

USING CURRICULUM-BASED MEASURES FOR ASSESSING  
ACHIEVEMENT IN CHILDREN WHO MAY HAVE  
POTENTIAL RISK -FACTORS FOR  
READING DIFFICULTY

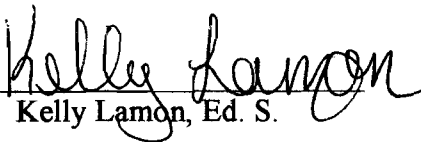
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**ABSTRACT**

Millions of school-aged children experience reading difficulty every year. Research indicates it is essential to identify reading problems early so that intervention may be appropriately implemented. There is debate regarding what risk-factors are related to reading difficulty, what reading instruction is best, and what methods are best to screen students for potential reading problems.

This research reviews the existing literature on poverty, family size, and birth order as potential risk-factors for reading difficulty. Curriculum-based measures, specifically DIBELS, were examined in regards to their utility in identifying and monitoring students at-risk of reading failure. Reading instruction was also addressed. A critical analysis of the relevant literature includes implications for current practice as well as future research.

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## Chapter I: Introduction

According to the National Reading Panel (2004), national longitudinal studies indicated that more than 17.5% of children, roughly 10 million, will experience reading difficulty in their first three years of schooling. Evidence suggests that successful reading begins early and once established, trajectories are difficult to change (National Reading Panel, 2004). VanDerHeyden, Witt, Naquin, and Noell (2001) proposed that early academic performance is likely to influence later academic performance; therefore, it is essential to identify reading problems and determine interventions early.

There is a potential link between certain family factors such as poverty, family size, and birth order to reading difficulty. Being knowledgeable about what students' risk-factors are for reading failure can aid early identification so intervention strategies can be employed.

Adams, Foorman, Lundberg, and Beeler (1998) suggested that proficient phonological awareness distinguished economically disadvantaged preschoolers from more advantaged children. Furthermore, poverty can impact parenting practices and the overall home environment, which can influence academic functioning. Papalia, Olds, and Feldman (2002) indicated that the effects of poverty lead to behavioral, emotional, and academic difficulties in children.

Family size and poverty are often related. More recently, families have decreased in size; however many large families still exist and many face financial difficulty. Past research has implied that the larger the family, the lower a child's IQ tends to be (Rogers, Cleveland, van den Oord, & Rowe, 2000). Factors associated with large families such as

overcrowding within the home, limited family resources, and a less sophisticated linguistic environment may all contribute to the trend of large families and lower IQ. Others argue this is indeed not the case (Rogers et al., 2000; Esping, 2000). According to Rodgers et al. (2000), parental IQ has a strong link to family IQ, and often low-IQ parents have many children, perhaps leading to the conclusion that large families are linked to children who struggle academically.

Along with family size, the position of a child within the family may also have an impact on academic success. Theorist Alfred Adler claimed that there are birth order differences in achievement potential (cited in Prochaska & Norcross, 2003). Francis Galton also conducted research to determine a link between IQ and birth order. His work proposed that firstborn children are more intelligent than laterborn children (cited in Esping, 2003). However, Rodgers et al. (2000) concluded that birth order does not directly decrease the intelligence of laterborn children.

Poverty, family size, and birth order may be potential predictors for reading difficulty. It is important for educators to know the risk-factors for underachievement so they can screen at-risk children and provide them with the appropriate interventions.

One way to screen underachievement is through curriculum-based measures. Curriculum-based measures have been researched thoroughly and have been found to hold high reliability and validity (Deno, 2003). These psychometric properties have been achieved through standardized observational procedures in the repeated study of student performance in reading, writing, and mathematical skills (Deno, 2003).

DIBELS, a form of curriculum-based measurement (CBM), is a set of individually administered standardized measures that relate to early literacy development. According to Mr. Don Sibley (WSPA conference, October 28, 2005), an expert in the field, DIBELS is designed to measure the development of pre-reading and early reading skills of elementary school children.

According to Manzo (2005), DIBELS has become the national assessment tool for *Reading First*, a federal program adopted under the No Child Left Behind Act of 2001. More than 40 states use DIBELS to screen students grades K-3 for potential reading problems. The tests are replicable, take little time, and are simple to administer, which appeals to many school districts. Officials use DIBELS scores to identify children at-risk for reading failure, hold schools accountable for student achievement, and aid educators in informing their teaching instruction (Manzo, 2005).

Curriculum-based measures, such as the DIBELS, can also assist with the referral process for special education programs. Teachers are typically the referral source for students potentially in need of special education based on classroom performance. There is human error involved in teachers referring based on their perceptions of classroom success (Deno, 2003). This suggests that teacher perception might not be the best “test” of student success at school. CBM has been used to make the practice of referring for special education services more objective and measurable (Deno, 2003).

Perhaps one of the greatest benefits of curriculum-based measures is that they allow the freedom of administration in the natural classroom setting. This greatly

contributes to the utility of CBM for instructors and allows for a more comprehensive assessment of academic skills (VanDerHeyden et al., 2001).

