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Cara Williams

*Eastern Illinois University*

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**An Investigation of the Dynamic Indicators of Basic Early Literacy Skills (DIBELS)  
And the Illinois Snapshot of Early Literacy (ISEL)**

BY

**Cara Williams**

**THESIS**

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS  
FOR THE DEGREE OF

**Specialist in School Psychology**

IN THE GRADUATE SCHOOL, EASTERN ILLINOIS UNIVERSITY  
CHARLESTON, ILLINOIS

**2006  
YEAR**

I HEREBY RECOMMEND THIS THESIS BE ACCEPTED AS FULFILLING  
THIS PART OF THE GRADUATE DEGREE CITED ABOVE

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Running head: AN INVESTIGATION OF DIBELS AND ISEL

An Investigation of the Dynamic Indicators of Basic Early Literacy Skills (DIBELS)  
and the Illinois Snapshot of Early Literacy (ISEL)

Cara Williams

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April 20, 2006

### Acknowledgements

I would like to thank the following for their assistance and support: The district for providing me with the data used in this study, Dr. Chris McCormick for advising me and guiding me through this process, Mr. Don Sibley for aiding me in the development of my research question, Dr. Ronan Bernas for assisting me in the data analysis process, and Dr. Mike Havey and Dr. Linda Leal for offering me beneficial constructive criticism as committee members.

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## Abstract

This longitudinal study was conducted to compare and investigate the predictive power of DIBELS and ISEL measures. Data were collected to determine if ISEL and DIBELS measures similarly identify students as being at-risk. The predictive value of DIBELS and ISEL scores were evaluated in relation to third grade Measures of Academic Progress (MAP) scores and Illinois Standards of Achievement Test (ISAT) scores. Participants included 63 students from one grade level at a Chicago suburban school. Test scores from kindergarten through third grade were obtained for these students. Results indicate that the risk identification of students was significantly different between ISEL and DIBELS measures. Results also suggest that, of the mid-kindergarten DIBELS scores, Letter Naming Fluency scores best predict third grade MAP and ISAT scores. Results yielded from the multiple regression analysis of first grade ISEL total scores and first grade DIBELS scores, indicate that first grade ISEL total scores best predict third grade MAP scores. According to these results, no first grade ISEL scores or first grade DIBELS scores are good predictors of third grade ISAT scores.



An Investigation of the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) and the Illinois Snapshot of Early Literacy (ISEL)

The structure of today's society makes learning to read a necessity. Poor readers are placed at an extreme, life-long disadvantage. Reading is foundational to most other subjects studied in school and to most activities encountered after graduation (Daly, Chafouleas, & Skinner, 2004). Also, reading is one of the primary requirements needed to achieve social, educational, and professional success (Jenkins & O'Conner, 2002). It is important and necessary to address reading problems early and effectively. The earlier reading problems are targeted, the more likely they are to improve. Numerous intervention studies have found that early, intensive and appropriate interventions can provide children with the early reading skills needed to prevent long-term reading problems (Torgesen, 2004).

The most critical grades for reading development are kindergarten through third grade. Statistically speaking, 90 percent of children who are poor readers at the end of first grade remain poor readers for life (Torgeson, 2004). By the time students reach fourth, fifth, and sixth grade they encounter 10,000 words annually that they have never seen before in print. Thus, fourth grade students must be skilled at using phonics to sound out unknown words. Unfortunately, the 2002 National Assessment of Educational Progress (NAEP) concluded that 37 percent of all fourth graders scored at the Below Basic level in reading, indicating that they were unable to read and comprehend a paragraph from a grade-level text (Rathvon, 2004). Furthermore, by middle school and high school, 20 to 25 percent of American children are in danger of not reading

accurately or fluently enough to guarantee comprehension in their primary academic courses (Snow, Burns, & Griffin, 1998).

All in all, more than one in three children encounter significant difficulties in learning to read. The problem is so extreme that the No Child Left Behind Act established a federally funded national initiative, Reading First, to improve reading instruction in kindergarten through third grade classrooms (Torgesen, 2004). Reading First is a \$900 million grant program that aims to adopt and implement scientifically based methods for reading instruction within local school districts across the states (Daly, Chafouleas, & Skinner, 2004).

