Use of the Bracken Basic Concept Scale-3: Receptive as a Screener of Preschool-Age Learning Risk Factors

DISSERTATION

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By

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Abstract

In today’s educational culture, children begin formal schooling with the expectation that they are ready to be active literacy and mathematics learners. Because such demands are being made earlier than ever before, it is critical that children who have potential learning problems be identified as soon as possible and be provided with interventions that could increase the likelihood of their acquiring needed foundational skills and experiencing future academic success. Years of research studies have provided substantial evidence of a relationship between early receptive language delays and later academic difficulties, thereby, providing a means of identifying young children exhibiting learning risk factors. The purpose of this non-experimental, exploratory study was to investigate the relationship between the BBCS-3: R, a receptive language measure, and the KABC-II, a cognitive and processing measure, in order to determine whether the BBCS-3: R can be used as a screener to identify children exhibiting potential learning risk factors. Results of Chi-square test analyses found significant relationships between the BBCS-3: R composite scores, the SRC and TC, and each scale of the KABC-II administered at the preschool level. Additional analyses examining relationships between the BBCS-3: R composite scores and the KABC-II global score, the MPI, also found significant relationships between the scores. These preliminary results suggest that the BBCS-3: R has the potential to be used as a screener to identify young children exhibiting risk factors associated with learning disabilities thereby providing school psychologists and other
educational professionals with a means of identifying children who would benefit from targeted interventions and early, differentiated instruction.
Dedication

This study is dedicated to my husband whose support and encouragement guided me throughout the process and to my parents who inspired me to remain strong regardless of challenges I faced.
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Chapter 1: Introduction

During the 2006-2007 school year, 13.6 million children ages 3 through 21 years of age received special education services, and of those, 5.4 million received services under the category of specific learning disabilities (Snyder, Dillow, & Hoffman, 2009). More children are served under this category than any other disability category, a trend which began in the early 1980’s. According to the Individuals with Disabilities Education Act, children qualify under this category when they do not make adequate progress in specific reading and math skills as well as in written expression, listening comprehension, and oral expression despite receiving adequate instruction. This definition excludes from consideration children whose difficulties relate to visual, hearing or motor disabilities; mental retardation; emotional disturbance; limited English proficiency; or economic disadvantage (U.S. Department of Education, 2010). The different types of learning disabilities encompassed under this category often co-occur with each other as well as with social skill deficits and emotional or behavioral problems (Lyon, 1996). As a result, in order to achieve success in school as well as meet demands of everyday life in the home and community, it is critical that children who are exhibiting signs of learning disabilities be identified as early as possible. Such identification allows for the implementation of specialized interventions that may improve learning outcomes and enhance life skills; however, because risk factors associated with learning disabilities are
frequently based on children’s acquisition of academic skills and become more evident as children are introduced to increasingly demanding curriculum, identification often does not take place until the mid-elementary years and only after children have already experienced several years of academic failure. In the meantime, children lose academic ground which results in their functioning grade levels below their peers and experiencing secondary problems such as frustration and anxiety which further exacerbate their academic difficulties.

Because early identification of risk factors associated with learning disabilities enables children to receive supports that can improve their future outcomes both in and out of school, it would be ideal to identify these factors in children before they begin formal schooling; however, attempting to do so is often complicated by the nature of young children’s development. During the preschool years, young children’s development is characterized by broad variability in rates and patterns of maturation. Effective identification needs to distinguish differences in ability that are temporary, resolving themselves during the normal course of development, from those differences that persist, requiring structured interventions in order to alleviate problems children are experiencing (Garland & Strosnider, 2007). Because a lack of clear distinction exists between children whose problems may persist and those who will make adequate progress with time, the challenge for school psychologists is to find methods that effectively and efficiently identify young children in need of enhanced learning opportunities and intervention services without unnecessarily labeling other children as having a disability, particularly those who have not been provided quality learning
opportunities. This requires an understanding of specific factors associated with the need for referral and timely implementation of early intervention services in order to mitigate the negative effects associated with these factors and enhance academic outcomes for all children (Mann, McCartney, & Park, 2007).

Researchers have examined the relationship between a number of risk factors and subsequent academic difficulties. Extensive research has been conducted on biological and environmental factors and more recently on specific characteristics found in young children, including their acquisition of specific skill sets that establish the foundation for their transition to formal schooling. These skill sets are comprised of pre-academic, pre-literacy, fine motor, and language skills. Of these skill sets, deficits in language have been found to be most strongly associated with later academic problems. Although language impairments are often considered under the broad category of specific language impairments (SLI), Bishop (2006) contends that SLI is a designation for a set of developmental disorders that involve some type of language pathology and are distinguished by specific speech/language markers. The first of these is typical SLI, which is characterized by problems with grammatical development and may be accompanied by difficulties in perceiving oral language at the rate at which it is normally produced. SLI is often referred to as developmental language disorder or developmental dysphasia. The second type is developmental verbal dyspraxia, which involves difficulties with speech production, and the third category is pragmatic language impairment, which involves difficulties in using language appropriately in a given context. Finally, the fourth type is the receptive language disorder which is characterized
as severe problems with understanding language. Despite the identification of these markers, children with language impairments are often categorized by more general categories such as having deficits in receptive language, expressive language, speech or articulation, or dysfluency.

Regardless of the manner in which language impairments are classified, researchers have found that children identified with speech or language impairments at a young age are at increased risk of future academic difficulties as well as continued speech and language problems. Johnson et al. (1999) found that children with early language impairments presented with long-term deficits in language, cognitive, and academic domains when compared to peers without early language difficulties. In addition, these researchers found that better long-term outcomes were associated with early speech problems than with early language problems. Other studies have found relationships between early language skills and later reading problems. In examining the literacy development of children identified with early speech and language impairments, Bishop and Adams (1990) found that children whose language delays persisted beyond the age of five were more likely to demonstrate reading problems, particularly in the areas of reading comprehension, and Beitchman, Wilson, Brownlie, Walters, and Lancee (1996) found that early childhood language competence, particularly in the understanding of language, was associated with late childhood linguistic, cognitive, and academic outcomes. Similarly Lewis, Freebairn, and Taylor (2000) found that children with histories of preschool language disorders were at high risk for later reading, spelling, and language problems which were compounded when children had preschool syntactic and
semantic impairments in addition to phonological impairments. These studies as well as others have found that when children experience difficulties in the acquisition of language skills during the preschool years, they are likely to be at-risk for later academic problems and subsequent placement in special education programs. As a result, assessing young children for potential language delays facilitates the early identification of children exhibiting learning risk factors and the implementation of interventions that provide a foundation for later learning. It also increases children’s opportunities for experiencing academic success and reduces the manifestation of secondary problems.

Because comprehensive assessments can be time consuming to administer and score and are not designed for use with large groups of children, the most effective, efficient, and low cost method of evaluating children’s language development is through screening; however, in order for screening to effectively distinguish children who could benefit from implementation of interventions from those who do not require some type of follow-up, the screening instrument must demonstrate criterion-related validity with assessments already proven to identify characteristics associated with learning disabilities. Although a number of preschool language instruments are available, their usefulness in screening for potential learning risk factors has not been explored. Reasons for this include controversy regarding whether early identification of risk factors associated with learning disabilities is possible as well as the limited number of reliable and valid assessments that can be used for this purpose with young children (Steele, 2004). Because research has established a relationship between early language skill acquisition and later learning problems, additional research needs to be conducted in
order to identify instruments that can reliably identify children who are at-risk and who could benefit from interventions or more comprehensive assessment of their skills.

One instrument that has been used with the preschool population is the Bracken Basic Concept Scale-3: Receptive (BBCS-3: R). The BBCS: 3-R is a receptive measure of children’s comprehension of basic educational concepts in ten categories including Colors, Letters, Numbers/Counting, Sizes/Comparisons, Shapes, Direction/Position, Self-/Social Awareness, Texture/Material, Quantity, and Time/Sequence. The first five subtests comprise the Receptive School Readiness Composite (Receptive SRC) whereas the additional five subtests in addition to the Receptive SRC subtests comprise the Receptive Total Composite (Receptive TC). Although the first two versions of the Bracken emphasized the instruments’ utility as a cognitive and school readiness screener, the third version emphasizes its ability to assess school readiness skills as well as identify children with language impairments (Bracken, 2006). As a measure of receptive language, this instrument serves as a screener of early language risk factors and as such, may also have the potential to identify early risk factors associated with learning disabilities; however, studies have not been conducted examining its potential use for this purpose.

In order to determine its potential for identifying children demonstrating risk factors associated with learning disabilities, the BBCS-3: R would need to be validated for such use by comparing it to a measure that has been proven effective in identifying processing deficits associated with learning problems in young children. This study seeks to accomplish this by examining the relationship between children’s performances on the
BBCS-3: R and the Kaufman Assessment Battery for Children-Second Edition (KABC-II). The KABC-II is the second edition of a measure of processing and cognitive abilities of children and adolescents, originally based on Luria’s sequential-simultaneous processing and cerebral specialization theory (Luria, 1970). According to Luria’s theory, there are three main blocks that represent the brain’s basic functions, including (a) Block 1, which is responsible for arousal and attention and corresponds to the reticular activating system; (b) Block 2, which uses an individual’s senses to analyze, code, and store information and corresponds to the occipital, parietal, and temporal lobes as well as the Rolandic fissure; and (c) Block 3, which involves the application of executive functioning for formulating plans and programming behavior and corresponds to the anterior portion of the frontal lobe (Kaufman, Lichtenberger, Fletcher-Janzen, & Kaufman, 2005). For children under the age of 7 years, the Luria model organizes the Kaufman subtests into three scales. The first one is the Sequential scale which measures the coding processes associated with Block 2 and examines a child’s ability to arrange linearly- or temporally-related units of information in serial order. In order to accomplish this, a child must be able to listen, comprehend and respond to information that is presented orally and transmitted through auditory pathways of the brain (Yalcinkaya, Muluk, & Sahin, 2009). The second one is the Simultaneous scale which also measures processes associated with Block 2. It provides information regarding a child’s ability to perceive, store and manipulate visual stimuli. Finally, the Learning scale measures the integration of the processes associated with all three of Luria’s blocks by providing information regarding a child’s ability to store and efficiently retrieve newly or
previously learned information (Mays, Kamphaus, & Reynolds, 2009). A global summary of processing abilities as measured by the three scales can be obtained by calculating the Mental Processing Index (MPI). If children exhibit deficits on any of these scales or on the MPI, the likelihood of their experiencing difficulty acquiring academically-based skills exists.

In addition to the Luria model, the KABC-II permits interpretation of results using a second theoretical model, the Cattell-Horn-Carroll (CHC) model, a psychometric data-driven theory that resulted from the merger of three researchers’ findings into a hierarchical model composed of three levels or strata of abilities. Within the CHC theory, Stratum I consists of approximately 70 narrow abilities, of which 15 are measured by one or more of the KABC-II subtests. Stratum II is composed of 8 broad abilities, of which the KABC-II only measures five of these including long-term storage and retrieval (Glr), short-term memory (Gsm) visual processing (Gv), fluid reasoning (Gf), and crystallized ability (Gc). Finally, Stratum III is comprised of a broad, general cognitive ability known as “g” which is measured by the KABC-II Fluid-Crystallized Index (Kaufman, Lichtenberger, Fletcher-Janzen & Kaufman, 2005). Use of this theory involves administration of the same subtests as the Luria model and provides information regarding very similar types of abilities; however, it also involves the administration of two additional subtests which provides information regarding children’s ability to acquire knowledge from their culture. Because of this theory’s broader focus, it is identified as the preferred model for use when assessing cognitive ability. As with the Luria model, if
children experience deficits on scales associated with this model or on the FCI, the potential for children experiencing learning problems exists.

**Purpose of Study**

Based on research that has established the existence of a relationship between early receptive language delays and subsequent identification of academic difficulties and learning problems, children who receive low scores on measures of receptive language should also receive low scores on measures of processing ability. As a result, this study examines the relationship between the Bracken Basic Concept Scale-Revised, Third Edition (BBCS-3: R), a receptive language measure, and the Kaufman Assessment Battery for Children, Second Edition (KABC-II), a measure of processing and cognitive abilities in children, in order to determine if children who score in the delayed categories on the two composite scales on the BBCS-3: R, the Receptive SRC and the Receptive TC, will also score in the below average categories on the KABC-II Sequential, Simultaneous and Learning scales as well as the MPI global score. This study was not only interested in determining if a relationship exists between the scales of the two measures but also if differences in relationships exist when using the BBCS-3: R 5-subtest SRC versus the full 10-subtest TC. Because scores falling below the mean are potential indicators of processing difficulties, a relationship between the delayed scores on the BBCS-3: R composites and the below average scores on the KABC-II scales suggests that the BBCS-3: R can be used as a screener of learning risk factors.
Research Questions and Suppositions

The current study is guided by four sets of research questions. Each set consists of two questions in which each of the BBCS-3: R composite scale scores, the Receptive SRC scores and Receptive TC scores, is examined in relationship to each of three KABC-II scales and to the Mental Processing Index.