Furthermore, curriculum-based measures, such as DIBELS, allow for the assessment of retained curriculum and generalization of learning. Scores can be compared across students or can be used to measure the learning of an individual student over time (Hintze & Silbergitt, 2005). Providing instructors with sensitive indicators of curriculum retention informs practice and reveals which teaching methods best meet students' learning needs. When teachers adapt their instruction to aid in successful learning, it has been shown that students demonstrate higher rates of achievement (Fuchs & Fuchs, 1986). The scores derived from CBM can also be used to accurately predict which students will struggle with curriculum (Hintze & Silbergitt, 2005).

Many practitioners believe early intervention is promising because it can prevent students from falling behind in their class, which often makes it harder for them to catch up. The possibility of reducing deficits when students are young is appealing and gives instructors a real sense of hope in the remediation of reading problems (VanDerHeyden et al., 2001).

### *Statement of the Problem*

As previously discussed, many children struggle with reading problems. There is a small window of opportunity to improve reading, therefore early identification is critical. It is important to know the risk factors related to reading difficulty in order to identify children early who might be in need of extra assistance. There is research indicating that poverty, birth order, and family size relate to reading achievement.



Pinpointing these risk factors allows educators to target those students in need of services. Curriculum-based measures can be used as screening tools to predict which elementary students will struggle with reading, as well as help to determine whether these factors relate to reading difficulty.

### *Purpose of the Study*

The purpose of this study is to explore the relation of family factors such as poverty, family size, and birth order and reading skills. Furthermore, the purpose is to examine CBM, specifically the DIBELS, to determine whether it is a good screening tool for assessing those at-risk for reading underachievement. And finally, the purpose is to examining specific types of reading instruction (i.e. phonics and phonemic awareness instruction) to determine whether they are related to reading success.

### *Research Questions*

The following research questions guided this study:

1. Is there a connection between poverty, family size, and birth order to academic difficulty, as indicated in the literature?
2. Are curriculum-based measures, specifically the DIBELS, effective in identifying and monitoring children at-risk for reading problems?
3. Are specific types of reading instruction, such as phonics and phonemic awareness instruction important for success in reading?

### *Definition of Terms*

The following seven terms required definition to ensure appropriate reader understanding.

*Birth order* – a child's position in the family constellation, the order a child was born into a family; ordinal position (Prochaska & Norcross, 2003).

*Curriculum-based measurement (CBM)* is a set of standardized procedures for collecting student data in the basic skill areas of reading, computation, mathematics, spelling, and written expression (Graney & Shinn, 2005).

*Grapheme* is the smallest part of written language that represents a phoneme in the spelling of a word (Armbruster, Lehr, & Osborn, 2003).

*No Child Left Behind Act* is legislation adopted in 2001 which claims to increase accountability in States, school districts, and schools. The Act also purports to offer parents and students more choices regarding their education, more flexibility for States in the use of Federal education money, and a stronger emphasis on reading (US Department of Education, 2002).

*Phoneme* is the smallest part of spoken language that makes a difference in the meaning of words (Armbruster, Lehr, & Osborn, 2003).

*Phonemic awareness* is the ability to hear, identify, and manipulate the individual sounds in spoken words (Armbruster, Lehr, & Osborn, 2003).

*Phonics* is the understanding that there is a predictable relationship between phonemes and graphemes (Armbruster, Lehr, & Osborn, 2003).

*Socioeconomic status (SES)* is a combination of economic and social factors including income, education, and occupation that describe an individual or family (Papalia, Olds, & Feldman, 2002).

#### *Assumptions and Limitations of the Study*

It was assumed that the articles cited provided mostly unbiased findings regarding poverty, family size, birth order, DIBELS, and other curriculum-based measures. Often it was assumed that reported research conclusions were significant enough to generalize to the typical school setting.

The goal of this literature review was to remain objective in reporting research literature findings; however, biases and human error must be taken into account. The researcher's own beliefs regarding poverty, family size, birth order, and CBM might have influenced the interpretation of literature and the presentation of information regarding risk-factors and the use of CBM in schools.

There was also an overabundance of CBM research, therefore it was the researcher's decision which articles to include in this review. Scholarly literature on the concepts of family size and birth order was minimal.

## Chapter II: Literature Review

This chapter will include a discussion examining potential risk factors such as poverty, family size, and birth order and how they relate to academic achievement. Curriculum-based measurement will be discussed in terms of its utility, psychometric properties, and effect on teacher instruction. The chapter will also cover specific types of reading instruction, such as phonemic awareness and phonics instruction, and their efficacy. Lastly, the chapter will include an overview of the curriculum-based measurement tool DIBELS.

### *Potential Risk Factors*

The acquisition of reading skills does not happen in isolation. It is a complex process which may be affected by different variables such as, environmental influences, within-child conditions, and the quality and type of instruction. In this section, poverty, family size, and birth order will be examined in their relation to the acquisition of reading skills.

### *Poverty*

Poverty is defined by the United States government by cash income using the federal poverty threshold as an indicator (McLoyd, 1998). Many studies have shown the effects of poverty lead to behavioral, emotional, and academic difficulties in children (Adams et al., 1998; Papalia, Olds, & Feldman, 2002). Children from poverty stricken families, on average, performed poorer on indicators of academic achievement such as course failure, grade retention, achievement test scores, and completed years of schooling. According to McLoyd (1998), meta-analyses suggested that family income

was the highest single correlate of academic achievement, among traditional indicators of socioeconomic status. Adams, Foorman, Lundberg, and Beeler (1998) suggested that proficient phonological awareness distinguishes economically disadvantaged preschoolers from more advantaged children.