#### Literature Review

In 1997, congress requested that a national panel meet to assess the effectiveness of various teaching methods for reading. The National Reading Panel (NRP) built and expanded upon the work of the National Research Council (NRC). The NRC report, Preventing Reading Difficulties in Young Children, is a consensus based on the professional judgments of a diverse group of experts in reading instruction research (Snow, Burns, & Griffin, 1998). In order to further assess instructional methods, the NRP developed an objective research review methodology to serve as criteria for the inclusion of studies. Studies were required to include evidence-based analyses relevant to a set of selected topics. Alphabets (which includes phonemic awareness and phonics instruction), fluency, and comprehension were the main topics agreed upon.

Each topic was researched using psycINFO and ERIC search engines. In order to be included studies needed to: measure reading as an outcome, be published in

English, focus on reading development within the age range of preschool to grade 12 and use an experimental or quasi-experimental design with a control group or a multiple-baseline method. For many topics, the number of studies that met the criteria was sufficient to conduct a formal meta-analysis. For other studies in which a full meta-analysis could not be conducted, a more qualitative analysis was completed. Based on these results, conclusions were made about each topic (National Reading Panel, 2000).

Phonemic awareness refers to the ability to detect and manipulate sound segments within words that are smaller than syllables. The results of a meta-analysis evaluating the importance of phonemic awareness showed that teaching children to manipulate phonemes was extremely effective under various teaching conditions and with a variety of learners (ranging in age and grade levels). Also, instruction that includes phonemic awareness training was shown to improve reading significantly more than instructions that lack training. The panel concluded that teaching phonemic awareness to children caused them to improve in their phonemic awareness skills, reading and spelling. The most successful phonemic awareness training programs involved explicit and systematic teaching, the mastery of only one or two letter-sound correspondences at a time and small group instruction (National Reading Panel, 2000).

Phonics instruction builds on phonemic awareness. Phonics instruction goes one step further by not only requiring students to identify individual sounds in words, but by also requiring them to link these sounds to letters. The main goals of phonics instruction are to help beginning readers understand letter-sound correspondences, form spelling patterns and learn how to apply this knowledge to reading texts (National Reading

Panel, 2000). The meta-analysis revealed that systematic phonics instruction produces significant benefits in the reading skills of students that range in age from kindergarten to 6th grade. Thus, training that involves phonics instruction was found to be more effective than instruction that teaches little or no phonics. Kindergartners who received systematic phonics instruction showed improvement in their reading and spelling skills. First graders developed better decoding skills, spelling skills, and showed significant improvement in comprehension. Older children showed improvement in their ability to decode, spell words and read text orally; their comprehension, however, was not significantly affected. Lastly, systematic synthetic phonics instruction also had a significant positive effect on the reading skills of disabled readers.

Fluency is one of the leading contributors to the development of reading comprehension, the ultimate goal of reading. Fluency is the ability to read accurately and quickly with the appropriate voice inflection and pronunciation. Unfortunately, the development of fluency is often overlooked in the schools. A detailed analysis showed that guided repeated oral reading with available corrective feedback, significantly increased word recognition, fluency, and comprehension throughout a wide range of grade levels. The panel found that silent independent reading, used as an instructional method, did not positively effect reading achievement and fluency. Furthermore, there is insufficient evidence to support the idea that encouraging students to read independently (without direct instruction in phonics skills) actually results in increased independent reading or improved reading skills (National Reading Panel, 2000).

When evaluating the topic of comprehension, the NRP found three important contributors in the research: vocabulary development, intentional reader and text interaction and teacher preparation. The studies that were reviewed revealed that age-appropriate vocabulary instruction leads to gains in comprehension. Vocabulary computer games were found to teach vocabulary more effectively than some traditional methods (i.e., direct instruction, flashcards, etc.). Also, reviewing vocabulary words prior to reading passages was shown to aid in comprehension. Furthermore, the data suggest that comprehension improves when readers relate the text to their past experiences and knowledge. Comprehension can also be improved by the explicit teaching of comprehension techniques. Evidence suggests that teaching a combination of reading comprehension techniques is most effective (i.e., comprehension monitoring, cooperative learning, story maps, question answering, question generation, story structure, or summarization) (National Reading Panel, 2000).

Overall, reading instruction must promote the reading development and success of students. Classroom instruction in kindergarten through third grade must be presented in a skillful manner and focus on word-level decoding skills. In order to develop decoding skills, it is necessary for students to first develop fluent letter recognition, phonemic awareness (ability to identify individual sounds of words) and the alphabetic principle (the ability to identify letter-sound correspondences). Skills in vocabulary and verbal reasoning become increasingly important for acquiring reading comprehension skills after third grade.