Research Question One

RQ1A. What is the probability that children with scores in the Delayed or Very Delayed Categories of the BBCS-3: R SRC will also demonstrate scores in the Below Average or Lower Extreme categories of the KABC-II Sequential scale?

RQ1B. What is the probability that children with scores in the Delayed or Very Delayed Categories of the BBCS-3: R TC will also demonstrate scores in the Below Average or Lower Extreme categories of the KABC-II Sequential scale?

In order to process information presented orally, children must be able to perceive, retain, retrieve, and apply information within a few seconds (Reynolds & Fletcher-Janzen, 2009). This requires the perception of stimuli in sequence as well as the formation of sounds and movements in order where each element is only related to those that precede it and the stimuli are not interrelated (Naglieri, 1999; Naglieri & Pickering, 2008). Such skills are utilized in tasks such as phonological analysis and the syntax of language. Any breakdown in this process can impact children’s understanding of information presented. In addition, because the foundation of receptive language is the ability to quickly and precisely analyze information presented orally, children who demonstrate difficulty with receptive language may also experience difficulty processing
any sounds they hear within their environment. Kruger, Kruger, Hugo and Campbell (2001) examined processing problems in children identified with learning disabilities and found that the most commonly co-occurring problem for children with language disorders involved deficits in auditory closure, the ability to fill in missing sounds in order to decode words. In fact, these researchers found that children who exhibited a language disorder also exhibited some type of sensory disorder whether it was auditory, visual, somato-sensory or all three. Because children’s ability to understand information presented orally depends on effective processing of that information, children’s scores on measures of receptive language should demonstrate a relationship with measures of sequential processing.

**Supposition 1**

There is a strong probability that children scoring in the Delayed or Very Delayed Categories of the BBCS-3: R SRC and TC will also score in the Below Average or Lower Extreme categories of the KABC-II Sequential scale.

**Research Question Two**

**RQ2A.** What is the probability that children with scores in the Delayed or Very Delayed Categories of the BBCS-3: R SRC will also demonstrate scores in the Below Average or Lower Extreme categories of the KABC-II Simultaneous scale?

**RQ2B.** What is the probability that children with scores in the Delayed or Very Delayed Categories of the BBCS-3: R TC will also demonstrate scores in the Below Average or Lower Extreme categories of the KABC-II Simultaneous scale?
According to Naglieri and Pickering (2003), simultaneous processing requires children to relate separate pieces of information into a group or determine how parts are related as a whole. An essential aspect of simultaneous processing involves the organization of interrelated elements into a whole. It can be used to solve tasks with both verbal and nonverbal content as long as the task requires integration of information. Simultaneous processing underlies the use and comprehension of grammatical statements because they demand comprehension of word relationships, prepositions and inflections in a manner that enables a person to obtain meaning based on the whole idea (Naglieri, 2005).

Despite the fact that simultaneous processing involves the understanding of logical and grammatical relationships in situations where information must be integrated into a whole, some researchers have found the absence of relationships between receptive language and children’s simultaneous processing ability. In a study using the original Kaufman Assessment Battery for Children, Chow and Skuy (1999) found that children with language-based learning disabilities obtained significantly higher scores on simultaneous processing tasks than on tasks of sequential processing while children who presented with nonverbal disabilities had difficulties in simultaneous processing but strengths in auditory processing (Chow and Skuy, 1999). Therefore, if the BBCS-3: R were simply a measure of receptive language, no relationship between its scores and those of the KABC-II Simultaneous scale should be found; however, despite the fact that the BBCS-3: R relies heavily on the processing of auditory information, it also requires children to integrate visually presented information with the auditory prompts provided in
order to arrive at the correct answer. It is, therefore, very possible that deficits in simultaneous processing could potentially impact scores children receive on the BBCS-3: R and as a result, this should be reflected in a relationship between the BBCS-3: R composite scores and the KABC-II Simultaneous scale score.

**Supposition 2**

There is a strong probability that children scoring in the Delayed or Very Delayed Categories of the BBCS-3: R SRC and TC will also score in the Below Average or Lower Extreme categories of the KABC-II Simultaneous scale.

**Research Question Three**

**RQ3A.** What is the probability that children with scores in the Delayed or Very Delayed Categories of the BBCS-3: R SRC will also demonstrate scores in the Below Average or Lower Extreme categories of the KABC-II Learning scale?

**RQ3B.** What is the probability that children with scores in the Delayed or Very Delayed Categories of the BBCS-3: R TC will also demonstrate scores in the Below Average or Lower Extreme categories of the KABC-II Learning scale?

According to Kaufman, Lichtenberger, Fletcher-Janzen, and Kaufman (2005), the Learning scale involves the integration of a number of cognitive processes working in sync with each other. This scale taps attention, coding, and long-term storing of stimuli as well as executive processing. It requires the use of sequential abilities to listen and organize information step by step, simultaneous processing to examine, organize and recall visual information, and planning abilities to prioritize the information. If there is a problem in the integration of these processes, performance on the Learning scale is likely
be affected by it. Because performance on this scale is dependent on the ability to efficiently process information presented orally, it is likely that children scoring in the below average categories of the BBCS-3: R will also exhibit below average scores on the KABC-II Learning scale.

**Supposition 3**

There is a strong probability that children scoring in the Delayed or Very Delayed Categories of the BBCS-3: R SRC and TC will also score in the Below Average or Lower Extreme categories of the KABC-II Learning scale.

**Research Question Four**

**RQ4A.** What is the probability that children with scores in the Delayed or Very Delayed Categories of the BBCS-3: R SRC will also demonstrate scores in the Below Average or Lower Extreme categories of the KABC-II MPI global score?

**RQ4B.** What is the probability that children with scores in the Delayed or Very Delayed Categories of the BBCS-3: R TC will also demonstrate scores in the Below Average or Lower Extreme categories of the KABC-II MPI global score?

Because this study examines whether a measure of receptive language can identify children who exhibit risk factors associated with learning disabilities, it is important to compare the composite scores of the receptive language measure with a cognitive global score which provides an accurate reflection of children’s overall processing abilities. Learning disabilities, by definition, involve deficits in psychological processing; therefore, in using the KABC-II to evaluate the validity of the BBCS-3: R as a screener for learning risk factors, it would appear that of the two global scores
available, the one associated with the Luria model, with its emphasis on mental processing ability, would provide the most accurate information. However, Kaufman and Kaufman (2004) recommend using the CHC model over the Luria model in most situations, including those involving a suspected disability in reading, written expression, or mathematics. The Luria model, on the other hand, is recommended for situations in which crystallized ability could negatively affect the validity of the Fluid-Crystallized Index (FCI) such as those involving children from a bilingual background, children with a formal diagnosis of autism or who are suspected of having such a diagnosis, and children diagnosed with or suspected of experiencing a language disorder, regardless of its nature.

If research demonstrating the existence of a relationship between early receptive language deficits and later learning problems is correct, it would stand to reason that the same theoretical model used for children suspected of having a language disorder should also be used for those suspected of having a potential learning disability. While the CHC model provides information on broader cognitive abilities, the Luria model, with its emphasis on processing abilities, provides specific information regarding brain functioning and as a result, it serves as a better cognitive global score measure for evaluating the ability of a receptive language measure to identify learning risk factors.

**Supposition 4**

There is a strong probability that children scoring in the Delayed or Very Delayed Categories of the BBCS-3: R SRC and TC will also score in the Below Average or Lower Extreme categories of the KABC-II MPI.
Definition of Terms

Cognitive or mental processing: Activities performed with the brain such as receiving information, integrating it, storing it, retrieving it, and putting it to use.

Composite score: One of two overall scores calculated for the Bracken Basic Concept Scale: Receptive, Third Edition. The School Readiness Composite score is an independent measure of children’s understanding of educationally relevant concepts children are expected to know in order to be prepared for early formal education and the Total Composite is a measure of children’s understanding of all foundational and functionally relevant educational concepts in ten important concept categories.

Expressive language: The communication of thoughts and feelings using verbal language.

Global score: A score reflecting a child’s overall test performance on the KABC-II which offers an approximate midpoint to assess the child’s relative strengths and weaknesses on the KABC-II scales.

Learning risk factors: Deficits in cognitive processing that are identified by below average performance on a formal, validated measure of such processing.

Mixed expressive-receptive language disorder: A communication disorder that affects both expressive and receptive language abilities.

Receptive language: The comprehension of language that involves attending to the message, comprehending the message, and processing the message.
**Scale score:** Transformed raw scores that are comprised of one or more subtest scores. On the KABC-II, these are standard scores reflecting a child’s learning ability, sequential processing, and simultaneous processing.

**Sequential processing:** A mental process that involves arranging input in serial order to solve a problem, where each idea is linearly and temporally related to the preceding one.

**Simultaneous processing:** A mental process that involves integrating separate stimuli into a whole or group.

**Specific learning disability:** A disability category under the Individuals with Disabilities Education Act that involves a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, that may manifest itself in an imperfect ability to listen, speak, read, write, spell, or do mathematical calculations.

**Summary**

Despite evidence that early intervention assists children in receiving supports that can improve their future outcomes both in and out of school, children with learning problems often endure several years of academic failure before they are provided with interventions and instruction that supports their learning differences. Research studies have provided substantial evidence of the relationship between early receptive language delays and later academic problems, thereby, providing a means by which young children, who already exhibit risk factors associated with such problems, can be identified. However, research studies examining screening measures that could provide this information are lacking. As a result, this study seeks to determine whether a
relationship exists between the BBCS-3: R, a measure of receptive language and the KABC-II, a measure of cognitive processing, in order to provide support for the use of the BBCS-3: R as a screener of potential learning risk factors in children of preschool age. If the BBCS-3: R can be used for this purpose, it would provide a means by which young children, exhibiting such risk factors, could be provided with interventions and differentiated instruction that could increase the likelihood of their experiencing success throughout their years in school.
Chapter 2: Review of Literature

To establish a foundation for the current study and provide support for its suppositions, a review of research literature was conducted on three topics related to this study. This chapter will begin with an overview of early speech and language impairments, their impact on later academic and cognitive functioning, and the stability of and subsequent changes in preschool-age speech/language classifications. Next, research related to the uses of the Bracken Basic Concept Scale-Third Edition: Receptive and the Kaufman Assessment Battery for Children, Second Edition is presented. The chapter concludes with an examination of two factors, ethnicity and socio-economic status, and their potential effects on early language development and assessment results. It also considers the potential effects of gender in identification of children exhibiting learning risk factors by presenting research findings on the influence of gender on specific learning disability classification.

Early Speech and Language Impairments

The implications of preschool speech/language diagnosis

For over 30 years, researchers have examined the long term effects of speech and language disorders identified prior to or during the preschool years. These studies have provided considerable evidence regarding the degree to which these disorders persist throughout childhood and their impact on children’s academic outcomes. Overwhelmingly, these studies have provided evidence that speech and language delays
identified during the preschool years are significant risk factors for subsequent literacy-related difficulties and other academic problems.

**General language studies.** In one of the earliest studies of language impairment effects, Hall and Tomblin (1978) examined the educational and vocational outcomes of children diagnosed with early language disorders by gathering information about their adolescent and early adult years. Although research published in the early 1970’s had provided evidence that early language impairments resulted in academic difficulties as children progressed through school (DeAjuriaguerra et al. 1976; Garvey & Gordon, 1973), this study was pivotal in that it established the persistence of these difficulties into adulthood. To obtain information regarding these long-term outcomes, the researchers sent questionnaires to the parents of a group of 18 language-impaired and 18 articulation-impaired children 13-20 years after they were first diagnosed. Parents were asked about their children’s educational and speech service history as well as current vocation. In addition, because these children had been part of a more comprehensive, long-term study, the researchers also had access to their elementary and secondary school achievement test results. Based on this information, the researchers found that 50% of the language-impaired children continued to experience long-term communication problems versus 5.6% of the articulation-impaired group. They also found that as these children progressed through school, the language-impaired children performed significantly below the articulation-impaired group in the areas of math and reading; however, their conclusions were constrained by the fact that the testing data collected could not be used as direct evidence of a relationship between language impairments and academic
performance. Finally, despite the majority of these children completing high school, fewer language-impaired children obtained educational degrees post-high school when compared to their articulation-impaired counterparts. Based on these findings, the researchers concluded that a relationship exists between early language deficits and children’s long-term educational performance, and that concerns raised by speech-language pathologists regarding the long-term impact of these early deficits were well-founded.

Similar findings were obtained by Aram and Nation (1980) who also conducted an early longitudinal study regarding the impact of early speech and language impairments on later language and academic performance. In their study, 63 children who were identified with language disorders in preschool were followed-up two times following their initial diagnosis. At initial assessment, 81.4% of the children exhibited moderate to severe phonological deficits while 71.4% had moderate to severe problems in sentence formulation and 58.7% exhibited deficits in syntax. At the first follow-up which took place 4-5 years later, the researchers reviewed the children’s preschool clinical records and administered questionnaires to the children’s parents and teachers. Based on this information, they found that 40% of these children continued to experience speech and language problems and approximately 40% also presented with other learning problems which resulted in specialized placement outside of the regular classroom setting. Of these children, 20 were followed-up a second time during adolescence at which time, 20% received services under the classification of educable mentally retarded.
while 69% had experienced grade retention, received special tutoring, or qualified for learning disability educational placement (Aram, Ekelman, & Nation, 1984).