The literature shows poverty is correlated with other factors: maternal education, parental IQ, and ethnicity (McClloyd, 1998). When examining the effects of poverty on academic skills, cognition, and general development, various studies have controlled for these factors and still have shown that poverty is indeed a major risk-factor for academic difficulties. Studies which controlled for maternal characteristics and behaviors, including, but not limited to, maternal education and maternal IQ, reported significant effects of poverty on children's cognitive and verbal skills (Korenman; Liaw & Brooks-Gunn; Smith; cited in McLoyd, 1998). Research from the Infant Health and Development Program, which accounted for family structure, ethnicity, and maternal education, suggested that family income and poverty status were predictors of IQ scores of five-year-olds (cited in McLoyd, 1998). Furthermore, when low birth rate and parental education are accounted for, it was found that there are still higher rates of retention for children living in poverty (Sherman, 1994; Zill, Moore, Smith, Stief, & Coiro, 1995). Research has consistently shown that poverty affects child development independent of other factors related to poverty and that family income is a powerful predictor academic achievement regardless of other factors (McLoyd, 1998).

Some literature suggests a negative correlation between the duration a child lives in poverty and their academic achievement. In other words, the longer a child lives in

poverty, the more difficulties he or she will have in school. Persistent poverty was found to be more detrimental to a child's IQ, school achievement, and socio-emotional functioning than transitory or infrequent episodes of poverty (McLoyd, 1998). McLoyd (1998) also reported that school achievement typically declines as the duration of poverty increases. The chance that a student will be retained increases by 2-3% for every year the child lives in poverty (Sherman, 1994; Zill et al., 1995).

Not only does the duration of poverty affect children, the age at which a child first experiences poverty also influences the child's academic difficulties. In a study by Duncan, it was found that poverty throughout the first five years of life was more detrimental to years of schooling completed than poverty in adolescence. An interpretation of the finding is that poverty at a young age inhibits school-readiness skills, which can set in motion a pattern of academic failure (cited in McLoyd, 1998).

Lower income families are subjected to situations, events, and cultural norms which differ from higher income families. Poverty is often related to other factors (i.e. parental stress, intense work hours, limited educational enrichment, environmental and neighborhood dangers) which can explain its effect on reading achievement.

Parental emotional distress, common with poverty, impacts a child's development behaviorally, emotionally, and academically (Papalia, Olds, & Feldman, 2002). Papalia, Olds, and Feldman (2002) contend that when resources are low, parenting practices can suffer, which can create a poor home environment. According to McLoyd (1998), children living in poverty had lower self-worth and increased behavior problems, which

may be attributed to the exposure to chronic family stressors such as overcrowding within the home, maternal depression, and parental conflict.

Beyond parental stress, poverty also is related to diminished family time. White (2004) reported that poor parents often work long hours, making them less able to provide their children with assistance in homework and less time to read stories with their children than wealthier families. Furthermore, a family experiencing economic hardship likely has less time to monitor their child's academic performance, which can relate to struggles with reading.

Not only do families living in poverty have less time, they also have fewer educational resources beneficial to children's development and academic achievement (White, 2004). Families with low socioeconomic status typically have less access to educational books and toys, as well as high quality childcare (Hargrave, 2000). Poor families have less money to provide their children with after-school activities that foster intellectual stimulation such as dance classes, music lessons, summer camps, and sports (White, 2004). They are also less able to access information regarding their child's health, including immunizations and nutrition.

Children living in poverty are not only disadvantaged in terms of family factors, they also experience disadvantages within their neighborhood environment and culture. When controlling for family resources, the resources of a neighborhood influenced a child's academic growth (Entwisle, Alexander, & Olson, cited in McLoyd, 1998). McLoyd (1998) stated that individuals who live in high-poverty communities are disadvantaged by lack of jobs, public schools with numerous resources, and access to

quality private services. Chronic stressors that influence poor children's development often include poor housing conditions such as overcrowding and poor and dangerous neighborhoods (McLoyd, 1998). These individuals are also exposed to life-threatening environmental stressors such as violence, drugs, homelessness, and negative role models.

Poverty can influence children by giving them a diminished view of their potential to attain academic success. McLoyd (1998) and Hargrave (2000) both concluded that poverty influences a child's ability to learn to read well and generally succeed in school. Children living in poor families often have less motivation and lowered expectations regarding their own abilities (White, 2004). Teachers often share lowered expectations, resulting in stifled academic enrichment (McLoyd, 1998). Furthermore, these students often have no expectation of receiving financial support for college. McLanahan and Sandefur determined that children who do not expect to ever go to college often do not work as hard in high school (cited in White, 2004).

### *Summary*

Studies have shown the effects of poverty lead to behavioral, emotional, and academic difficulties in children (Adams et al., 1998; Papalia, Olds, & Feldman, 2002). Research shows that poverty status is a strong predictor of academic difficulties, even when other factors such as maternal and paternal education and IQ, ethnicity, and family resources are controlled for (McLoyd, 1998). There are various explanations for why poverty relates to low reading achievement; these explanations include fewer resources, chronic stressors, and low motivation (McLoyd, 1998; White, 2004). Therefore, it is essential to examine poverty as a potential risk factor in the acquisition of reading skills.