Recent research identifies the essential components of kindergarten through third grade reading instruction. In kindergarten, phonemic awareness, letter knowledge, and vocabulary should be emphasized and assessed. First graders should be taught and evaluated in the areas of phonemic awareness, alphabetic reading skills, and oral reading fluency. In second and third grade, alphabetic reading skills and oral reading fluency should be practiced and further monitored. In order to achieve ultimate effectiveness, reading instruction should always, throughout all grades, be explicit and systematic. Explicit and systematic approaches to instruction are consistently more effective than approaches that are indirect and dependent upon student inference (Torgesen, 1999).

Children that enter first grade with weak phonemic awareness skills have difficulties learning to read. Without phonemic awareness, children have problems understanding letter-sound correspondences and “sounding out” words. Once children begin to develop the alphabetic principle, they are able to generate words that they can only partially “sound out” by evaluating the context in which the word is placed. In order to develop the alphabetic principle, children must have letter-sound knowledge, basic phonological awareness and the ability to use context cues (Torgesen, 1999).

Children who continue to lack phonics skills throughout first grade are likely to rely on guessing, maintain inaccurate habits and resist independent reading. Students who have developed enough decoding skills to read grade level text fluently and accurately can comprehend the meaning of what they are reading with greater ease. Vocabulary and oral language weaknesses can interfere with reading comprehension (Torgesen, 1999).

Previous preparation and individual skills lead to huge differences in instructional needs. Thus, procedures must be in place to correctly identify students who are lacking early reading skills. The needs of at-risk students should then be addressed by providing additional explicit instruction and implementing interventions. There are over 24 early screening assessments available for the assessment of kindergarteners through third graders. These screening assessments cover a variety reading skills (phonemic awareness, phonics, fluency, vocabulary and comprehension) and purposes (screening, diagnosis and progress monitoring) (Torgeson, 2004).

There are still many unanswered questions regarding the most effective way to identify at-risk children. The controversial issues surrounding early reading assessment are as follows: the goals of early reading assessment; the variables that should be measured; the role of teacher ratings in identifying at-risk students; the most effective times to screen; the determination of at-risk status; the assessment of linguistically diverse students; and the interpretation of results (Rathvon, 2004).

Two current reading measures of early reading skills are the Dynamic Indicators of Basic Early Literacy Skills (DIBELS) and the Illinois Snapshot of Early Literacy (ISEL). DIBELS is a nationally prominent and widely-used set of individually administered literacy measures available for students in kindergarten through sixth grade. DIBELS is made up of multiple one-minute fluency indicators, designed to frequently monitor the progression of pre-reading and early reading skills for early identification and intervention purposes. DIBELS is designed to be brief, easy to administer, sensitive to growth and available in multiple forms. It is not designed to be a comprehensive

diagnostic reading measure.

DIBELS (Good & Kaminski, 1996) measures were founded on the essential literacy domains reported by the National Reading Panel (2000) and National Reading Council (1998) and assess the following three domains: phonological awareness, alphabetic understanding, and fluency with connected text. DIBELS measures are administered to students three times per year. When used as recommended, results can provide individualized student progress feedback as well as grade-level feedback in regards to instructional objectives (<http://dibels.uoregon.edu>).

DIBELS results can be scored according to local or national norms. Scores can be stored and analyzed by using the DIBELS Data System, which is available on the DIBELS website for a small fee. When using the DIBELS Data System, scores are automatically interpreted according to the performance of all those using the Data System. If a student's score falls below the 20th percentile, he/she is placed in the At Risk category. If the student's scores are between the 20th and 40th percentile, he/she is placed in the Some Risk category. And lastly, if a student's scores are above the 40th percentile, he/she is placed in the Low Risk category (Rathvon, 2004).

The reliability of DIBELS varies according to the measure. Initial Sound Fluency (ISF) is the least reliable, while Letter Naming Fluency (LNF) and Oral Reading Fluency (ORF) are the most reliable measures. The administration of ISF, along with Phoneme Segmentation Fluency (PSF) and Word Use Fluency (WUF), requires a lot of practice because examiners must present test stimuli at a steady pace, while recording responses. Thus, this may account for the lower reliability of ISF.



Kaminski and Good (1996) found that, in a study with 38 kindergartners and 40 first graders, the one week alternate-form reliability for LNF was .93 for point estimates (performance on single probe) and .99 for level estimates (average across all probes in data collection period). Lastly, a recent study found that the alternate-form reliability for the DIBELS ORF was .94 (Rathvon, 2004).