Using a sample of 29 language-impaired children who were diagnosed with language impairment in early childhood and 14 children who were typically-developing, Stark et al. (1984) administered speech, language, and cognitive measures to these children between the ages of 4.5 and 8 years and again 3-4 years later. They found that 90% of the language-impaired children exhibited a reading disability at follow-up and almost 80% of them experienced an impairment that was severe enough that they participated in remedial instruction. In addition, they found that children, whose language impairment appeared resolved, still experienced a significant gap between nonverbal abilities which were measured by Performance IQ and linguistic abilities which were measured by language tests. Based on this information, the researchers concluded that early intervention may be necessary to facilitate the development of literacy skills in children with language impairments.

Silva, Williams, and McGee (1983) and Silva, McGee, and Williams (1987) conducted a longitudinal study with a large sample of approximately 1000 children who were born at the same New Zealand hospital within a 12 month period in 1972. Within one month of their third birthday, the children were administered the Reynell Developmental Language scales and based on their performance, the children were placed into one of the following four language categories: (a) general delay, (b) comprehension delay, (c) expressive delay, or (d) no language delay. The children were then followed up at seven, nine, and eleven years of age at which time the children’s
cognitive and reading skills were assessed. At 7 years of age, 64% of children with a preschool diagnosis of general language delay had low reading scores compared to 38% of children with comprehension delay and 32% of children with expressive delay. The same trend was observed for the children at age 9 with 40% of children with language delays scoring low on measures of reading in comparison to 22% of those with comprehension delays and 28% of those with expressive delays and also at age 11 with 54% of children with general language delays receiving lower reading scores in comparison to 18% of those with comprehension delays and 21% of those with expressive delays. In addition, the researchers found that over 70% of the children with general language delay scored low on measures of IQ across all three ages studied. The results of this study suggested that children with early general language delays were not only at high risk for long-term academic difficulties but for cognitive skill deficits as well.

Another longitudinal study that provided evidence of the relationship between preschool language status and later language and academic difficulties was conducted in England (Bishop & Adams, 1990; Bishop and Edmundson, 1987; Stothard, Snowling, Bishop, Chipchase, & Kaplan, 1998). In this study, children between the ages of 3 years, 9 months and 4 years, 2 months, identified as being speech-language impaired, were administered a nonverbal IQ measure as well as a battery of standardized and functional language measures. Those with impaired speech-language skills but normal nonverbal cognitive ability were classified as having specific language impairment (SLI) while children with impaired speech-language skills and nonverbal cognitive ability of at least
two standard deviations below the mean were classified as having a general delay (GD). Follow-up of these children occurred at three points during their development, twice in middle childhood and once in early adolescence. At each follow-up, the children’s language and literacy scores were compared with those of a control group that was established at each of the follow-up points. The first follow-up took place when the children were 5 years, 6 months of age. At that time, approximately 34% of the SLI children experienced good outcomes and were classified as the SLI-resolved group. Of the children in the GD group, 44% of them continued to experience language difficulties and based on this finding, they were classified as the persistent-SLI group. Although the SLI-resolved group did not differ from their typically-developing peers on spoken language skills, they did score lower on measures of phonological awareness. At age 8 years, 6 months, the researchers found that despite having lower scores on phonological awareness at 5 years, 6 months of age, 97% of the children in the SLI-resolved group were normally developing readers while only 56% of the SLI-persistent group experienced typical reading skills development. Children whose early impairments involved deficits in expressive phonology and grammar were more likely demonstrate normal comprehension in mid-elementary school while children who experienced a broader range of language impairments demonstrated difficulty with reading comprehension despite exhibiting normal reading accuracy. Based on these findings, the researchers concluded that the skill most affected in children with language impairments was reading comprehension. The final follow-up of these children took place when they were 15-16 years of age at which time they were compared with age-matched normal-
language controls. Over two-thirds of the children retained the language classifications they received at 5 years of age. Of those originally classified in the GD category, 60% continued to exhibit significant verbal and nonverbal deficits into adolescence. In addition, while children, who were originally classified as SLI-resolved, performed similar to the controls on tests of vocabulary and language comprehension, they performed significantly below their peers on measures of phonological processing and literacy skills. Children originally classified as persistent-SLI as well as those who originally met the criteria for GD continued to demonstrate significant impairments on all measures of spoken and written language and lagged behind their typical peers in vocabulary growth. The researchers concluded that language outcomes could be reasonably predicted from children’s early speech/language classification and that children who presented with language difficulties at age 5 were at high risk for language, literacy, and educational problems that persist into adolescence. They also found that despite early resolution of speech/language problems, children, who at one time were identified as having SLI, continued to demonstrate weaker literacy skills suggesting that early language problems, even when resolved, place children at greater risk for long-term literacy skill deficits.

Interested in the effects of very early language delays, Scarborough and Dobrich (1990) followed 4 children who were identified with language delay at 2 years, 6 months of age and 12 typically-developing peers through the second grade. Children were assessed with a variety of language measures at 24, 30, 36, 42, 48, and 60 months of age. In addition, cognitive measures were administered at 36, 48 and 60 months of age, and a
reading measure was administered at the end of second grade. By 60 months of age, the four children, who presented with early language delays, exhibited normal or near normal speech suggesting that the language impairment had been resolved; however, when followed up 3 years later, 75% of the children experienced reading problems at a level that would qualify them for a reading disability. Although the sample was so small that broad generalizations could not be made, the results of this study suggested that not only does a potential link exist between early language delays and later reading problems but that children whose early language problems appear to be resolved, should be monitored closely due to the potential for manifestation of later academic difficulties.

Interested in the developmental trajectory of children identified with early language impairments, Beitchman, Wilson Brownlie, Walter, and Lancee (1996) examined the long-term developmental and academic outcomes of 124 speech/language-impaired and typically-developing children who were followed-up seven years after their initial assessment at 5 years of age. Children with speech and language impairments were initially classified into one of the following four groups: (a) high overall speech and language functioning, (b) poor comprehension, (c) poor articulation, or (d) low overall speech and language functioning. Using the results of academic, cognitive, and speech/language measures administered to the children at follow-up, the researchers compared the functioning of the four groups and found that children with the most severe speech and language impairments had the lowest scores across all of the measures administered. Language differences were found on measures of receptive vocabulary, auditory memory, receptive language, expressive language, and pragmatics. In addition,
the researchers also found differences from initial assessment to follow-up in terms of
special education placement with 64% of the low overall speech group receiving services
as compared to 50% of children with poor comprehension, 46.3% of children with poor
articulation and none of the children who were originally classified as high functioning.
Because skill deficits were observed across several areas of functioning and the deficits
were similar in degree to the linguistic ones, the researchers suggested that a
neurodevelopmental delay may be the underlying cause of these deficits which continues
to affect children’s functioning across a variety of areas as they progress through school.

Examining outcomes of language-impaired children over a longer period of time,
Johnson et al. (1999) extended previous research findings by following a group of 242
Canadian children from 5 years to 19 years of age. At age 5, the children were
administered several speech and language measures and based on performance criteria
established by the researchers, they were classified into one of the following four groups:
(a) normal speech and language, (b) speech-only impairment, (c) language-only
impairment, or (d) speech and language impairment. Follow-up occurred twice over a
fourteen year period and consisted of administration of a multi-domain assessment
comprised of communication, cognitive, academic, behavioral, and psychiatric measures.
The first follow-up took place when the children were 12 years of age. Of the original
sample, 215 children were reassessed with 72% of the children continuing to meet criteria
for speech and/or language impairment. Children who were originally classified as
having both speech and language problems were more likely to continue meeting
eligibility for an expressive or receptive impairment than those originally classified with
speech-only impairment (Beitchman et al., 1994). The second follow-up took place when these children reached the age of 19 at which time the researchers found that the majority of the children retained the diagnostic classification they were given at age 5 and as a result, they concluded that language impairments identified at early ages are likely to result in continued communication difficulties. They also concluded that language performance tends to remain stable over time, and children initially identified with speech-only impairments have better long-term outcomes than those with speech and language or language-only impairments. Finally, the researchers found that children classified as language-impaired performed at significantly lower levels on reading measures than the normal speech or speech-impaired only groups. These findings provided further support that children, who experience early language impairments, show long-term language, cognitive, and academic deficits when compared to peers who did not experience early speech or language difficulties (Johnson et al., 1999).

**Receptive language comorbidity.** While some studies have found that children who experience speech impairments in the absence of receptive delays are at increased risk of poor literacy outcomes (Leitao & Fletcher, 2004; Nathan, Stackhouse, Goulandris, & Snowling (2004), a growing number of studies have provided evidence that the poorest outcomes result when deficits in expressive language are accompanied by deficits in receptive language skills. Lewis, Freebairn, and Taylor (2000) examined academic outcomes of 52 preschool children identified as having moderate to severe speech sound disorders. The children were administered speech and language measures upon study entry and then underwent a battery of tests which assessed language, reading and spelling
skills at ages 8-11 years. Despite the children being referred on the basis of expressive language disorders, the researcher’s initial assessment identified that only 52% of the children presented with isolated phonology disorders while 31% exhibited semantic deficiencies and 35% exhibited syntactic deficiencies in addition to the phonology disorder. When these children were followed-up at school age, the researchers found that reading disorders were predicted by deficits in a wide range of preschool linguistic competencies including deficiencies in syntactic and semantic skills as well as deficits in phonology and phonological encoding. In addition, they found that school age spelling impairments were associated with preschool phonology impairments and phoneme discrimination deficits. Although the children were initially identified as experiencing expressive language problems, a number of these children were experiencing undetected language problems that were associated with later deficits in literacy skills.

Investigating the relationship between spelling ability and early speech sound disorders (SSD) of 52 children identified with SSD at preschool age, Lewis, Freebairn, and Taylor (2002) found that children identified as having isolated speech sound problems in preschool demonstrated weaknesses in spelling skills relative to their reading and language abilities; however, children identified with both speech and language problems in preschool demonstrated much poorer spelling suggesting greater risk when deficits in both expressive and receptive language are present.

Raitano, Pennington, Tunick, Boada, and Shriberg (2004) examined the pre-literacy skills of 142 children with and without history of SSD. Administering a battery of tests that assessed speech, language and pre-literacy skills, these researchers found that
as a group, all children with SSD performed at a level that was below that of their normally-developing peers on tasks that assessed phonological awareness and letter identification tasks; however, when children with SSD were also identified as having a language impairment, an additive effect resulted with performance being reduced even further. In addition, when both impairments were present, children also performed weaker on tasks of rapid naming ability. While SSD identified at an early age was a risk factor whether it persisted or resolved, the combination of SSD and language impairment appeared to result in greater risk of later reading problems.

More recently, Sices, Taylor, Freebairn, Hansen, and Lewis (2007) examined the relationship between SSD and early literacy development when language impairment (LI) was also present. These researchers administered measures of reading readiness and writing to a sample of 125 children who were ages 3-6 years and had been diagnosed with moderate to severe SSD, 53% of whom had comorbid language impairment. Based on their findings, the researchers determined that language impairment affected early reading and writing skill development while the severity of the SSD had no effect on the development of these skills.

**Early language impairments and later school performance.** Menyuk et al. (1991) were interested in identifying early predictors of later reading problems by conducting a 3-year follow-up of 131 children who were classified as: (a) language-impaired, (b) possibly at-risk due to previously diagnosed language impairment but not experiencing problems at present, and (c) prematurely-born. These children were administered speech and language measures upon study entry, measures of language
meta-processing abilities six months later, and standard measures of reading at 80-96 months of age. Based on initial assessment scores, the children were further classified according to low, medium and high language ability. Most SLI children as well as some premature children or those with previous learning delays fell in the low ability group. Further evaluation of the low ability group’s performance found that measures of metalinguistic abilities were the best predictors of later reading problems for all the children in that group; however, the SLI group differed from the premature and at-risk children in that syllable segmentation was the best predictor of their later reading achievement while phonetic segmentation was the better predictor for the other children.

As a result, these researchers concluded that while language impairment is associated with later literacy deficits, the type of deficit involved appears to be specific in nature and that by collecting data regarding specific skills, better identification of at-risk children can be made and more effective interventions can be implemented.

Interested in a variety of school-age outcomes associated the preschool-age language impairment, Shevell, Majnemer, Webster, Platt, and Birnbaum (2005) followed a group of 43 preschool children diagnosed with developmental language delay into the early elementary school years. To qualify for this diagnosis, the children had to be experiencing significant delays in the use of expressive or receptive language in the absence of cognitive impairments. The researchers found that, in addition to continued difficulties in the area of communication, these children also experienced deficits in their development and functional skills. On the Battelle Developmental Inventory, a measure of developmental abilities in motor, adaptive, communication, cognitive and personal-
social domains, 67% of the children met criteria for significant developmental concerns and on the Vineland Adaptive Behavior Scale, a measure of functional status in daily living skills, communication, and socialization skills, 48% of the children met the criteria for impairment in at least two of the domains.