### *Birth Order and Family Size*

A second risk-factor to poor reading achievement is birth order and family size.

The following section outlines historical research on birth order and family size and also examines what contemporary research shows about the effect on academic achievement, intelligence, and language development.

According to Prochaska and Norcross (2003), theorist Alfred Adler believed that a child's position in the family constellation was very important. Adler was one of the first psychologists to research birth order (cited in Klas, 2002) and he proposed that birth order could predict the lifestyle an individual would choose in adulthood. The oldest child, or firstborn, had the inevitable experience of being dethroned by a younger sibling. Adler concluded that firstborns often enjoy thinking back on the past when there was no rival; therefore, they are more likely to choose a more conservative style of life. A middle child would be more likely to choose an ambitious lifestyle, while the youngest child would be most likely to live like a prince or princess since they always had older siblings who served as peacemakers (Prochaska & Norcross, 2003).

According to Klas (2002), Alfred Adler believed that if the family environment allowed it, a child could take on another sibling's birth order position. In the case of a disability, for example, Adler believed a younger child could adopt the firstborn's characteristics if the firstborn had a disability. Influences such as the social and economic position of the family and the attitudes of parents also played a part in shaping birth order characteristics. Adler also contended that if more than three years separated siblings, a

subgroup would form and have a significant impact on birth order influences (cited in Klas, 2002).

In 1874, Francis Galton published *English Men of Science: Their Nature and Nurture* which continued the debate concerning intelligence and its relation to birth order (cited in Esping, 2003). Galton collected birth order information on 99 men from various scientific fields. Forty-eight percent of these eminent men were considered firstborn, leading him to believe that firstborns were typically more successful than laterborns. Importantly, Galton did not include any female children in his count for birth order, therefore a subject could have been considered firstborn even if he was the fifth child, as long as the older four siblings were female (cited in Esping, 2003).

Countless studies since have supported Galton's conclusions. Firstborns have been overrepresented among prominent psychologists (Terry, cited in Esping, 2003), classical music composers (Schubert; Wagner & Schubert, cited in Esping, 2003), and Nobel Peace Prize recipients (Clark & Rice, cited in Esping, 2003). Laterborn children have been reported to be more creative than their firstborn siblings and more likely to become revolutionary leaders and scientists (Sullyoway; Simonton; cited in Esping, 2003). Interestingly, cross-sectional studies have historically supported the notion that the higher the birth order, the lower the intelligence quotient (IQ), whereas longitudinal studies often reveal no relationship between intelligence and birth order (Rodgers et al., 2000; Berbaum & Moreland; Retherford & Sewell; Rodgers et al.; Schooler; cited in Esping, 2003).

Although birth order and intelligence seem to be related, it has not been determined whether the relationship is direct or indirect. According to Rodgers et al. (2006), birth order does not directly decrease the intelligence of laterborn children. Previous research that claimed there was a direct relationship between intelligence and birth order often mistook across-family effects, such as family size which is an across-family measure, for within-family effects, such as birth order which is a within-family measure (Rodgers et al., 2000). Therefore, birth order may indirectly relate to academic success or difficulty. There are various explanations.

According to Francis Galton, firstborn sons are more likely to gain financial resources; consequently they have a greater ability to continue their education, therefore raising IQ scores (cited in Esping, 2003). Another explanation reported by Galton is that firstborns are often more eminent because they are more likely to be treated as companions by parents, which often instills responsibility in children. Also, firstborn children frequently gain more attention and nourishment in families with limited resources than their younger siblings (cited in Esping, 2003).

Modern explanations include the Resource Dilution Model and The Confluence Model (Esping, 2003). The Resource Dilution Model assumes that firstborns have the luxury of accessing 100% of their parents' resources until their siblings arrive. When families grow, the financial resources are divided accordingly, reducing the parental resources received by any one child (Esping, 2003). The Confluence Model attributes a changing intellectual environment within the family as the correlation between birth order and IQ. Firstborns do not have to share the attention of their parents and are

typically exposed to more adult language. Esping (2003) also reported that the linguistic environment often becomes less mature as more children are introduced to the family. Furthermore, firstborns often assist parents in teaching and raising laterborn children. Teaching has been known to increase verbal abilities and helps firstborns cognitively process information (Esping, 2003). Factors such as socioeconomic status and parental IQ may also be responsible for the link between birth order and IQ (Esping, 2003).

Birth order and family size are interrelated concepts. As birth order increases, so does family size. A study using scores from the Raven Progressive Matrices, a tool designed to measure an individual's ability to form perceptual relations and to reason by analogy, determined that firstborns not only scored higher than laterborns, but there was also a slight gradient of declining scores with rising birth order. It was reported that overall, as family size increased, Raven scores decreased within any birth order position (cited in Esping, 2003). This reveals that academic success is not only impacted by birth order, family size is also a factor. A classic study by Belmont and Marolla, revealed that children from larger families obtained lower scores on measures of intelligence as well as educational measures, even when measures of social class were controlled (cited in Esping, 2003).