Of the DIBELS tasks, LNF and ORF measures have the strongest criterion-related validity, meaning these measures are the most strongly correlated with other measures of reading proficiency (Rathvon, 2004). Kaminski and Good (1996) found that the PSF and LNF were highly correlated with the Metropolitan Readiness Tests (.88 and .73). LNF was highly correlated with the Stanford Diagnostic Reading Test (.77) (Karlsen, Madden, & Gardner, 1985). ORF correlations with TORF (Total Oral Reading Fluency) range from .52 to .91 (<http://dibels.uoregon.edu>).

The ISEL K/1 is a classroom-based reading performance screening and diagnostic inventory for students in kindergarten and first grade developed by the Illinois State Board of Education. Version 1 includes the original 8 subtests (alphabet recognition, story listening, phonemic awareness, one-to-one word matching, letter sounds, developmental spelling, word recognition, and passage reading) and uses similar assessments in both fall and spring to demonstrate growth. Version 2 is the enhanced version that includes the original 8 subtests and an additional vocabulary and fluency subtest. ISEL-S is an inventory used to assess Spanish speaking kindergartners and first graders. ISEL-2 is a second grade assessment in English with two sets of

snapshots: a Form A for fall assessment and a Form B for spring assessment (Barr, Blachowicz, Buhle, Chaney, Ivy, Silva, 2004).

The ISEL inventories are based on scientific reading research, reflect the National Standards for Reading and the Illinois Learning Standards and are linked to the overall goals of the Illinois Reading Initiative. There are three purposes for the administration of the ISEL inventories: to provide information for instructional planning, to identify students who may need early interventions and to assess student progress with pre and post assessment data. The ISEL inventories can be administered in approximately 20 minutes per child, while DIBELS measures can be administered in a total of two to four minutes per child depending upon the time of year and grade level (Barr, et al., 2004). Abbreviated administration guidelines are available for shorter ISEL assessments.

In 2002 the norming process was completed. One thousand kindergarten and first grade students from the state of Illinois were given the ISEL K/1. The sample was matched to the overall demographics of Illinois (socio-economic status, rural/suburban/urban, ethnicity, geography, and population density) (Barr, et al., 2004). Each child included in the norming process was given the ISEL-K/1 twice, once at the beginning of the school year and once at the end.

The norming process unveiled two critical scores that could be used to help guide teachers in their decision-making about student instruction. The "Target Score", or the 50th Percentile Score, represents the average raw score that students in the norming process achieved. When administration takes place during the same time frame with the same procedures as the normed students, teachers may compare their own student

outcomes to the 50th Percentile Score for each snapshot. The second score is the “Watch Score” or the 20th Percentile Score. It is representative of the lowest 20% of the norming student population. Students at or below this score are categorized as “at-risk” for making adequate literacy progress. These students are the most in need of a structured intervention.

Reliability coefficients varied across subtests, but generally suggest that the ISEL measures are sufficiently reliable for kindergarten and first grade in the fall, but are slightly less reliable in the spring. According to the research literature, all ISEL tasks have high construct validity because the tasks were developed to assess the information that teachers desire to know as they plan instruction for children (Barr, et al., 2004). Concurrent validity was assessed by comparing the ISEL-K/1 to the Gates-MacGinitie Reading Test and the Iowa Test of Basic Skills. When compared with the Gates MacGinitie Reading Test, coefficients among subtests ranged from .58 to .98 ( $M = .77$ ). When compared with the Iowa Test of Basic Skills, coefficients ranged from .60 to .84 ( $M = .73$ ) (Barr, et al., 2004).

In this study, the longitudinal data of students' performance on both DIBELS and ISEL measures in kindergarten and first grade were examined in order to determine how comparable these measures were in risk identification and in predicting third grade reading achievement. The researcher hypothesized that DIBELS would better predict third grade Illinois State Achievement Test (ISAT) scores and third grade Measures of Academic Progress (MAP) scores. Because DIBELS measures are timed, they measure the acquisition and fluency of tasks. The ISEL is not timed, therefore it only measures

the acquisition of tasks. Thus, it seems that DIBELS measures would be more precise when identifying “at-risk” students.