Other studies have examined the relationship between language impairment and reading skill development. Following a group of 86 Midwestern kindergarten students through the second grade, Catts (1993) found that children identified with articulation impairments in kindergarten performed very similarly to children without language impairments on measures of phonological awareness and rapid automatized naming as well as on measures of written word recognition and reading comprehension; however, the children with general language impairments demonstrated poorer performance on these same measures in comparison to children with articulation impairment or no language impairment.

Catts, Fey, Tomblin, and Zhang (2002) also conducted a study examining literacy outcomes for children with language impairments. Their sample consisted of 570 language-impaired and normally-developing children who were administered a battery of tests measuring language, phonological processing, reading ability, and nonverbal cognitive ability in the second and fourth grades. These researchers found that kindergartners identified with language impairments were at higher risk for subsequent reading disabilities but that the level of risk was dependent on the type of language impairment the child experienced. Children who experienced both nonverbal and language deficits were found to be at greater risk for later reading disabilities than
children who experienced deficits in language alone. Based on these findings, they concluded that children at highest risk of being identified with a reading disability at second and fourth grade were those who demonstrated deficits in nonverbal cognitive ability in conjunction with language deficits. While nonverbal abilities have been viewed as having less influence than verbal abilities on reading, these finding suggest that nonverbal abilities may also contribute to the acquisition of literacy skills. Additionally, the researchers found that even though the children with language impairment experienced deficits in their reading skills, their rate of growth in reading achievement was comparable to typically-developing peers, which suggests that early identification of risk factors associated with reading disabilities allows for the implementation of interventions that may reduce the gap between the skills of children with and without language impairments (Catts, Bridges, Little, & Tomblin, 2008).

Flax, Realpe-Bonilla, Roesler, Choudhury, and Benasich (2009) also examined early precursors to later literacy problems by examining the impact of family history for language-learning impairments (LLI) on language abilities, phonological awareness and reading abilities in early elementary school. Administering a standardized battery of tests to a group of 99 language-impaired and typically-developing children with and without family histories of LLI at ages 2, 3, 5 and 7 years of age, these researchers found an increased risk of language impairments among children with a family history of such impairment and that the language-impaired group as a whole scored lower on all language measures at ages 2 and 3, on phonological awareness measures at age 5, and on phonological awareness and nonword reading at age 7 years. The best predictor of later
language and early literacy skills for both groups was language comprehension at 3 years of age providing further evidence of the importance of monitoring early language development, particularly for children with a family history of LLI, in order to identify language and literacy risk factors which can be addressed through interventions prior to formal school entry.

**Early language impairments and processing ability.** Prompted by findings that despite having normal nonverbal IQ, children with specific language impairments often demonstrate difficulty with certain cognitive tasks, researchers have endeavored to determine the nature of these deficits by examining the relationship between language impairment and mental processing ability. Because learning disabilities are defined as deficits in basic psychological processes, research findings establishing a relationship between language impairment and processing ability provide further evidence for the connection between language impairment and learning disabilities. Some of these studies have examined the phonological short-term memory of elementary-age children who were identified with language impairments as preschoolers and found that children with language impairments exhibit reduced phonological storage capacity suggesting that they have less functional verbal working memory capacity both in their ability to store and to process information (Gathercole & Baddley, 1990, Gillam, Cowan, & Marler; 1998, Montgomery, 1995, Montgomery, 2000). Other researchers have found that children, whose language impairment was considered resolved, continued to exhibit deficits in phonological short-term memory (Bishop, North, & Donlan, 1996) and that processing capacity remained unimproved even when the rate at which information was provided
was significantly reduced (Weismer & Hesketh, 1996). Examining differences in processing speed of children with and without language impairments, Kail (1994) focused on children’s processing speed on tasks that involved visual and auditory processing and found that processing speed was significantly slower across tasks in children identified with language impairments.

Extending the work of previous researchers, Hick, Botting, and Conti-Ramsden (2005) examined the verbal short-term memory, visuo-spatial short-term memory and visuo-spatial processing of a sample of 9 typically-developing and 9 speech-language impaired (SLI) preschool children. While children, with and without SLI, performed similarly on a visuo-spatial processing task, children with SLI demonstrated poorer performance than their typically-developing peers on a verbal short-term task; however, as children underwent repeated assessment of the skill, rate of development on the verbal short-term task was similar for both groups of children. In addition, the children with SLI also exhibited slower development on the visuo-spatial short term memory task than their typically-developing peers. Based on these findings, the researchers suggested that children with SLI may experience cognitive processing difficulties despite exhibiting overall normal nonverbal abilities and that short-term memory difficulties experienced by children with SLI may be more global in nature rather than limited to deficits in verbal short-term memory only.
Stability of preschool speech/language classification

If a relationship exists between early language impairments and later academic difficulties, evidence of this relationship should be reflected in changes to children’s disability classification over time; however, research on disability classification changes is quite limited. One of the earliest studies, conducted by Walker et al. (1988), involved a two-year follow-up of 1184 elementary-age children enrolled in special education programs in 3 separate elementary schools. These researchers found that children who were most likely to experience a disability classification change, either through termination or reclassification, were those who were originally classified as speech-impaired. At the two-year follow-up point, 33% of speech-impaired children were terminated and 21% were reclassified. Children most likely to be terminated from language disability classification were those who were solely receiving speech therapy services while children who were experiencing more global speech and language impairments were more likely to retain their classification or be reclassified under another disability category. When reclassification occurred, children originally classified as speech-impaired were most likely to be reclassified under the learning disability category. Based on their findings, the researchers suggested that changes in classification may have resulted from more accurate diagnoses or the possibility that the children were originally experiencing additional problems but that speech classification was initially selected in order to reduce the stigma associated with special education labels.
Examining the stability of classifications for 523 students by tracking their placements from graduation back to their entrance into school, Wolman, Thurlow, and Bruininks (1989) found that of the 24% of students who experienced reclassification, 54% were students who were initially classified as having a speech and language impairment and then later reclassified as having a learning disability. Only 5% of students originally classified under the speech and language category retained their classification. Based on these findings, the researchers concluded that the strongest predictor of subsequent placement change was initial placement under the speech and language category.

More recently, Wong (1997) examined the stability of special education classification for 334 children who were preschool age when they were first qualified for special education. Data regarding placement was collected when these children were between 5-10 years of age. One major difference between Wong’s study and previous studies was the introduction of the Preschooler with a Disability/Developmentally Delayed (DD) special education category for children of preschool age. Because this category only applied to preschoolers, all children originally classified under it, who continued to qualify for special education services when transitioning to kindergarten, had to be reclassified into a school-age disability category. As a result, Wong found highest reclassification rates for children in this category; however, when children classified under this category were excluded from the data, the group with the greatest rate of reclassification was the one with children originally qualified under the Speech Language Impairment (SLI) category. While the majority of these children terminated
classification, of those who remained in special education, 28% retained the same classification whereas 13% were reclassified as having a Specific Learning Disability (SLD). The large number of children exiting from the SLI category was attributed to the heterogeneity in the types of disabilities this category encompasses and the fact that some very common disabilities that fall under this category, such as articulation delay, often improve with maturation or through short-term intervention resulting in termination while the more severe disabilities, which include a smaller percentage of identified children, result in a continued need for services.

Use of the Preschooler with a Disability/DD category resulted in a large number of children requiring reclassification for school-age services. In this study 84% of children originally classified under this category qualified for school-age special education services with the majority transitioning to services under the SLI (23%) and SLD (18%) categories. Because the DD category is often used for children who are experiencing problems that are not well-defined, it is possible that the rate of reclassification may have been smaller if preschool screening instruments had been available that could effectively detect learning risk factors at an earlier age.

As for the large number of preschool children originally classified under the SLI category who retained their classification when they transitioned to school age services, it is unclear if this high retention of SLI classification occurred because the SLI category was the most applicable to the problems children were experiencing or because detection of learning problems had not yet occurred.
Established Uses of the Bracken and Kaufman Instruments

Bracken criterion-related validity studies

Since its inception in 1984, the Bracken Basic Concept Scale has been compared to a number of other measures in order to determine its effectiveness in measuring receptive language skills as it is purported to measure as well as its potential to assess other skill areas. Because the proposed study is contingent on the ability of the BBCS-3: R to assess receptive language skills as well as to demonstrate a relationship with measures of cognitive functioning, it is important to examine research findings regarding the Bracken’s relationship with measures of language as well as those that assess cognitive ability in order to evaluate its potential for providing the necessary data for this study.

Studies with receptive language measures. To establish evidence of the Bracken test’s effectiveness as a measure of receptive language, studies have been conducted comparing it with several different measures of language. Some of the earliest studies examined the relationship between the Bracken Basic Concept Scale (BBCS), the original version of the test, and the Peabody-Pictures Vocabulary Test-Revised (PPVT-R). Using an early elementary-age population of 24 children, Breen (1985) found a strong relationship of .67 between the tests while Bracken, Howell, and Crain (1993) found an even stronger relationship of .88 when administering the measures to a group of 60 preschool-age children.

When the Bracken test was revised in 1998, additional studies were conducted in conjunction with its standardization to determine if the newer version was as effective a
measure of receptive language as its predecessor. One of these studies examined the relationship between the Bracken Basic Concept Scale-Revised (BBCS-R) and the Peabody Picture Vocabulary Test-Third Edition (PPVT-III) and found that while the BBCS-R Total Test and PPVT-III correlated at .79, the BBCS-R SRC and PPVT-III only correlated at .69. Although the results did not demonstrate as strong of a relationship between these instruments as between the instruments’ predecessors, they provided evidence that both tests measure highly similar constructs. An additional study examined the relationship between the BBCS-R and the Preschool Language Scale-3 (PLS-3). Strong correlations (.74-.84) were found between the BBCS-R Total Test and PLS-3 while moderate correlations (.46-.57) were found between the BBCS-R SRC and PLS-3 (Bracken, 1998).

Because the most recent Bracken test, the Bracken Basic Concept Scale-3: Receptive (BBCS-3: R), has only been available for a short time, studies comparing it to other measures have been limited to those conducted in the standardization process. Bracken (2006) conducted a study comparing the BBCS-3: R to the scales of the Preschool Language Scale-Fourth Edition (PLS-4) and found moderate to high correlations between the subscales of these instruments (.46 to .77). These results were not unexpected because the PLS-4 measures both expressive and receptive language; therefore, while the BBCS-3: R was only moderately related to the PLS-4 subtests measuring expressive language, it strongly correlated with the PLS-4 subtests measuring receptive language skills.
Studies with cognitive measures. The original Bracken test, the BBCS, was comprised of two instruments, a diagnostic full scale instrument and a brief 30 item screener that could be administered to a large group of children quickly and efficiently (Bracken, 1984). Although some researchers were interested in the relationship between the screening test and cognitive measures in order to assess the brief version’s capacity to be used as a quick cognitive screener, others were interested in the relationship between the full scale version of the Bracken and other tests of cognitive ability. Using a sample of 213 kindergartners being considered for gifted placement, Schneider and Gervais (1991) examined the relationship between the BBCS screening test and the Wechsler Preschool and Primary Scale of Intelligence-Revised (WPPSI-R) and found that the BBCS Screening Test/SRC and WPPSI-R correlated moderately at .63. Slightly different results were obtained in a similar study conducted by Laughlin (1995) who administered the two measures to a group 83 preschool-age children and found that the two measures correlated more strongly at .77. As a result, Laughlin concluded that the two measures assess similar constructs providing support for use of the BBCS Screening Test as a cognitive screener.

Another validity study examined the relationship between the BBCS and the Stanford-Binet-IV (SB-IV). Howell and Bracken (1992) administered the measures to 80 African American preschoolers and found a strong correlation of .91 between the BBCS Total Test score and the SB-IV Total Test Composite and a smaller yet strong correlation of .68 between the BBCS SRC and the SB-IV Total Test Composite.
Studies have also been conducted comparing the BBCS to the Differential Ability Scale (DAS). In a study examining the use of the BBCS as an intellectual screener with a sample of 35 at-risk preschoolers, McIntosh, Brown and Ross (1995) found a strong correlation of .70 between the BBCS Total Test and the General Conceptual Ability (GCA) scale of the DAS as well as between the BBCS SRC and DAS GCA (.66). Using a sample of 60 typical preschoolers, McIntosh, Wayland, Gridley, & Barnes (1995) found similar results with the BBCS Total Test and the GCA correlating at .80 and the BBCS SRC and DAS GCA correlating at .78. These studies provided further support for use of the BBCS as a preschool intellectual screener.