Although there is research which shows that increased family size is related to lower achievement, other research indicates that increased family size has no affect on achievement. According to Rodgers et al. (2000), the National Longitudinal Study of Youth determined that large family size does not necessarily result in children with lower IQ. The study examined a large national sample of families for 22 years. Children's

academic performance was reviewed several times throughout each year. It was determined that many of the links between birth order/family size and intelligence might be due to mistakenly using across-family effects rather than within-family effects. It was concluded and stated by the authors that it is simply wrong to believe that birth order acts directly to decrease the intelligence of laterborn children. The study suggests that parental IQ, family environment, and genetic heritage likely contribute to the relationship between family size and IQ (Rodgers et al., 2000).

The possibility that parents with lower IQ tend to have more children than parents with higher IQ has been discussed; however that would suggest that the mean IQ score for the population would be declining over time, when in fact, IQ scores have been rising (Esping, 2003). Despite various explanations, the trend for larger families to bear children with lower IQ seems to remain consistent regardless of the research approach (Rodgers et al., 2000).

### *Summary*

The debate regarding birth order and family size and their relation to development, achievement, and intelligence has a long history. According to Esping (2003), firstborns have been overrepresented among prominent individuals in many occupational areas. Further, Rodgers et al. (2000) reported the trend for larger families to bear children with lower IQ remains consistent. Various explanations may help to explain this link: children from smaller families may have more financial and emotional resources, children from smaller families have a more sophisticated linguistic environment, and parents with lower IQ may have more children (Esping, 2003).

Nevertheless, the studies reveal that directly or indirectly, birth order and family size can be indicators of academic achievement in children.

### *Curriculum-Based Measurement*

As previously discussed, curriculum-based measurement (CBM) is a tool which can be used to directly measure student competency and progress in basic skills areas in education. Defining features of curriculum-based measures include the focus on direct, repeated measurement of student skills, as well as the capability of determining student performance based on curriculum taught in the classroom. Often, curriculum-based measures are in the form of probes that can be used to quickly and efficiently assess and monitor student progress (VanDerHeyden et al., 2001).

### *Utility of Curriculum-Based Measures*

Curriculum-based measurement (CBM) began as a tool used by special education teachers to monitor the progress of their students (Deno, 2003). It was used primarily to test the effectiveness of special education interventions. The data collected was used by special education teachers to evaluate and modify their instruction in an effort to improve their overall effectiveness with students who received special education. As CBM got more popular, criteria were established that made it possible to measure technical adequacy, treatment validity, and the viability of educational programs (Deno, 2003).

Currently CBM is used to assess the growth of students' skills and to effectively gather data to support educational decisions including screening, pre-referral evaluation, placement in special education programs, and formative evaluation. CBM is often used as part of the referral process for students in potential need of special education services

(Deno, 2003). Many schools use teachers as the main referral source for special education, relying on them to be the best judge of student performance. By using CBM as part of the pre-referral and referral process, the practice of referring has become more objective and measurable (Deno, 2003).

More recently, CBM data has been used to predict success on high-stakes testing and to measure growth in areas of secondary school programs (Deno, 2003). Hintze and Silberglitt (2005) conducted research looking at the diagnostic accuracy and predictive validity of reading curriculum-based measures (R-CBM) and high-stakes testing. The Minnesota Comprehensive Assessment (MCA) was chosen to represent high-stakes testing in this study. The predictive validity of R-CBM to MCA was significant at all time periods and for all grade levels. The results of this study suggest that R-CBM does have strong validity in predicting high-stakes testing performance. An R-CBM benchmark was also established and led to the ability to predict who would pass the MCA. The findings support the use of R-CBM to predict success in global measures of reading, such as the MCA. The researchers concluded that R-CBM was a proficient method of predicting which students were likely to pass reading portions of high-stakes testing. Furthermore, R-CBM was found to be a successful screener to alert instructors of students at-risk of failing high-stakes tests, which could directly influence intervention and instruction (Hintze & Silberglitt, 2005).

#### *Psychometric Properties of Curriculum-Based Measurement*

As the previously discussed study shows, the reliability and validity of curriculum-based measures have been established through standardized observational

procedures (Deno, 2003). This is rare of most informal measures of performance, which make the concepts of reliability and validity hallmarks of CBM. According to Deno (2003), curriculum-based measures are not only easy to teach, score, and administer, they are also time efficient and can use instructional materials obtained directly from the school. Since curriculum-based measures are standardized, they can be used to compare individual performance to that of a group (Deno, 2003).

VanDerHeyden et al. (2001) cautioned that the value of curriculum-based measures relies on the adequacy of their technical properties, as well as the educational and social consequences they have for students. Curriculum-based measures are not free from error; therefore it may also be helpful for practitioners to work further with students identified by parents and teachers as needing intervention, rather than just those students identified with CBM probes (VanDerHeyden et al., 2001).

#### *Curriculum-Based Measurement's Effect on Teacher Instruction*

Some researchers have examined the impact of using CBM on the instruction of teachers. The majority of prior research done in this subject area has been in special education settings; therefore, research on R-CBM in general education is limited. Graney and Shinn (2005) examined the effects of R-CBM and teacher feedback in the general education classroom. The findings of their study failed to support the hypothesis that general education teachers who got feedback on their students' reading progress would increase the achievement of their students.

There are multiple ways to explain the above results. According to Graney and Shinn (2005), a possible explanation for this finding was that teachers who received



positive feedback regarding their students' reading progress subsequently "relaxed" their instruction. It was also hypothesized that teachers who received negative feedback about their students' reading progress subsequently "gave up" on those students. Graney and Shinn (2005) also proposed that the lack of progress made by some of the students led the teachers to believe the problem was more serious than they could accommodate.