### Methods

#### *Participants*

Participants included all students within one grade level at a suburban Chicago school. Participants’ scores were tracked from kindergarten through third grade. The sample size consisted of 63 students. The sample was homogeneous, consisting primarily of middle to upper-class Caucasian students. Data was used from an elementary school with the following demographics: 91% Caucasian, .3% African American, 1% Hispanic, 7.3% Asian/Pacific Islander, 0% Native American and .5% multi-racial. Fifty-two percent of the students in the sample were boys and 48% of the students were girls. As a district-required procedure, all students completed DIBELS measures in kindergarten and first grade and completed the ISEL in the beginning of first grade. All students also completed ISAT and MAP testing in third grade.

#### *Materials*

The kindergarten and first grade Dynamic Indicators of Basic Early Literacy Skills (DIBELS) scores and first grade Illinois Snapshot of Early Literacy (ISEL) K/1 Version 1 scores, of students used in the data analysis, were obtained from school administrators. Kindergarten DIBELS scores included mid-kindergarten Letter Naming Fluency (LNF), Initial Sound Fluency (ISF) and Phonemic Segmentation Fluency (PSF) scores. First grade DIBELS scores included fall LNF, PSF, and Nonsense Word Fluency (NWF) scores. ISEL K/1 Version 1 scores from the fall of first grade included:

Phonemic Awareness (PA), One-To-One Matching and Word Naming (WN), Letter Sounds (LS), Developmental Spelling (DS), Word Recognition (WR), Passage Reading (PR) scores and ISEL total scores. Third grade ISAT and MAP scores were also obtained from the district and used in the data analysis.

The Illinois Standards of Achievement Test (ISAT) measures individual student achievement relative to the Illinois Learning Standards. The Reading and Mathematics portion of the ISAT were administered to participants in the spring of third grade ([www.isbe.state.il.us](http://www.isbe.state.il.us)). Reading standard scores were used in the data analysis. The reading portion of the ISAT assesses each student's ability to predict, make inferences, evaluate information, interpret and apply the information that they have read ([www.isbe.state.il.us](http://www.isbe.state.il.us)).

The Measures of Academic Progress (MAP) assessment is designed to inform teaching and learning by providing information that can be translated into instructional strategies and school improvement. MAP tests are aligned to the content and structure of state standards. MAP is an adaptive, un-timed, computerized assessment program that consists of a Reading, Mathematics, and Language Usage portion. The difficulty of each test adjusts to the individual student's performance, allowing each student complete a tailored set of questions. This district administers MAP to third graders once in the fall and once in the spring. Reading standard scores for the spring were used in this study's data analysis ([www.nwea.org](http://www.nwea.org)).

*Procedures*

A complete data set was collected from a suburban Chicago school. This type of data is routinely collected within this district. ISEL data were collected primarily by building literacy teachers. Some additional assistance was provided from other school personnel (i.e., school psychologists and resource teachers). Those who collected ISEL data received training prior to administering the test. Special education teachers, special education assistants, school psychologists, school psychology practicum students, school psychology interns and literacy teachers collected DIBELS data. Everyone who collected DIBELS data received extensive, explicit and structured training, provided at either the building or district level. ISAT and MAP measures were administered by classroom teachers who received explicit instructions. DIBELS and ISEL were individually administered, while ISAT and MAP were administered as a class. Duration of administration varied between measures. All measures were scored according to state or national norms.

Chi-square tests corrected for continuity (tests were corrected for continuity due to the small number of students in some of the cells) were conducted to determine if selected DIBELS and ISEL subtests identified the same students as falling within the risk category. Fall of first grade DIBELS and ISEL subtests were paired according to construct by the researcher. This means that the researcher paired subtests that appeared to measure the same construct prior to running chi-square analyses (see Appendices A and B for a visual display of paired subtests). Risk classification was determined by

combining the some and at-risk categories for DIBELS and using the 50th percentile score for ISEL. SPSS was used to analyze the data.

Step-wise multiple regression analyses were used to evaluate the predictive value of DIBELS and ISEL scores in relation to third grade MAP and ISAT scores. DIBELS measures only provided individual subtest scores, while ISEL measures provided subtest scores and a total score for each student. DIBELS scores from the winter of kindergarten were evaluated to determine which measure best predicted third grade reading achievement scores. Fall of first grade DIBELS scores and fall of first grade ISEL total scores were also evaluated to determine which measure was the best predictor of third grade reading achievement (see Appendix C for a visual display of multiple regression sets). SPSS was used to analyze the data.