In comparing the BBCS to the Woodcock Johnson Psychoeducational Battery-Revised (WJ-R), a correlation of .65 was found between the WJ-R Broad Cognitive Ability Score and the BBCS Total Test (McGrew, Werder, & Woodcock, 1991); however when the BBCS was compared to language-reduced tests such as the Kaufman Assessment Battery for Children (K-ABC) and Raven’s Progress Matrices, the correlations were more moderate. Using a sample of 60 preschoolers, Bracken and Howell (1991) found that the BBCS Total Test only correlated .57 with the K-ABC Mental Processing Composite (MPC), and using the same sample, Bracken, Howell, and Crain (1993) found a correlation of .51 between the BBCS and Raven’s Progress Matrices. The researchers suggested that these more moderate correlations may have been due to the fact that the K-ABC and Raven Progress Matrices de-emphasize language abilities while the BBCS is more language-oriented in nature.
With the development of the second version of the Bracken, the BBCS-R, additional studies were conducted concurrently with the standardization of the instrument in order to examine the relationship between the BBCS-R and other cognitive measures. To examine the relationship between the BBCS-R and the WPPSI-R, the measures were administered to thirty 5-year-olds with results indicating that the WPPSI Full Scale IQ correlated at .85 with the BBCS-R Total Test and .88 with the BBCS-R SRC. Strong correlations were also found between the BBCS-R Total Test and SRC and the WPPSI-R Performance and Verbal scales. Similarly, in a study using a sample of 27 four-year-olds to compare the BBCS-R and the DAS, Bracken found that the BBCS-R Total Test correlated with the DAS General Conceptual Ability (GCA) score at .88 while the SRC correlated with the GCA score at .79. In addition, strong correlations were found between the BBCS-R Total Test and SRC and the Verbal and Non-verbal Clusters of the DAS suggesting that either the BBCS-R SRC or the BBCS-R Total test could be used as a cognitive screener (Bracken, 1998).

Although standardization of the second version of the Bracken involved a number of studies examining its relationship with cognitive measures, similar studies were not conducted in conjunction with the standardization of the BBCS-3:R. In addition, a review of research literature found the absence of any such criterion-related validity studies with the BBCS-3: R.
Kaufman criterion-related validity studies

The Kaufman Assessment Battery for Children (K-ABC) has also been examined in relation to other measures in order to determine its effectiveness in measuring cognitive skills and mental processing as well as its potential to assess other skill areas. Because the proposed study is contingent on the ability of the BBCS-3: R to demonstrate a relationship with the KABC-II, it is important to examine research findings regarding the Kaufman test’s relationship with measures of language as well as with other measures of cognitive ability in order to evaluate its potential for providing the necessary data for this study.

Studies with receptive language measures. A review of the research literature found only a few studies examining the relationship between the Kaufman cognitive test and measures of receptive language, and all of these studies were conducted with its first version, the K-ABC. Using a sample of 46 children with a mean age of 6.85 who were exhibiting learning difficulties, D’Amato, Gray, and Dean (1987) found that the K-ABC Sequential and Simultaneous scales and the Mental Processing Composite (MPC) only correlated moderately (.42, .52, & .53 respectively) with the Peabody Picture Vocabulary Test-Revised (PPVT-R) while the K-ABC Achievement scale and PPVT-R correlated strongly (.78). In a study using a sample of 39 children, 10 of whom were identified with language impairments, 13 who were identified with behavioral problems, and 16 who were typically-developing children, Williams, Voelker, and Ricciardi (1995) found a moderate correlation between the Achievement scale and PPVT-R (.63) and a strong correlation between the K-ABC MPC and PPVT-R (.73); however, results differed
depending on the characteristics of the children. Although the correlations were strong for the group as a whole and for the typically-developing preschoolers, the correlations between the two measures for language-impaired children were moderate to low. Using the same sample, these researchers also compared the K-ABC to the Test for Auditory Comprehension of Language (TACL), another measure of receptive language, with similar results being obtained. While these research findings suggest that the K-ABC may not be useful in making predictions for children with language impairments, the generalizability of these findings was limited by the small language-impaired group sample size as well as the study design which relied on baseline measures that were restricted to data available from children’s clinical charts and the absence of specific information regarding the type of language impairment the children experienced.

When the KABC-II was introduced in 2004, a number of changes distinguished it from its predecessor including the addition, deletion, and modification of subtests and scales that comprised the instrument as well as the introduction of an additional theoretical model that could be used to interpret results. Despite these changes, no additional studies were conducted, even in the standardization of the instrument, examining the relationship of the KABC-II with measures of receptive language.

**Studies with achievement measures.** If cognitive measures are to be used for the identification of children at risk for learning problems, they need to demonstrate strong relationships with measures of achievement. Several studies were conducted during the standardization of the KABC-II examining its relationship with a number of achievement tests including the Peabody Individual Achievement Test-Revised, the Woodcock-

Using a sample of 32 students in first through fourth grades, Kaufman and Kaufman (2004) administered the KABC-II and Peabody Individual Achievement Test-Revised (PIAT-R) and found that all three KABC-II global scores, the KABC-II Mental Processing Index (MPI), the Fluid-Crystallized Index (FCI) and the Nonverbal Index (NVI) correlated strongly with the PIAT-R Total Test (r = .69, .67, and .66 respectively). When comparing the KABC-II global scales to the PIAT-R subtests, the researchers found strong correlations between the KABC-II MPI and PIAT-R General Information, Reading Comprehension, Total Reading, and Mathematics subtests (.70, .68, .69, and .68, respectively), the KABC-II FCI and the PIAT-R General Information subtest (.75); and the KABC-II NVI and PIAT-R General Information and Mathematics subtests (.74 and .68 respectively). Significant but more moderate relationships were found between the KABC-II MPI and the PIAT-R Reading Recognition subtest (.62), the KABC-II NVI and the PIAT-R Reading Comprehension and Total Reading subtests (.61 and .60 respectively), and the KABC-II FCI and the PIAT-R Reading Recognition, Reading Comprehension, Total Reading, and Mathematics subtests (.59, .63, .64, and .63 respectively). In examining the KABC-II scales and PIAT-R subtests, the researchers found strong correlations between the KABC-II Knowledge scale and the PIAT-R General Information subtest (.73) and the KABC-II Planning Scale and the PIAT-R General Information subtest (.77). More moderate yet significant correlations were found between the KABC-II Knowledge scale and the PIAT-R Total Reading subtest (.60), the
KABC-II Planning scale and the PIAT-R Mathematics subtest (.56), and the KABC-II Learning scale and the PIAT-R Total Reading subtest (.60).

In comparing the KABC-II to the Woodcock-Johnson III, Tests of Achievement (WJ III ACH) with a sample of 79 students in grades 2-5, Kaufman and Kaufman (2004) found a strong correlation between the KABC-II FCI and WJ III ACH Total Achievement Composite (.70) and a moderate correlation between the KABC-II MPI and WJ III ACH Total Achievement Composite (.63). They also found that the KABC-II MPI correlated strongly with the WJ III ACH Broad Math cluster, the Sound Awareness subtest (.65), and the Academic Applications subtests (.65, .66, and .76 respectively). In addition, they found that the KABC-II FCI correlated strongly with WJ III ACH Passage Comprehension, Applied Problems, Sound Awareness, and Academic Applications subtests (.70, .67, .69, and .76 respectively) and that the KABC-II NVI correlated strongly with the WJ III ACH Broad Math cluster (.65). In comparing the KABC-II scales to WJ III ACH clusters and subtests, the researchers found that the KABC-II Knowledge scale correlated strongly with the WJ III ACH Broad Reading cluster (.69), the Broad Math cluster (.65), the Oral Language cluster (.71), and the Listening Comprehension subtest (.80). The KABC-II Knowledge scale was also found to correlate strongly with the WJ III ACH Total Achievement Composite (.70).

Using a sample of 82 children in grades 2-5, Kaufman and Kaufman (2004) also compared the KABC-II to the Wechsler Individual Achievement Test, Second Edition (WIAT-II). The results of this study found strong correlations when comparing the KABC-II FCI and MPI to the WIAT-II Total score (.72 and .65 respectively) and a
moderate correlation when comparing the KABC-II NVI to the WIAT-II Total score (.52). In comparing the KABC-II global scores with the WIAT-II composites, the researchers found a strong correlation between the KABC-II NVI and the WIAT-II Math Composite (.66) while moderate correlations were found between the KABC-II MPI and the WIAT-II Math and Written Language Composites (.61 and .58 respectively) as well as between the KABC-II FCI and the WIAT-II Reading, Math, and Written Language Composites (.56, .64, and .62 respectively). A comparison of the KABC-II scales and WIAT-II composites found that the KABC-II Knowledge Scale correlated strongly with the WIAT-II Total Test score (.68) and moderately with the WIAT-II Reading, Math and Written Language Composites (.61, .55, and .55 respectively). In comparing the KABC-II scales and the WIAT-II subtests, strong correlations were found between the KABC-II Knowledge Scale and the WIAT-II Math Reasoning and Listening Comprehension subtests (.70 and .67 respectively) and moderate correlations were found between the KABC-II Knowledge Scale and the WIAT-II Word Reading, Reading Comprehension, and Spelling subtests (.57, .62, and .57 respectively). When a second study was conducted comparing the two measures with 84 children in grades 7-10, the researchers found even stronger correlations between the KABC-II and WIAT-II scales, subtests and global scores than they found for the younger sample.

An additional study conducted with the KABC-II compared it to the Kaufman Test of Educational Achievement, Second Edition (KTEA-II). Kaufman, Lichtenberger, Fletcher-Janzen and Kaufman (2005) reported that the administration of these measures to a group of 370 preschool and kindergarten students resulted in strong correlations (.74
and .72 respectively) when the KABC-II FCI and MPI were compared with the KTEA-II Comprehensive Achievement Composite (CAC). In comparing the KABC-II global scores with the KTEA composite scores for children 4.5-6 years of age, the researchers found that the KABC-II FCI and MPI correlated strongly with the KTEA-II Reading Composite (.67 and .68 respectively) and with the Written Language Composite (.67 and .70 respectively) while the KABC-II FCI, MPI, and NVI correlated strongly with the Math Composite (.70, .71, and .65 respectively) and with Comprehensive Achievement Composite (.75, .73, and .65 respectively).

The results from all of these studies provide strong support for the KABC-II’s criterion-related validity suggesting that the KABC-II global scores and scales tap many of the same abilities that are also measured through achievement tests. As a result, the KABC-II global score and scales appear to provide sound information regarding children’s strengths and weaknesses in relation to their academic performance.

**Specific learning disability studies.** The premise behind identification of children with a Specific Learning Disability (SLD) is the presence of a disorder in one or more of the basic psychological processes involved in listening, speaking, reading, writing, spelling, and calculating mathematical problems (U.S. Department of Education, 2009). Identifying children with SLD in a manner that is consistent with the definition requires the use of measures that can assess these underlying psychological processes; however, controversy over the effectiveness of cognitive tests in the identification of SLD has resulted in movement away from their use. Because a comprehensive evaluation for suspected SLD must be consistent with its definition, the role of cognitive tests should
not be discounted, particularly those that provide specific information regarding processing strengths and weaknesses. Because the KABC-II was designed to assess processing abilities in addition to cognitive ability, a number of research studies were conducted during the instrument’s standardization examining its effectiveness in distinguishing between typically-developing children and groups of children at-risk for a variety of learning problems. These studies were important in demonstrating the range of applications for which this instrument could be used as well as the KABC-II’s capacity to provide practitioners with detailed information regarding children’s processing strengths and weaknesses when concerns regarding children’s learning abilities exist.

The first of these studies involved the administration of the KABC-II to a sample of 141 children with reading disabilities. These children, whose mean age was 13 years, 2 months, were selected because they had a significant discrepancy between their performance on a measure of intellectual ability and a measure of reading achievement. Their scores on the KABC-II were compared to a non-clinical reference group based on the standardization sample with significant differences (p < .001) found for all three global scores as well as for all of the scale scores. The highest index for children with reading disabilities was the Simultaneous scale followed by the Sequential scale. The lowest index resulted on the Learning scale; however, the mean indexes for this group only varied by slightly less than 3 points. The children were then administered the KTEA-II which resulted in significant differences between the two groups on all of the test’s composites. Not only did the reading disability group demonstrate overall low-average information processing on the KABC-II, but they also demonstrated significant
deficits on measures of reading decoding, fluency, and comprehension skills and low-average functioning in terms of their oral language skills (Kaufman, 2004).

A similar study was conducted with 96 students with learning disabilities in mathematics, whose mean age was 13 years, 7 months. In comparing the results of this study to those examining reading and written language disabilities, the researchers found the largest difference in scores (15.9 points) with the lowest index resulting on the Planning scale. This was not surprising since the Planning scale is a measure of decision-making, and mathematics, in general, requires children to arrive at a strategy that will result in successful problem-solving. The highest index for children with math disabilities was the Simultaneous scale followed by the Sequential and Learning scales. The range of mean indexes for this group was slightly less than 3 points which was similar to that of the reading disability group. When comparing the KTEA-II scores of the math disability students and the nonclinical sample, significant differences were found with the math disability group demonstrating significant deficits on academic tests measuring mathematics, reading, decoding, and written language skills. These results were not surprising as 81% of the children identified with math disabilities were identified with reading disabilities as well (Kaufman & Kaufman, 2004).