Another explanation given the lack of research done on R-CBM in general education classrooms is that general education teachers are not in the habit of changing their instruction to accommodate the progress of certain students. Graney and Shinn (2005) found evidence to suggest that teachers need substantial ongoing support to enable them to modify instruction; this might be especially true for general education teachers.

### *Summary*

Although CBM began as a tool used primarily by special education teachers, currently curriculum-based measures are used by many personnel in the school setting. The use of CBM is increasing as a tool for identifying students in need of remedial reading instruction, assessing academic achievement, and monitoring academic progress. CBM has often replaced teacher reporting in the pre-referral process for special education, making the practice of referring more objective (Deno, 2003). Curriculum-based measures can also be a useful way for general education teachers to track the progress of their students. However, for various reasons, general education teachers are not as receptive to data obtained using CBM as special education teachers (Graney & Shinn, 2005).

Although many studies support the predictive validity of CBM (Deno, 2003; Graney & Shinn, 2005; Hintze & Silbergitt, 2005; VanDerHeyden et al., 2001;), VanDerHeyden et al. (2001) note that curriculum-based measures are not errorless; therefore it is beneficial for practitioners to also work with students identified by teachers and parents as needing intervention.

### *Reading Instruction*

The National Reading Panel conducted scientifically based research which indicated that both phonemic awareness instruction and phonics instruction are critical in the acquisition of reading skills (National Reading Panel, 2004). This section will discuss each type of instruction, as well specific measures of phonemic awareness skills, specifically the Dynamic Indicators of Basic Early Literacy Skills (DIBELS).

#### *Phonemic Awareness Instruction*

Phonemic awareness refers to the ability to hear, identify, and manipulate the individual sounds in spoken words (Armbruster, Lehr, & Osborn, 2003). Phonemic awareness instruction involves teaching students how to treat speech as an object and shift focus away from the content of speech to the form of speech. It also involves teaching students how to analyze and manipulate the components of speech (Yop, 1992). According to the National Reading Panel, phonemic awareness instruction improved children's ability to read words and comprehend reading passages. All children, even those at different reading levels benefited from phonemic awareness instruction (Armbruster, Lehr, & Osborn, 2003).

The Reading Panel published recommendations based on their results. One suggestion was for students to be screened on their level of sophistication for phonemic awareness. For those where this skill is strong, less time can be spent going through phonemic awareness instruction (Armbruster, Lehr, & Osborn, 2003). Children who need more instruction in phonemic awareness might benefit from starting with simpler types of phoneme manipulation (Armbruster, Lehr, & Osborn, 2003). The Reading Panel also recommended that phonemic awareness instruction be conducted in small groups of students, rather than individually or to the whole classroom (Armbruster, Lehr, & Osborn, 2003). This is beneficial because children can learn from hearing each other use and manipulate phonemes and can hear one another respond and get feedback from the teacher. It should also be noted that phonemic awareness instruction should not be considered a complete reading program, but rather a beginning or remedial reading program that is a part of other literacy curriculum (Armbruster, Lehr, & Osborn, 2003).

### *Phonics Instruction*

In the world of education, there has been a debate regarding the teaching of phonics. According to Armbruster, Lehr, and Osborn (2003), it is critical that children learn to recognize the predictable relationships between letters and spoken words, called phonics. Understanding the relationships that exist between letters, sounds, and words allows children to automatically and accurately decode new words. They also contended that phonics instruction teaches children a system of how to read and recognize new words (Armbruster, Lehr, & Osborn, 2003). Critics argue that English spellings do not have enough consistencies for phonics instruction to aid in successful reading; however,

the National Reading Panel found data to support phonics instruction (Armbruster, Lehr, & Osborn, 2003). Armbruster, Lehr, and Osborn (2003) contended that the alphabetic system can be used as a mnemonic tool that aids the memory in reading specific words.

The National Reading Panel also indicated that systematic and explicit phonics instruction is most beneficial when introduced early (Armbruster, Lehr, & Osborn, 2003). Systematic instruction indicates some type of plan regarding the instruction. Explicit instruction means the phonics instruction was be fully and clearly demonstrated. Both types of phonics instruction have been significantly more effective than no phonics instruction, especially in helping prevent reading difficulties for groups of children at-risk of developing reading problems. Furthermore, systematic phonics instruction was effective for children from all socioeconomic backgrounds (Armbruster, Lehr, & Osborn, 2003).

The Report of the National Reading Panel (2004), indicated phonics instruction significantly improved word reading skills for children of low socioeconomic status (SES). Teaching less focused on phonics was proven less efficient. Phonics instruction is most effective when a student has developed phonemic awareness, which is the ability to understand that the sounds of spoken language work together to create words (Armbruster, Lehr, & Osborn, 2003).

### *Summary*

According to the National Reading Panel (2004), phonemic awareness and phonics instruction are important in the process of learning to read. Phonemic awareness instruction improves children's ability to read words and comprehend reading passages,

and children at different reading levels benefit from phonemic awareness instruction (Armbruster, Lehr, & Osborn, 2003). The National Reading Panel (2004) indicated that phonics instruction significantly improved word reading skills for children of low socioeconomic status. Instruction less focused on phonics was less effective. Therefore, these two types of instruction may be beneficial in improving the reading skills for all children.