### Results

Chi-square tests corrected for continuity were conducted on the proportion of items correct on ISEL subtests and DIBELS subtests (see Appendix A and B) to determine if these measures identify the same students for risk categories. A chi-square analysis comparing risk and non-risk categorizations for Word Matching (ISEL) and Nonsense Word Fluency (DIBELS) resulted in 43 of 63 students (68%) being similarly identified in the risk (16%) and non-risk (52%) categories. Twenty of the 63 students (32%) were placed in the risk category on only one of the measures. The frequency distribution across the categories for these two measures was significantly different  $X^2 = (5.25), p = .022$ , meaning that these measures identified a significantly different number of students.

A comparison of the number of students in the risk and non-risk categories for Letter Sounds (ISEL) and Nonsense Word Fluency (DIBELS) resulted in the similar identification of 46 of the 63 students (73%) in the risk (14%) and non-risk (59%) categories. Seventeen of 63 students (27%) were placed into the risk category on only one of the measures. Again, the number of students placed into the risk and non-risk categories was significantly different between the two measures,  $X^2 = (6.07)$ ,  $p = .014$ .

The comparison of Word Recognition (ISEL) and Nonsense Word Fluency (DIBELS) scores indicated that 47 of 63 students (75%) were placed into similar risk (14%) and non-risk (60%) categories. Sixteen of 63 students (25%) were placed into the risk category by only one of these measures. There was significant difference in the number of students placed into risk and non-risk categories between these two measures,  $X^2 = (6.97)$ ,  $p = .008$ .

Placement in risk and non-risk categories for Letter Sound (ISEL) and Phonemic Segmentation Fluency (DIBELS) resulted in the similar identification of 45 of 63 students (71%) in the risk (14%) and non-risk (57%) categories. Eighteen students (29%) were placed into the risk category by only one of the measures. This difference in placement was significant,  $X^2 = (4.82)$ ,  $p = .028$ .

The comparison for Developmental Spelling (ISEL) and Phonemic Segmentation Fluency (DIBELS) placed 49 of 63 students (78%) in the same risk (11%) and non-risk (67%) categories, with a significant difference between the measures,  $X^2 = (6.19)$ ,  $p = .013$ . Fourteen of 63 students (22%) were placed in the risk category by only one of the measures.



For all five of the comparisons, the ISEL subtests and DIBELS indicators identified a significantly different number of students for risk and non-risk categories. Specifically, for each of the five DIBELS and ISEL chi-square comparisons, of the total number of students in the risk categories, between 33.3 and 36% were placed in a risk category on both the ISEL and the DIBELS measures and between 64 and 66.6% of the total number of students were placed in a risk category on only one of the measures in the comparison. For four out of the five comparisons (all except Spelling and Phonemic Segmentation Fluency), the ISEL subtests placed more students into risk categories than the DIBELS indicators (see Appendix A).

An examination of the specific students placed into the categories showed that 37 of 63 students (59%) were placed into a risk category for at least one of the ISEL measures and 21 of 63 students (33%) were placed into a risk category on at least one of the DIBELS indicators. Eighteen (29%) of these students were placed into a risk category on both a DIBELS indicator and an ISEL subtest. Eight students (13%) were categorized as being at-risk on all four of the ISEL measures and eight (13%) were categorized as being at-risk on all of the fall of first grade DIBELS measures. Of the 63 participants in this study, four (6%) were consistently at-risk on all of the ISEL and DIBELS measures that were investigated.

Step-wise multiple regression analyses were conducted to examine how DIBELS indicator scores and ISEL total scores contributed to MAP and ISAT scores. First, a multiple regression analysis was conducted to determine how the following first grade scores predicted MAP scores: ISEL total scores, LNF fall of first grade scores, PSF fall

of first grade scores and NWF fall of first grade scores. Results show that for this set of predictors ISEL scores accounted for 33% of the variance in MAP scores,  $F(1,17) = 9.852, p = .006$ . The other predictors did not significantly account for the additional variance.

Next, a multiple regression analysis was conducted to evaluate how the following first grade scores predicted ISAT scores: ISEL total scores, LNF fall of first grade scores, PSF fall of first grade scores and NWF fall of first grade scores. None of the predictors made a significant, unique contribution to ISAT scores.