In the third study, the researchers used a sample of 122 children identified with written expression disabilities whose mean age was 13 years, 3 months. One third of these children were also diagnosed with a reading disability. As a result, the performance of this group was very similar to that of the children with reading disabilities. While the highest index resulted on the Simultaneous scale, the lowest index was found on the
Learning scale. The difference in mean indexes again was quite small at less than 4 points. In terms of performance on the KTEA-II, the writing disability group obtained the lowest scores on the Reading Decoding composite followed closely by the Reading, Reading Fluency, and Written Language composites. The results for this group suggested that reading and writing activities were equally difficult for them. Again, similar to the reading disability group, this group’s strongest area of achievement resulted on the Oral Fluency composite (Kaufman, Lichtenberger, Fletcher-Janzen, & Kaufman, 2005).

Although the reading, mathematics and written language disability groups performed significantly different from the control sample, their performance in comparison to each other was quite similar both in respect to their scores on the KABC-II scales as well as their Comprehensive Achievement Composite scores on the KTEA-II. Although this may have resulted from the fact that a number of these children did not exhibit pure learning disabilities, it may have occurred because children who experience learning problems also exhibit deficits in cognitive processes that affect performance across multiple academic areas.

Although these studies provide strong evidence that the KABC-II can be used for identification of children exhibiting risk factors associated with learning disabilities, a review of research literature did not find any additional studies that have attempted to replicate these findings. In particular, as an instrument that has been developed for use with young children, studies examining the KABC-II’s ability to detect learning problems in young children is absent from research literature.
Factors Influencing Language Development and Assessment Results

Because this study examines a language measure’s potential use as a cognitive screener by comparing children’s scores on the measure with those they achieve on an established cognitive assessment, it is important to control for factors that could influence the results. In particular, consideration must be given to factors that affect early language development which in turn can impact children’s language scores as well as factors that could depress children’s cognitive test results. In this study, two such factors that were considered include socioeconomic status and race/ethnicity.

Socioeconomic status effects

According to Douglas-Hall and Chau (2008), in 2007 over 5.2 million children in the United States or 21% of all children ages 6 or younger lived in families with incomes below the federal poverty level. Children at greatest risk are those who experience economic hardship during the first five years of life and those who experience hardship of long duration (Duncan & Brooks-Gunn, 1997). Family socioeconomic status (SES), whether measured by family income, educational level, or occupational status, has been linked to the socio-emotional, behavioral, cognitive, and language development of children (Brooks-Gunn, Duncan, & Britto, 1999; Hart & Risley, 1992; Korenman, Miller, & Sjaastad, 1995, McLoyd, 1998; Pungello, Iruka, Dotterer, Mills-Koonce, & Reznick, 2009). As a result, researchers have conducted a number of studies examining factors associated with SES which contribute to the children’s early development with a number of these studies focusing on language development.
Language development and SES. Assigning families to one of three SES categories based on income level, Hart and Risley (1992, 1995) conducted monthly observations of the verbal interactions of 42 families from the time their children were 10 months old until they reached 3 years of age. Although children from all three SES categories began using expressive communication at similar ages and all developed good structure and use of language, children from the highest SES group heard the most words per hour and therefore, as preschoolers they had developed larger vocabularies than children from the other two groups. Although the age at which children began using language was not affected by factors related to SES, the degree of language acquisition varied based on SES level.

In a study of 32 children who were assessed each fall and spring from kindergarten through third grade, Walker, Greenwood, Hart, and Carta (1994) also found that children raised in low SES environments have fewer early language experiences than their higher SES counterparts. Similar to the Hart and Risley study, these researchers found that children in lower SES homes were exposed to less diverse vocabulary than the higher SES children. In addition, they found that children in lower SES homes had fewer opportunities to engage in verbal exchanges and that SES-related differences in language prior to school entry were related to subsequent language ability and academic achievement as assessed through standardized measures. The lower SES children were found to be more likely to experience poorer academic outcomes in elementary school, particularly in subjects such as reading and spelling. Although these early SES-related differences in language skills did not impact the children’s social experiences within their
homes and communities, they significantly affected the children’s academic experiences in their language-rich school environments.

Using a sample of 85 Appalachian children who were assessed four times from 4 months of age to kindergarten age, Fish and Pinkerman (2003) observed a similar pattern of language development as that found by Hart and Risley (1992, 1995). At 15 months of age, there were few differences in the expressive communication skills of low and high SES children; however, by the time these children reached 4 years of age, the majority of low SES children were found to have low language skills. These researchers found that at 4 years of age, SES-related factors that most influenced language development were maternal interaction in teaching situations, child temperament, infant language skills, and home literacy environment based on numbers of books in the home; however, at kindergarten entry, language development, number of books in the home, earlier language development, and secure infant attachment distinguished the children’s language skills. Although this study defined home literacy more narrowly by considering it in terms of number of books in the home, other researchers have adopted a broader view of it and its impact on children’s early language development. In a study conducted by Payne, Whitehurst, and Angell (1994), home literacy was defined by eleven concepts including onset and duration of shared picture book reading, frequency of children’s requests to engage in picture book reading, and private play with books as well as number of books in the home. Using a sample of 323 Head Start children, the researchers found that that home literacy environment accounted for 18.5% of child language development and remained at 12% even after effects of maternal IQ and education were controlled.
Defining home literacy as consisting of shared book reading frequency, maternal book reading strategies, maternal sensitivity, and children’s enjoyment of reading, Roberts, Jurgens, and Burchinal (2005) found that for their sample of primarily low SES families, the strongest predictor of children’s early language skills and later literacy development was the degree to which all of these home literacy factors were found in the home environment as measured by the Home Observation for Measurement of the Environmental Inventory (HOME). Although some of the individual practices such as maternal sensitivity and maternal use of book reading strategies were associated with children’s receptive language skills at 3 years of age and upon entry to kindergarten, these individual practices were not as consistent predictors of language development as the HOME results. Similarly, Bracken and Fishel (2008) examined home literacy in terms of child reading interest, parent reading interest, and parent-child reading interaction in a sample of 233 low SES children attending Head Start and found that parent-child reading interaction was a significant predictor of children’s receptive language skills.

Although each of these studies defined home literacy as consisting of slightly different practices, all of studies found that home literacy practices were influenced by SES level which in turn influenced the development of children’s language skills in some manner.

Raviv, Kessenich, and Morrison (2004) also examined the relationship between SES and children’s early language development. Using a sample of 1016 families from a longitudinal study conducted by the National Institute of Child Health and Human Development (NICHD), these researchers identified maternal sensitivity and cognitive
stimulation as partial mediators between SES and children’s early language development; however, they also determined that SES produced some direct effects on language development as well. In addition, these researchers found differences in the influences of these factors on the development of expressive versus receptive language with environmental factors such as maternal sensitivity having a more powerful influence on receptive language skills and development and maturation exerting a greater influence on expressive language skills.

Overall, the results of these studies suggest that differences in early language ability are associated with factors related to the socioeconomic conditions within a child’s home. Because opportunities for learning can vary based on the SES level in the home, it is important to distinguish children who are experiencing difficulties due to physical conditions or learning problems from those who are experiencing difficulties due to lack of educational opportunities. As a result, it is important to consider the influence of socioeconomic status when using standardized measures to evaluate young children’s language skills and drawing conclusions based on the children’s performance.

**Race/Ethnicity effects**

Race and ethnic diversity in the United States has grown dramatically over the past three decades. In 2008, 56% of children were White, non-Hispanic, 22% were Hispanic, 15% were Black, 4% were Asian, and 5% were categorized as “all other races.” Hispanic children saw the greatest increase from 9% of the child population in 1980 to 22% in 2008. By 2021, it is projected that one in four children in the United States will be Hispanic (America’s Children, 2010). As a result, when examining the potential use of
assessment measures to identify children with learning risk factors, it is important to consider the influences that children’s race and ethnicity may have on this process and the results obtained.

**Language socialization practices and multicultural children.** Differences in language socialization practices found in the home can result in different levels of preschool language acquisition (Pena & Quinn, 1997). This can be seen in verbal interaction styles that Latino-American, African American and European American mothers use with their young children. In a study of European American and African American mothers and their children, Anderson-Yockel, & Hayes (1994) found that European American mothers ask their young children more closed-ended questions and those beginning with “wh” than African American mothers. As a result, the European American children produced more question-related communication than the African American children. Unlike the European American mothers, African American mothers were more likely to ask questions that required their children to compare or explain something or to respond nonverbally. Langdon and Cheng (1992) examined the verbal interaction styles of Latino-American mothers and found that they rarely asked their children to retell events or facts or to provide information that they, the adult, already knows. This variation in language socialization can affect ethnic minority children’s performance on standardized tests which often include a labeling task for evaluating vocabulary or require restating of information to assess reading comprehension. As a result, when culturally or linguistically diverse children are administered a test in a
format that is unfamiliar to them, the results may be more indicative of how well the children have become acculturated rather than the abilities they possess.

**Primary language acquisition.** Another factor that can affect assessment of multicultural children is the primary language spoken in the home. When young children are only exposed to the English language in the classroom, their understanding of what is being communicated to them as well as their understanding of the structure of the language is limited. Because these children may be unable to process information they are receiving in English, they can appear as inattentive or unable to learn (Santos de Barona & Barona, 2007). This also leads to difficulty in assessing children for potential language deficits. In these circumstances it becomes important to determine if a child’s communication difficulties are the result of limited English skills, the process of acquiring a second language, or a communication disorder that requires intervention (Hernandez, 1994). Limited English proficiency should not be considered a potential language issue; however, if children experience difficulties in both their primary language and English, a language disorder may be suspected with the only exception being stuttering (Barrera, 1995). As a result, when confronted with the need to evaluate multicultural children for potential language or other learning difficulties, it is important to determine the child’s primary language and level of secondary language acquisition in order to determine the most effective manner in which the assessment should be conducted.

**Assessment and multicultural children.** According to Santos de Barona and Barona (2007), culturally different children are those from an ethnic group that possess
sociocultural patterns that differ from those of the predominant society. Because the values, behaviors, experiences, and attitudes of these children can vary significantly from those of acculturated middle class families, these factors can affect the way learning occurs as well as the manner in which information is learned. As a result, assessments that are conducted with culturally and linguistically diverse young children should be conducted in a manner that accounts for these differences. For example, some researchers have found that individuals of different cultures are more likely to recall and understand aspects of a lesson that relate most to their own culture (Steffensen, Joag-Dev, & Anderson, 1979). Other researchers have found that what is important and expected for preschoolers to know in one culture may not be important in another culture meaning that adaptive, motor, language, and cognitive behaviors commonly assessed are culturally-defined and should be interpreted within a child’s particular culture (Brassard & Boehm, 2007). It is, therefore, important to ensure that any language-based or cognitive assessments, considered for use with ethnically and racially diverse children, assess children’s true abilities and not their level of acculturation to mainstream society; however, because the developers of cognitive tests are influenced by the cultures in which they live, the tests they design are culturally loaded to some degree, reflecting their developers’ experiences, knowledge, values, and notions of cognitive ability (Valencia & Suzuki, 2001). As a result, there has been long-standing debate whether the scores from these tests can be used fairly to make decisions about individuals, particularly those who are members of ethnic minority groups. This debate over test bias, a statistical concept dealing with differences in assessment results based on group membership, has resulted
in a wealth of research findings that members of different ethnic groups have different levels of performance on a number of cognitive tests and IQ measures (Reynolds, Chastain, Kaufman & McLean, 1987). Because accurate interpretation of cognitive test results is key to effective decision-making for individuals, it is important to understand the reasons for differences in performance for members of ethnic groups. While some researchers have attributed these differences in performance to genetic or environmental influences or a combination of both, others have attributed them to cultural bias (Reynolds, 2000). As a result, test developers have been challenged to design tests that are culturally sensitive, that minimize item bias, and that meet rigorous standards for reliability and validity.

**The BBCS-3: R and cultural diversity.** In order to ensure that the Bracken Basic Concept Scale-3: Receptive (BBCS-3:R) was appropriate for culturally and linguistically diverse children, the normative data were derived from a sample of children that was representative of the U.S. population and was stratified on the basis of age, gender, race/ethnicity, geographic region, and parent education level. In addition, the test’s verbal and visual stimuli were reviewed by a panel of speech-language pathologists and education specialists experienced in the assessment of diverse populations. Based on their recommendations, the artwork was modified to depict greater diversity and to eliminate any visual stimuli that were considered culturally insensitive or to which exposure may be restricted due to locations in which children live. Additionally, item analysis was conducted during the standardization process and as a result, some items were removed, some relocated and others modified (Bracken, 2006). With these changes, the BBCS-3: R
was determined to be a fair assessment of children from diverse cultural and ethnic backgrounds.

**The KABC-II and cultural diversity.** In order to address bias concerns in the development of the KABC-II, a number of steps were taken. First, data of the original K-ABC was reviewed and variables identified as reducing the discrepancies between children from ethnic and mainstream backgrounds were retained. This analysis was based on the administration of the K-ABC to children in North America as well as Europe, Africa and Asia. It included elimination of knowledge-based subtests from the global score indexes and reduction of emphasis on language and crystallized abilities in measuring cognitive ability. In addition, subtests that were found to have few cultural differences were retained and new subtest designs were included that emphasized cognitive processes rather than acquired knowledge. After making revisions, the test was administered to a tryout sample with two-thirds of this sample consisting of ethnic minority children. Items that showed potential bias were analyzed to determine the cause of the difference and based on this analysis, those items were either eliminated or modified. In addition, a panel of experts also reviewed the items in order to evaluate them for fairness to population subgroups such as ethnic group, gender, SES, education, and physical disabilities. Differences were then analyzed a second time during the standardization process which used a sample of children representative of the U.S. population at that time. An additional study was also conducted with a population of American Indian children in order to gather additional information. Based on the
information obtained during standardization, the KABC-II was found to be a fair measure of ability across diverse groups of children.