### *DIBELS*

Literature has demonstrated a link between phonological awareness and successful reading outcomes; therefore, a series of probes that measure phonemic awareness fluency were developed (VanDerHeyden et al., 2001). Dynamic Indicators of Basic Early Literacy Skills (DIBELS), a form of curriculum-based measurement (CBM), is a set of individually administered standardized measures that relate to early literacy development (WSPA conference, October 28, 2005).

DIBELS probes have been shown to differentiate less skilled students from more skilled students. Currently more than 40 states use DIBELS to screen K-3 students for potential reading problems and to monitor their progress (Manzo, 2005). Officials have used the scores to inform instruction, identify children at-risk of failure in reading, and to hold schools accountable for student underachievement and achievement.

VanDerHeyden et al. (2001) used DIBELS to identify reading skill deficits in kindergartners. The goal of the study was to construct a series of CBM probes that could be administered to kindergartner students to identify children in need of intervention or further assessment. The findings coincided with other studies that have demonstrated the

adequacy of CBM probes for elementary students in general and special education (VanDerHeyden et al., 2001).

The data collected by VanDerHeyden et al. (2001) indicated that the probes were reliably scored in a short amount of time and that teachers found them to be acceptable. For the study, it was beneficial to use probe measures that could be conducted in the classroom, the child's natural school setting, allowing for a more complete assessment of academic performance (VanDerHeyden et al., 2001). Using CBM may enhance the identification of students at-risk for failure in reading.

Although many teachers, administrators, and researchers have praised DIBELS for their reliability in predicting student reading success, many critics argue that teachers are teaching to the tests. However, as discussed in the previous section, phonemic awareness and phonemic awareness fluency are purportedly cornerstones for developing successful reading skills (Armbruster, Lehr, & Osborn, 2003); therefore it seems that teaching to tests such as DIBELS would actually be helping students learn to read.

Others believe that DIBELS is over-promoted by the federal proponents of the *Reading First* program (The National Reading Panel, 2004). The *Reading First* program focuses on putting research based methods of reading instruction into the classroom. States and districts receive funding from the government to implement the program within their schools. The goal of the program is to ensure that all students have the ability to read by the end of 3<sup>rd</sup> grade (US Department of Education).

Another main criticism is that DIBELS only measures how fast children can read, rather than if they are reading with any comprehension (Manzo, 2005). Word recognition

and fluency are basic steps of reading; therefore reading comprehension is tied to phonics and phonemic awareness. The ability of students to recognize and understand the meaning of words is essential to later reading comprehension (Armbruster, Lehr, & Osborn, 2003). To further assist in reading comprehension, Armbruster, Lehr, and Osborn (2003) recommend implementing text comprehension strategies once the building blocks of phonics and phonemic awareness fluency have been established.

### *Summary*

The DIBELS, a curriculum-based measure, assesses students' knowledge of phonics and phonemic awareness. The DIBELS can be helpful in monitoring students' reading skills and alert the need for early intervention, when necessary (VanDerHeyden et al., 2001). As a result, more children can receive assistance, if needed, and are more likely to learn to read successfully. Critics argue that DIBELS encourages teaching to the test, but according to Armbruster, Lehr, and Osborn (2003), DIBELS measures phonemic awareness and phonetic knowledge, therefore teaching to the test is actually teaching students to read.

### Chapter III: Summary and Implications

#### *Summary of Main Findings*

The purpose of this study is to explore the relation of family factors such as poverty, family size, and birth order and reading skills. Furthermore, the purpose is to examine CBM, specifically the DIBELS, to determine whether it is a good screening tool for assessing those at-risk for reading underachievement. And finally, the purpose is to examining specific types of reading instruction (i.e. phonics and phonemic awareness instruction) to determine whether they are related to reading success.

Research question 1: Is there a connection between poverty, family size, and birth order to academic difficulty, as indicated in the literature? Research supports the link between poverty, family size, birth order, and reading achievement. Poverty, as a potential risk factor, seemed to illicit the most research (Adams, Foorman, Lundberg, & Beeler, 1998; Hargrave, 2000; McLoyd, 1998; Papalia, Olds, & Feldman, 2002; Sherman, 1994; White, 2004; Zill, Moore, Smith, Stief, & Coiro, 1995). It was concluded by McLoyd (1998) that children who lived in poverty performed poorer on indicators of academic achievement. Hargrave (2000) stated that children from poor families were less likely than other children to learn to read well. The research indicates that the duration of poverty and the age at which a child first experiences poverty can have detrimental affects on academic achievement. Persistent poverty was found to more disadvantageous than transitory poverty (McLoyd, 1998), and Duncan (cited in McLoyd, 1998) determined that poverty throughout the first five years of life was more harmful than poverty in adolescence, in terms of years of schooling. Individuals who reside in



impoverished families were reported to experience several other factors which also affect achievement: parental stress (McLoyd, 1998), diminished family time (White, 2004), fewer resources for health and childcare (Hargrave, 2000), fewer resources for enrichment activities (White, 2004), and environmental stressors such as violence and drugs (McLoyd, 1998).

