline Day #1

This is a sink, a cat, gloves, and a hat (point to pictures).

Question	Score
1. Which picture begins with 'gl'.	/1
2. Which picture begins with 's'.	/1
3. Which picture begins with 'c'.	/1
4. What sound does 'hat' begin with.	/1

This is a purse, a banana, a lamb, and a stove (point to pictures).

5. Which picture begins with 'st'.	/1
6. Which picture begins with 'p'.	/1
7. Which picture begins with 'b'.	/1
8. What sound does 'lamb' begin with.	/1

This is a hat, a towel, a duck, and a bone (point to pictures).

9. Which picture begins with 'd'.	/1
10. Which picture begins with 'b'.	/1
11. Which picture begins with 'h'.	/1
12. What sound does 'towel' begin with.	/1

This is a bus, a can, an eraser, and a rake (point to pictures).

13. Which picture begins with 'r'.	/1
14. Which picture begins with 'ear'.	/1
15. Which picture begins with 'b'.	/1
16. What sound does 'can' begin with.	/1

Total Time:_____ Total /16

Student:_____ Score_____/_____
ID #_____ Time Taken _____
Teacher:_____

Phonological Awareness Word List 5

Word	Scoring	Student Score / Possible
hat	/h/ /ă/ /t/	/3
big	/b/ /ĭ/ /g/	/3
beak	/b/ /ee/ /k/	/3
bird	/b/ /er/ /d/	/3
Emma	/e/ /m/ /ă/	/3
feel	/f/ /ee/ /l/	/3
like	/l/ /ī/ /k/	/3
off	/ah/ /f/	/2
tuff	/t/ /ŭ/ /f/	/3
mole	/m/ /oa/ /l/	/3

Time:_____ Total Segments Produced:_____/29

pgcao phl
scribner

Appendix B

Teacher Questionnaire

1) How many children are in your class: all day:_____ half day:_____

2) How many of your students qualify for free mild or free lunch programs: _____

3) Please specify how many of your students belong to the following race/ethnic background: Caucasian _____ African-American _____ Hispanic _____ other_____

4) How many of your students receive Special Education services? Please specify the services they receive:

5) How many of your students went through the Early Childhood Education program?

6) Please list the student(s) by their I.D. #, that have been referred for a Special Education evaluation, and list their deficit area:

7) Please list the student(s) by their I.D. #, that will repeat kindergarten, and list their deficit area:

8) Please list the student(s) by their I.D. # who will probably receive extra receive reading instruction (ex: tutoring, Chapter, Reading Recovery) in first grade:

9) Please list the student(s) by their I.D. # who you expect would/will have major difficulty with 1st grade reading instruction. (This list will overlap with above questions).

10) How do you introduce letters in your class?

11) Describe or list the type of assessment procedures you use in your class to assess reading readiness skills and specify how often the assessments are done: Does your class participate in school wide assessment? Is your assessment formal or informal? If possible, would you attach a copy or example of what you use?

12) Describe your impressions/feelings about the DIBELS measurements and the Initial Consonant Sound Identification as an assessment for early reading skills. How or would you use this type of information?

Thank you for your participation

Table 1

Means and Standard Deviations of DIBELS Measures (LNF, ORF, and PSF)

And the Initial Consonant Sound Identification Measure (n = 50)

Measure	M	SD	Possible Score	Range
Letter Naming Fluency	28.76	17.86	N/A	1-94
Onset Recognition Fluency	12.20	4.02	16	0-16
Phonemic Segmentation Fluency	11.00	7.32	29	0-28
Initial Consonant Sound Identification	14.22	6.49	16	0-16

Table 2

Correlations between DIBELS measures (LNF, ORF, and PSF) and the Initial Consonant Sound Identification, (n = 50)

	ICSI	LNF	ORF	PSF
ICSI	1.0			
LNF	.62	1.0		
ORF	.76	.45	1.0	
PSF	.63	.42	.56	1.0

Note: All correlations significant $p<.003$

Table 3

Stepwise Discriminant Analysis Separating "At Risk"(n = 15)/"Non At-Risk"(n = 35) Classifications by Teachers

Step 1				
Variable(s) selected	Wilks' Lambda	Equivalent F	df	Significance
Onset Recognition Fluency	.5944	32.74	1, 48	.000
Variables not in Analysis after step 1				
Initial Consonant Sound Identification				
Letter Naming Fluency				
Phonemic Segmentation Fluency				
Variables ordered by size of correlation with function				
Onset Recognition Fluency	1.000			
Initial Consonant Sound Identification	.628			
Letter Naming Fluency	.424			
Phonemic Segmentation Fluency	.340			

Table 4

Diagnostic Efficiency Table

		Teacher Diagnosis		
		Present	Absent	Total
	Positive	11	4	15
Test	Negative	4	31	35
	Total	15	35	50

Results

Sensitivity (True Positive Rate)= .73

Specificity (True Negative Rate) = .89

Positive Predictive Power = .74

Negative Predictive Power = .89

False Positive Rate = .11

False Negative Rage = .27

Overall Correct Classification (hit) Rate = .84

Observed Agreement P0 = .84

Chance Agreement Pc = .58

Kappa = .62

Standard Error of Kappa = .14

Significance Test for Kappa Ho: k = 0 Z = 4.38

P< 0.00 two tail test and P< 0.00 one tail test