In addition, the test developers anticipated the possibility that some children who need cognitive assessment may have limited English proficiency; therefore, they also included a nonverbal scale which is composed of subtests that can be administered to children in pantomime and responded to nonverbally (Kaufman, Lichtenberger, Fletcher-Janzen & Kaufman, 2005).

Although the developers of the two assessments used in this study employed rigorous measures to ensure the fair assessment of ethnically-diverse children, the potential for bias in the test results still exists. It is, therefore, critical that steps are taken to ensure that ethnically-diverse children are not overly represented as exhibiting risk factors associated with disabilities. One way in which this can be addressed is in the recruitment of subjects. In this study, ensuring that children who participate in the study are proficient in the English language and have had time to acculturate to the American lifestyle will increase the likelihood that children are appropriately identified as exhibiting learning risk factors instead of being misidentified due to their limited language proficiency or unfamiliarity with the culture in which they live.

**Gender and Assessment of Learning Risk Factors**

Any process used to identify children, who may be at-risk for learning problems and subsequently identified for specialized services, needs to ensure that it does not over- or under-identify children based on gender. A number of researchers have examined the breakdown of gender relative to special education classification and found that disparities
exist. Approximately 7.8% of males in the United States ages five to fifteen are reported as having a disability as compared to 4.7% of females in the same age range (Erikson and Lee, 2008). Using data collected from state education agencies, Tschantz & Markowitz (2003) found that two-thirds of all children receiving special education services were males with a disproportional representation of males to females being most evident in the disability categories of emotional disturbance and specific learning disabilities. Concern over such gender differences has resulted in more attention being given to the topic of gender and special education, and the need to identify the underlying reasons for this trend.

**Gender and learning disabilities.** Although researchers have not determined the exact cause for gender differences in identification for specialized educational services, they have proposed a number of theories for the higher numbers of males identified, particularly those served under the specific learning disability category (Coutinho & Oswald, 2000; Coutinho & Oswald, 2005; Oswald, Best, Coutinho, & Nagle, 2003). Referred to as the “three B’s,” the first of these theories suggests that biological differences exist between boys and girls including differences in genetics, hormones, maturation, cognition, and behavior that account for the higher identification of disabilities in males (Coutinho, Oswald, & King, 2001; Oswald et al., 2003). Although biological differences based on gender have been found to contribute in cases where children are identified with cognitive disabilities, they do not appear to play a role in the identification of children with learning disabilities (Lyon, 1996). Another theory that has been proposed for differences in identification involves differences in behavior and
characteristics of boys and girls. In a study examining the assessment of children with learning disabilities, Ysseldyke et al. (1983) found that decisions regarding special education identification were often made on the basis of pupil characteristics rather than data presented. Similarly, Shaywitz, Shaywitz, Fletcher, and Escobar (1990) found that overactivity and behavioral problems were characteristics that influenced the process of learning disability identification rather than concerns regarding children’s ability and achievement. Finally, a third theory proposed for the discrepancy in learning disability identification rates between boys and girls is bias in the special education referral process. Flynn and Rahbar (1994) found that even when teachers possessed standardized test data identifying equal numbers of boys and girls at risk for reading failure, the boys were still referred for suspected learning problems at a higher rate than the girls. Because researchers have found that the number of male and female students with learning disabilities is more proportional than enrollment in such programs indicate, the higher numbers of males being qualified for services under the specific learning disability (SLD) category would suggest that objective criteria is not consistently used when teachers refer children which results in referral standards and patterns that identify male students at a higher rate than female students (Anderson, 1997).

Although this would appear to be a problem solely affecting males, this is also an issue for females who, as a result of this bias, may be overlooked for special education services when they need these services. (Oswald, Best, Coutinho, & Nagle, 2003; Wehmeyer, & Schwartz, 2001). When this occurs, the unidentified girls are more likely
to become teen mothers, less likely to become employed, and more likely to receive public assistance (Arms, Bickett, & Graf, 2008).

Despite the fact that differences observed in identification for special education services between boys and girls cannot be attributed to one particular factor, it is clear that gender plays a role in the special education referral and identification process, particularly under the specific learning disability category. Although the focus of this study is not to identify children for special education services, it does involve the identification of children exhibiting learning problems so that these children can be provided early educational support through interventions and differentiated instruction. As such, the specific learning disability gender issues point to the importance of evaluating such processes for gender bias and ensuring that they effectively and accurately identify children in need of such services.

**Summary**

The purpose of this literature review was fourfold: (a) to present research findings establishing a relationship between early language development and later academic difficulties, (b) to provide evidence regarding the need for language-based screening measures that can be used with preschool-age children in order to identify those who could benefit from intervention or more comprehensive evaluation, (c) to establish validity of the BBCS-3: R and KABC-II for the purpose of this research project, and (d) to provide evidence regarding the need for consideration of socioeconomic status, race/ethnicity, and gender influences when using language-based and cognitive assessments to identify children as exhibiting learning risk factors.
Despite evidence that early identification of learning difficulties and implementation of interventions increases the likelihood of better academic outcomes and that a relationship between early receptive language skills and later academic and cognitive ability exists, little progress has been made in identifying measures that could facilitate this process for preschool-age children. One language measure that has been developed for use with young children is the BBCS-3: R. Research studies examining the BBCS-3: R and its predecessors have found these instruments to be strong measures of receptive language. Although the concurrent validity of the BBCS and BBCS-R with cognitive measures has been established thereby providing support for their use as cognitive screeners, similar studies have not been conducted with the BBCS-3: R. Although the test developer contends that the BBCS-3: R is similar to its two earlier versions and presents evidence of strong correlations between the instruments, studies examining the concurrent validity of the BBCS-3: R with cognitive measures are needed to provide support for use of this instrument as a screener of cognitive and mental processing ability.

The KABC-II is an ideal cognitive measure to be used for this purpose. It was not only developed for use with young children but has been shown to have a strong relationship with measures of achievement as well as the ability to discriminate at-risk children from those who are typically-developing. As such, establishing a relationship between this instrument and the BBCS-3: R would provide evidence of the BBCS-3: R’s ability to identify children exhibiting learning risk factors.
Finally, when examining the effectiveness of the BBCS-3: R for the purpose of identifying at-risk children, it is important to consider factors that can impact the validity of the results obtained. Two factors that have been shown to influence the development of early language skills and therefore have the potential to affect preschool language measure results are socioeconomic status and ethnicity. A third factor that must be considered is gender. Research studies have found gender differences in the special education referral and identification process with males being over-identified, particularly in the category of specific learning disabilities while females tend to be under-identified in this category. Therefore, when evaluating children for learning problems and possible subsequent special education placement, it is important to address any aspects of the process that may result in gender bias. If, after addressing these factors, a relationship between the BBCS-3: R and KABC-II can be established, the BBCS-3: R can then be used as a screener of learning risk factors thereby identifying preschool-age children who could benefit from the provision of interventions prior to the start of formal schooling.
Chapter 3: Methodology

Justification of Study

Although it is well-founded that early identification and intervention for children with special needs is critical to their future development, there are some educational professionals who question whether such early identification is possible when young children experience learning problems. Because identification of such problems has traditionally been based on children’s persistent difficulties in at least one academic area, those who argue against early identification of learning problems do so on the basis that children do not begin to engage in such activities until they are school-age; therefore, assessment of these risk factors cannot be conducted until that time. As a result of this mindset, children may experience several years of academic failure before interventions addressing these problems are implemented. However, scientific studies involving genetic research based on twin studies, sibling analysis, and family pedigree analysis as well as studies of the brain have determined that learning problems are neurobiological in nature (Fiedrowicz, 1999) and as such, they can be identified long before children begin to struggle with the demands of school-age academics and develop secondary problems such as frustration and lack of motivation. Although early identification of learning problems can be difficult, its proponents believe that it is not only possible but critical in helping children experience later academic success (Steele, 2004).
For young children, the identification of learning problems requires focusing on delays in developmental domains (Lowenthal, 1998). A key indicator of later learning problems that has been substantiated by a wealth of research findings is early language deficits. In some children this may be evidenced as difficulties in the development of oral language (Bishop & Adams, 1990, Scarborough & Dobrich, 1990) while for other children, it is reflected in their difficulties in understanding words and sentences or in distinguishing between speech sounds (Catts, 1993; Montgomery, 1995; Montgomery, 2000). While early childhood assessment is a relatively new domain within psychoeducational assessment, there are several measures that have been developed to assess young children’s language skills. One of these, the Bracken Basic Concept Scale-Third Edition: Receptive (BBCS-3: R), has been substantiated as a valid measure of receptive language and is often used to screen children for potential language deficits; however, despite its utility as a language screener, studies have not been conducted to determine whether as a screener of receptive language delays, it also has the potential to identify risk factors associated with learning problems. In order to be used in this manner, the BBCS-3: R would need to demonstrate a relationship with a standardized measure that is traditionally used in the assessment of learning problems.

Because the basis for identifying learning problems is making a determination regarding deficits in psychological processes that set the foundation for learning, instruments used to evaluate the existence of these deficits must be able to measure processing ability. The Kaufman Assessment Battery for Children, Second Edition (KABC-II) is a comprehensive assessment of cognitive and processing ability that has
been designed for this purpose and has demonstrated the ability to effectively discriminate typically-developing children from those who have deficits in a variety of learning areas.

The purpose of this study, therefore, is to examine the relationship between the BBCS-3: R and the KABC-II in order to determine whether the BBCS-3: R can be used as a screener of learning risk factors. Specifically, this study investigates whether children scoring delayed or lower on the BBCS-3: R composite scores also score in the below average categories on one or more of the KABC-II scales as well as on the KABC-II’s global score, the Mental Processing Index; thus, providing evidence of the BBCS-3: R’s ability to identify children at risk for processing disorders associated with the KABC-II’s scales. If these deficits can be identified before children enter formal schooling, interventions can be implemented in an attempt to minimize later difficulties associated with these problems as well as reduce future school failure.

Participants

The population for this study consists of 100 children who attend the full or half-day programs at Columbus Development Council of Franklin County (CDCFC) Inc. Head Start centers or the full-day programs at CDCFC federal partnerships which are private daycare centers that provide Head Start services. Any child with parent/guardian consent was eligible to participate in the study.

Children selected for participation range in age from 4:0 to 5:11 years of age. Age range of the subjects is restricted because administration of the KABC-II to children 3:0 to 3:11 years of age only allows for calculation of a global score while both global and
scale scores can be calculated for children between the ages of 4:0 and 5:11 years of age. Calculation of scale scores is critical to this study because the KABC-II scale scores provide information regarding specific cognitive processes. These scores can then be examined in relationship to the BBCS-3: R composite scores in order to make a determination regarding the BBCS-3: R’s potential for detecting deficits in processing ability.

**Setting**

The centers utilized in this study are located within both urban and suburban areas of a large, Midwestern city. Four of the centers are CDCFC Head Start centers which provide comprehensive developmental programs and services to income-eligible children 3-5 years of age and their families including full and half-day preschool classes as well as health, nutrition and other social services. Three of the centers are privately-owned daycare facilities which participate in the Head Start federal partnership program providing income-eligible 3-5 year old students with Head Start services.

In order to meet the income eligibility for Head Start, children’s families must meet federal poverty income guidelines; however, Head Start is permitted to offer 10% of their enrollment to children whose families are above the poverty guideline. CDCFC Head Start children receive instruction under the Creative Curriculum which organizes learning experiences around four developmental areas with a particular emphasis on the development of language and literacy-based skills that directly impact early reading and school readiness thus exposing children to pre-academic skills (CDCFC Head Start Inc.,
As a result, all of the children in this study, regardless of their center placement, receive similar literacy-based preschool instruction.

**Sampling Method**

The sampling method used for this study consists of non-probability, convenience sampling. Although probability sampling is preferred in quantitative research, the use of non-probability sampling is acceptable when a researcher is performing a preliminary exploratory study and is seeking an estimate of the results as is the case with the current study (Schutt, 2006).

**Research Method**

Because the purpose of the current study is to determine relationships and patterns of relationships among variables in a single group of subjects, a correlational research method was selected. This research method allows for the analysis and prediction of a dichotomous outcome: whether or not children who score in the two delayed categories of the BBCS-3: R School Readiness Composite and/or Total Composite also score in the two below average categories on the KABC-II Sequential, Simultaneous, and Learning scales and the Mental Processing Index. This research method is appropriate because it provides research findings regarding potential associations between scores obtained on the BBCS-3: R scales and the KABC-II in the absence of active introduction or manipulation of variables. Unlike experimental studies, correlational studies do not imply causality; however, these studies still play a valuable role in research by (1) establishing important relationships, (2) guiding future experimental studies, and (3) identifying nearly causal relationships. Experimental research can be expensive and time-
consuming, as well as difficult to implement, particularly in the school setting; therefore, by ensuring that a causal relationship between variables exists prior to commencing such a study, researchers are provided with vital information regarding specific variables to target in future experimental studies (Cook & Cook, 2008).