Family size and birth order have also been linked to intelligence and academic performance. A study cited by Esping (2003) found that children from larger families obtained lower scores on measures of intelligence and that the linguistic environment became less mature as more children joined the family, therefore indicating that firstborns often were more mature and had a greater opportunity to achieve academic success. Esping (2003) reported that socioeconomic status and parental IQ might be responsible for the connection between birth order and intelligence. Esping (2003) also reported that cross-sectional studies often supported that the higher the birth order, the lower IQ scores, but that longitudinal studies, conversely, often found no relationship between intelligence and birth order. Cross-family rather than within-family effects were often considered in studies and may have mistakenly contributed to the idea that there was a direct relationship between family size, birth order, and IQ (Rodgers et al., 2000). Furthermore, there are many factors that make the concept of birth order complex. Blended families, spacing of siblings, multiple births, adoptions, and sibling deaths all influence birth order and can lead to characteristics within an individual (Klas, 2002).

Research question 2: Are curriculum-based measures, specifically the DIBELS, effective in identifying and monitoring children at-risk for reading problems? An

examination of curriculum-based measures shows they have good reliability and validity and have been shown to effectively screen students for reading problems, as well as assess their progress (Deno, 2003). VanDerHeyden et al. (2001) proposed that curriculum-based measures, such as the DIBELS, can enhance the identification of students at-risk for reading difficulty. Many states use DIBELS to screen and monitor the progress of students, and teachers have reported that the measures are easy to use and benefit their instruction (Manzo, 2005).

Research question 3: Are specific types of reading instruction, such as phonics and phonemic awareness instruction, important for success in reading? Phonemic awareness and phonics instruction were both found to be essential components of successful reading (Arbruster, Lehr, & Osborn, 2003). The research indicated that phonemic awareness and phonics instruction can be helpful for every child, especially those considered at-risk of reading failure. All children, even those at different reading levels, benefited from phonemic awareness instruction (Armbruster, Lehr, & Osborn, 2003). The Report of the National Reading Panel (2004) cited that phonics instruction significantly improved word reading skills for children of low socioeconomic status.

#### *Implications for Practice*

The National Reading Panel (2004) determined that early intervention is critical in the remediation of reading problems. Therefore, poverty, family size, and birth order can be useful indicators of which students may be at-risk to develop reading problems. Screening students who show risk-factors could be helpful in determining what children are in need of intervention. All children are certainly monitored for reading achievement

and underachievement, yet focusing screening efforts on children will offer efficiency and ensure schools are serving those who are most at-risk.

Although focusing on children who show risk-factors for poor achievement will allow for efficient screening, caution needs to be used with this approach. Considering the controversy over whether poverty, family size, and birth order influence academic achievement, educators need to be cautious in assuming that the purported risk factors are directly linked to reading difficulty. Poverty can undoubtedly influence a child's life; however, it remains uncertain as to whether it is poverty itself that leads to reading failure or the situations many impoverished families encounter. Societal perceptions of poverty could also have an influence on reading performance. Lower teacher expectations could contribute to the "self fulfilling prophecies" of many poor children. The aforementioned factors could be useful indicators of at-risk students; however, educational decisions should not be based solely on these factors.

DIBELS, a form of curriculum-based measurement, has been shown to differentiate less skilled students from more skilled students (Manzo, 2005). DIBELS specifically measures phonological awareness and phonics skills and can therefore be a critical tool to screen and monitor reading failure and progress. Currently more than 40 states use DIBELS to screen K-3 students for potential reading problems and to monitor their progress (Manzo, 2005). More schools could have their teachers and other school personnel trained in the DIBELS to target those students at-risk for poor reading achievement.

Even though the DIBELS appears to be a good screening tool for identifying those with low achievement in reading, according to Manzo (2005), critics of curriculum-based measures claim that teachers often “teach to the test” and that DIBELS has been over-promoted by the federal government. There is also debate regarding whether or not children are learning to read faster and also comprehending what they read (Manzo, 2005).

### *Implications for Future Research*

Future research should further assess the link between poverty, family size, birth order, and reading difficulty. A comprehensive analysis of the factors related to poverty would be helpful in determining what aspects of poverty may directly contribute to academic achievement. Research examining how and why family size often relates to poverty would be beneficial in determining if family size alone contributes to reading failure.

Birth order and family size research seems to be somewhat biased and outdated. The current research does not seem to indicate a strong conclusion about how birth order and family size affects reading achievement. Therefore, correlational research determining a connection between birth order/family size and achievement would be useful to truly understand whether these are risk-factors for underachievement. Furthermore, families have changed considerably over the last 50 years. A modern approach to understanding the influences of birth order and the complexities of the common blended family is recommended.

Additional research should focus on the implementation of DIBELS and other curriculum-based measures to further assess their adequacy and usefulness in screening and monitoring students. Studying the feasibility of this instrument for the use in schools by teachers needs be examined. Interviews could be conducted with educators to better understand the strengths and limitations curriculum-based measures have in the school setting.

### *Conclusion*

Research supports the correlation between poverty, birth order, and family size to reading difficulties and strongly promotes early intervention services. A curriculum-based measurement tool that focuses on phonological awareness and phonics, such as the DIBELS, can be useful in targeting students at-risk of reading failure. Additional research should focus on assessing the adequacy of curriculum-based measures in the school setting.

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