Kindergarten DIBELS scores were also evaluated using a multiple regression analysis. A multiple regression analysis was conducted to examine how the following kindergarten DIBELS scores predicted MAP scores: Letter Naming Fluency (LNF) mid-kindergarten scores, Initial Sound Fluency (ISF) mid-kindergarten scores and Phoneme Segmentation (PSF) mid-kindergarten scores. Results show that for this set of predictors LNF accounted for 26% of the variance in MAP scores,  $F(1,47) = 18.2, p = .00$ . The other predictors did not significantly account for the additional variance.

Next, a multiple regression analysis was conducted to examine how the following kindergarten DIBELS scores predicted ISAT scores: LNF winter of kindergarten scores, ISF winter of kindergarten scores and PSF winter of kindergarten scores. Results indicated that for this set of predictors LNF accounted for 35% of the variance in ISAT scores,  $F(1,47) = 25.536, p = .00$ . Other predictors did not significantly account for additional unique variance.

## Discussion

Today's culture makes learning to read a necessity. Those who remain poor readers throughout adulthood are placed at an extreme disadvantage. Early intervention has been found to be the most effective way to ameliorate reading problems. Several studies have found that early, intensive and appropriate interventions can provide children with the early reading skills required to prevent long-term reading problems (Torgesen, 2004). The years between Kindergarten and third grade are the most critical for reading development. Research has shown that ninety percent of children who are poor readers at the end of first grade remain so for life (Torgesen, 2004). Thus, it is extremely important for schools to use measures that identify students early and accurately for interventions. Unfortunately, the identification process is complicated and there are still many unanswered questions regarding the most effective way to identify at-risk children. For example, what variables should be measured? Which instruments most accurately identify students as "at-risk" for reading problems?

This study was conducted to investigate the identification process and predictive value of ISEL and DIBELS measures. Data was collected to determine if ISEL and DIBELS measures placed the same students into risk categories. Also, data was analyzed to determine the predictive value of ISEL and DIBELS scores in relation to third grade reading achievement scores (MAP and ISAT). Because DIBELS measures are timed, the researcher hypothesized that DIBELS would better predict third grade Illinois State Achievement Test (ISAT) scores and third grade MAP scores.

Results of the chi square analyses indicated that all five comparisons placed a significantly different number of students in risk categories. Furthermore, in four of the five comparisons, the ISEL subtest scores placed more first grade students into the risk category than the DIBELS measures. Forty percent of the students were classified within the risk category on at least one of the four ISEL subtests, while 29% of the students were placed within the risk category on at least one of the two DIBELS indicators. However, it is important to note that the ISEL categorization for risk was based on the 50<sup>th</sup> percentile (to include some risk and at-risk students) and the DIBELS categorization for risk was based on the 40<sup>th</sup> percentile (to include some risk and at-risk students). In this study, the determination of risk status was not consistent across measures. The different decision rules for risk status on ISEL and DIBELS measures may account for the considerable variability in the number of students placed within risk categories.

Mid-kindergarten DIBELS scores were evaluated to determine the best predictor of third grade reading achievement on the MAP and ISAT. Mid-kindergarten Letter Naming Fluency scores were the single best predictors for both MAP and ISAT scores. This finding is supported by Rathvon's (2004) research, which identifies LNF and ORF among the DIBELS tasks, as the most reliable measures with the strongest criterion-related validity. These results suggest that a student's ability to name letters in kindergarten is an indicator for his/her future reading achievement. However, as Torgesen (2002; 2004) has summarized, letter naming is not the only skill needed to read

successfully. Early reading instruction needs to also include phonemic awareness, the alphabetic principle and vocabulary.

Results also indicated that fall of first grade ISEL total scores were the best predictor of third grade MAP scores. Thus, ISEL scores at the beginning of first grade are more useful than the DIBELS indicators for predicting MAP scores in third grade. The skills assessed on the ISEL appear to provide a better match to the skills required for the MAP in third grade.

Neither the beginning of first grade ISEL or DIBELS scores, contributed unique variance to ISAT scores. This suggests that none of the variables in this analysis were good predictors of ISAT scores. Although this result was unexpected, it may indicate that student performance on the ISAT includes more demands on vocabulary and comprehension skills, which are not directly assessed by the ISEL or DIBELS measures. It may be that by third grade, reading achievement as measured on the ISAT, is a more complex set of skills that cannot be explained by the individual measures of the first grade ISEL or DIBELS. However, another probable explanation for this finding is that scores on both ISEL and DIBELS measures provided similar influences on ISAT scores, while no one variable predicted ISAT scores significantly better than all of the other variables.

Overall, the hypothesis that DIBELS would emerge as the "better" measure was not supported and suggesting a preference for either ISEL or DIBELS measures is not possible from this analysis. DIBELS offers more opportunities for progress monitoring and involves less administration time. However, in the beginning of first grade ISEL is

the better predictor of third grade MAP scores. This study also points out that risk classification is influenced by identification criteria and related to the type of measure used. According to Rathvon (2004), these factors should be considered in the interpretation of risk status before instructional decisions are made and school resources are allocated.

### *Limitations*

Because ISEL and DIBELS have different types of subtests, the researcher had to evaluate and decide which subtests had similar constructs before conducting chi-square tests corrected for continuity. Because the arrangement of chi-square pairs was based on the researcher's decision, there was room for error. There may be other subtest pairs that offer better or more informative comparisons.

Multiple regression results were also influenced by variations in test construction. Unlike ISEL, DIBELS does not have a total score. DIBELS measures are given multiple times during a year, but only scores from the winter of kindergarten and fall of first grade DIBELS measures were used in this study. Thus, this study's multiple regression results do not evaluate all DIBELS administrations (fall, winter, spring) per measure to determine which is the best overall predictor of MAP and ISAT scores. Furthermore, multiple regression results may have been influenced by multi-collinearity. Multiple regression analyses offer the most accurate results when the potential predictors are independent of one another. In this study, the sets of predictors analyzed were not entirely independent of one another. Thus, results may be somewhat skewed due to multi-collinearity.

Lastly, results may be specific to the small homogeneous sample of this study. The sixty-three participants were all students at one school within a suburban Chicago district. This district consists primarily of middle to upper-class Caucasian students. Future studies should investigate these research questions with a larger more diverse sample to determine if these results generalize and are applicable to a broader range of students.

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Appendix A

Table 1  
 Frequency of Placement into Risk and Non-Risk Categories for ISEL Subtests  
 and DIBELS Indicators in the Fall of First Grade

Nonsense Word Fluency (DIBELS)

Word Matching (ISEL)

	Risk	Non-Risk
Risk	10	16
Non-Risk	4	33

Nonsense Word Fluency (DIBELS)

Letter Sounds (ISEL)

	Risk	Non-Risk
Risk	9	12
Non-Risk	5	37

Nonsense Word Fluency (DIBELS)

Word Recognition (ISEL)

	Risk	Non-Risk
Risk	9	11
Non-Risk	5	38

Phonemic Segmentation Fluency (DIBELS)

Letter Sounds (ISEL)

	Risk	Non-Risk
Risk	9	12
Non-Risk	6	36

Phonemic Segmentation Fluency (DIBELS)

Spelling (ISEL)

	Risk	Non-Risk
Risk	7	6
Non-Risk	8	42

## Appendix B

ISEL subtests	DIBELS subtests	Chi Square P Values
One-to-One Matching and Word Naming (1st grade)	Nonsense Word Fluency (fall of first grade)	.022
Letter Sounds (1st grade)	Nonsense Word Fluency (fall of first grade)	.014
Word Recognition (1st grade)	Nonsense Word Fluency (fall of first grade)	.008
Letter Sounds (1st grade)	Phonemic Segmentation Fluency (fall of first grade)	.028
Developmental Spelling (1st grade)	Phonemic Segmentation Fluency (fall of first grade)	.013

Appendix C

Multiple Regression Clusters and Results

Set of Predictors: First Grade ISEL and DIBELS Scores

ISEL total scores  
 LNF fall of first grade scores  
 PSF fall of first grade scores      =====>      MAP scores  
 NWF fall of first grade scores

*33% of the variance in MAP scores is predicted by first grade ISEL total scores*

ISEL total scores  
 LNF fall of first grade scores  
 PSF fall of first grade scores      =====>      ISAT scores  
 NWF fall of first grade scores

*None of the predictors made a significant unique contribution to ISAT scores*

Set of Predictors: DIBELS Kindergarten Scores

LNF mid-kindergarten scores  
 ISF mid-kindergarten scores      =====>      MAP scores  
 PSF mid-kindergarten scores

*26% of the variance in MAP scores is predicted by LNF mid-kindergarten scores*

LNF mid-kindergarten scores  
 ISF mid-kindergarten scores      =====>      ISAT scores  
 PSF mid-kindergarten scores

*35% of the variance in ISAT scores is predicted by LNF mid-kindergarten scores*