Because the decision was made to dichotomize the variables in this study, consideration was given to the potential implications of this practice. In terms of statistical significance, research studies have shown that dichotomization of variables can result in loss of information regarding individual differences, loss of effect size and power, the occurrence of false significant main effects, and risk of overlooking nonlinear effects (MacCallum, Shang, Preacher, & Rucker, 2002). As a result, statistical significance can be adversely affected. In order to address this concern, correlations among the individual variables will be examined in order to assess the strength of their relationships and to identify any resulting effects from the variables’ subsequent dichotomization.

In addition, consideration was also given to practical significance. Within the field of education, decisions regarding provision of specialized services are frequently made on the basis of established cut-off points. Children who score below that point receive remediation or specialized services while those who score above that point are deemed ineligible for such services. Therefore, the decision to dichotomize BBCS-3: R and KABC-II assessment results as a means of distinguishing between children who do and do not exhibit learning risk factors falls in line with common practice in the field and provides practical significance in terms of this study’s findings.
Instrumentation

The BBCS-3: R. The Bracken Basic Concept Scale-Third Edition: Receptive (BBCS-3: R) is a measure of receptive language and children’s acquisition of basic educational concepts designed for administration to children ages 3 years, 0 months through 6 years, 11 months. It consists of ten subtests which include Colors, Letters, Numbers/Counting, Sizes/Comparisons, Shapes, Direction/Position, Self-/Social Awareness, Texture/Material, Quantity and Time/Sequence. The first five subtests comprise the Receptive School Readiness Composite (Receptive SRC) while the five additional subtests in addition to the Receptive SRC subtests comprise the Receptive Total Composite (Receptive TC) (Bracken, 2006). The purpose of the Receptive SRC is to assess concepts that children have traditionally needed to know in order to be prepared for formal education and that have been established as reliable predictors of early childhood academic success (Panter and Bracken, 2009) while the purpose of the Receptive TC is to provide information about children’s overall conceptual development as assessed receptively (Bracken, 2006). The BBCS-3: R Composite scores are based on a mean of 100 and SD of 15 to permit direct comparison of children’s performance with those obtained on other major tests.

During its standardization, the reliability of the BBCS-3: R was estimated using test-retest stability and internal consistency. To obtain evidence of test-retest stability, the BBCS-3: R was administered to 87 children on two separate occasions within 2 to 30 days with both test administrations conducted by the same examiner. Using Pearson’s product-moment correlation coefficients for the age groups of 3;0-4:11 and 5;0-6:11 as
well as for all ages combined, Bracken (2006) found adequate to good stability across
time for all age groups. The average corrected stability coefficients for all ages for the
SRC, Directions/Position, Texture/Material, and Time/Sequence subtests fell in the .80’s
and those for the Self-Social Awareness and Quantity subtests fell in the .70’s. In
addition, the average corrected stability coefficients of the Receptive TC and the
Receptive SRC scores were strong falling at .94 and .86 respectively.

Bracken (2006) also found that the mean retest scores for all subtests for
combined ages were higher than the scores for the first test with the effect sizes ranging
from .11 to .39. In addition, score differences for combined ages, primarily due to
practice effects fell within expected ranges of 4.7 points for the Receptive TC score and
3.4 points for the Receptive SRC score.

Additional evidence of reliability was calculated using the split-half method
which provides a measure of internal consistency. Tests were conducted for the
normative sample of 640 children as well as two clinical samples, 52 children with
language impairments and 64 children with cognitive disability. For the normative
sample, the average split-half reliability coefficients of the BBCS-3: R subtests ranged
from .91 for Self/Social Awareness, Texture/Material and Time/Sequence to .97 for
Direction/Position. Examination of reliability information for subgroups found strong
reliability coefficients regardless of age, gender or ethnicity. In addition, all reliability
coefficients for the two clinical groups were in the .90s which suggests that the BBCS-3:
R is a reliable measure of children’s receptive language and basic concept acquisition
whether the children are members of the general population or diagnosed with language impairment or a cognitive disability (Bracken, 2006).

Evidence of the validity of the BBCS-3: R was obtained through tests of content, construct, and criterion-related studies. In order to assess content validity, the content items of BBCS-3: R were reviewed by the author, national and international test developers, and an expert panel of speech language pathologists and psychologists. For young children, the content items were compared directly to the early childhood educational standards that have been or are in the process of being developed for the 50 states of the United States. Based on this comprehensive analysis, the items were found to adequately represent the concepts measured by each subtest.

Evidence of construct validity was determined through intercorrelational analyses. Because each of the subtests measures basic language concepts, it was expected that they would moderately to highly correlate with each other. Using the normative sample of 640 children, Bracken (2006) found a high correlation of .79 between the Receptive TC and the Receptive SRC across all ages. This result was expected since the Receptive SRC raw score is considered in the calculation of the Receptive TC score. The correlations found among the individual subtests were more moderate. Because the observed pattern among the correlations was consistent with the expected pattern, the results were interpreted as providing strong evidence for the construct validity of the BBCS-3: R.

In order to evaluate its criterion-related validity, the BBCS-3: R was compared with its predecessor, the Bracken Basic Concept Scale-Revised (BBCS-R), and with the Preschool Language Scale-Fourth Edition (PLS-4), a measure of expressive and receptive
language abilities. An examination of the relationship between the BBCS-3: R and its predecessor found strong correlations (.69 to .84) when comparing their subtests as well as strong correlations (.85) when comparing the BBCS-R composite scores to the BBCS-3: R composite scores. In comparing the BBCS-3: R to the scales of the Preschool Language Scale-Fourth Edition (PLS-4), Bracken found moderate to high correlations of .46 to .77 between the subscales of these instruments. These results were expected since some of the PLS-4 subtests measure expressive language skills which were not expected to correlate strongly with the receptive language scales of the BBCS-3:R. (Bracken, 2006). Although the studies conducted on the BBCS-3: R are limited in number, each time an updated version of the Bracken test has been published, studies comparing it to its previous version have demonstrated that the instruments are very strongly related to each other. As a result, Bracken considers those previous studies as indicative of the current BBCS-3:R’s criterion-related validity; therefore, in considering the current results in conjunction with studies conducted on the previous versions of the Bracken test with the Peabody Picture Vocabulary Test-Revised (Bracken, Howell & Crain, 1993), the Wechsler Preschool and Primary Scale of Intelligence-Revised (Bracken, 1998; Laughlin, 1995; Schneider and Gervais, 1991), the Stanford-Binet Test of Intelligence, Fourth Edition (Howell & Bracken, 1992), the Differential Abilities Scale (Bracken, 1998; McIntosh, Brown & Ross, 1995, McIntosh, Wayland, Gridley, & Barnes, 1995), and the Woodcock Johnson-Revised Tests of Cognitive Abilities (McGrew, Werder & Woodcock, 1991), Bracken concluded that these studies as a whole provide evidence of the BBCS-3: R’s criterion-related validity.
The KABC-II. The Kaufman Assessment Battery for Children (K-ABC) was introduced in 1983 and revised in 2004. The original version was developed as a measure of intelligence and achievement for children ages 2 years, 6 months to 12 years, 6 months. Its 2004 version, the Kaufman Assessment Battery for Children, Second Edition (KABC-II), is a measure of processing and cognitive ability of children and adolescents between the ages of 3 years, 0 months and 18 years, 11 months organized into the three levels of age 3, ages 4-6 years, and ages 7-18 (Kaufman, Lichtenberger, Fletcher-Janzen & Kaufman, 2005). Unlike the K-ABC which was based solely on Luria’s three blocks theoretical model (Luria, 1970), the KABC-II offers a choice of two theoretical approaches, Luria’s model and the Cattell-Horn-Carroll hierarchically organized model (McGrew, 2005). The two models are differentiated by their global index scores, the Mental Processing Index (MPI) for the Luria model and the Fluid-Crystallized Index (FCI) for the CHC model.

All KABC-II scales provide standard scores with a mean of 100 and $SD$ of 15 to permit direct comparison of cognitive ability and achievement for children suspected of learning disabilities and to allow for meaningful interpretation of KABC-II standard scores in comparison to scores obtained on other major tests of cognitive ability.

The KABC-II consists of 18 subtests which are designated as core or supplementary. Each scale is comprised of a combination of these subtests which are broken down in the following manner: (1) Sequential scale subtests include Number Order, Word Order, and Hand Movements; (2) Simultaneous scale subtests include the core subtests of Conceptual Thinking, Face Recognition, Rover, Triangles, and Block
Counting as well as the supplementary subtest, Gestalt Closure; (3) Learning scale subtests include the core subtests of Atlantis and Rebus and the supplementary subtests of Atlantis Delayed and Rebus Delayed; (4) Knowledge scale subtests include Expressive Vocabulary, Verbal Knowledge and Riddles; and (5) Planning scale subtests include Story Completion and Pattern Reasoning. Despite the fact that there are 18 subtests, the number of core subtests that are considered in the global score varies from five for children who are 3 years of age to nine subtests for children ages 4-6 years, and seven for children ages 7-18 years when using the Luria model. For the CHC model, one additional subtest is administered at age 3 and two additional subtests are administered at all other ages contributing to the additional scale associated with crystallized knowledge. Close attention must be paid by an examiner during the administration of the KABC-II because different subtests are administered for each age group and even within age groups depending on the global scale selected (Bain & Gray, 2008; Kaufman & Kaufman, 2007).

In order to evaluate the reliability of the KABC-II, the test developers conducted two different tests. The first, which estimated internal-consistency reliabilities of subtests using the split-half technique, examined the extent to which the KABC-II items measure the same ability and the extent to which performance on each item was determined by the ability being measured as well as the impact of the number of items on the subtests. Based on the calculated Pearson’s product-moment correlation coefficients, the subtests demonstrated overall strong internal consistency at all ages. Average internal consistency coefficients were .95 for the MPI at both ages 3-6 years and ages 7-18 years while the coefficient values for the FCI were .96 for ages 3-5 years and .97 for ages 7-18 years.
Internal consistency values for the subtests ranged from .69 for Hand Movements to .92 for Rebus for the 3-6 year group and .74 on Gestalt Closure to .93 for Rebus for the 7-18 year group. The supplementary subtests had slightly lower reliabilities on average (Kaufman, Lichtenberger, Fletcher-Janzen, & Kaufman, 2005).

In order to assess the consistency of KABC-II scores over a period of time, the battery was administered twice to 205 children in three age ranges during an interval that ranged from 12 to 56 days. While the retest reliabilities of the FCI and MPI ranged from the mid .80s to the mid .90s, they were lower for the Nonverbal Scale (NVI). In looking at the scales, test-retest reliabilities near .80 were found for all scales except the Knowledge scale for which the values ranged from the high .80s to the low .90s. Median retest reliability of core subtests ranged from .72 for children 3-5 years of age to .75 for children 7-12 years of age. As expected, retest stabilities of the FCI and NVI increased with age which results from more stable performance as children become older (Kaufman & Kaufman, 2004). In terms of practice effects, the largest change from the first to second testing was 14-15 points for the Learning scale at ages 7-18 which was expected considering that the subtests comprising this scale assess long-term retention of information which would account for the increased scores during the second administration (Kaufman, Lichtenberger, Fletcher-Janzen, & Kaufman, 2005). Overall, these findings suggest that the KABC-II is a fairly stable instrument.

In order to assess the construct validity of the KABC-II, factor-analytic studies were conducted. Results of the confirmatory factor analyses (CFA) across the different age groups supported the use of different batteries for different age levels. In addition, an
analysis was conducted in order to provide validity evidence for the theoretical basis of
the test. This involved an analysis of cases in the normative sample at ages 4 and older
that were conducted separately for the age ranges of age 4, ages 5-6, ages 7-12, and ages
13-18 and included all of the subtests including the supplementary ones. The results
demonstrated several patterns. First, the loadings on core subtests on their ability factors
were high which suggests that they are strong measures of the ability that underlies the
scale to which they belong. In addition, all of the loadings of the ability factors on the
general factor were high suggesting that the abilities are influenced to a substantial
degree by the general ability factor. Finally, the core subtest model at each age
demonstrated good fit to the data. For the analysis of core subtests, the Confirmatory Fit
Index (CFI) ranged from .997 to .999 where values of .95 of higher are considered
indicative of good fit. In addition, the Root Mean Squared Error of Approximation
(RMSEA) ranged from .025 to .055 where values of .05 or below indicate good fit. These
results provided evidence for the theory-based structure of the KABC-II (Kaufman &
Kaufman, 2004).

In addition to the factor analyses, validity of the KABC-II was further supported
by its correlations with a number of cognitive and achievement measures including the
Peabody Individual Achievement Test-Revised (PIAT-R), the Woodcock Johnson III-
Tests of Achievement (WJ III ACH), the Wechsler Intelligence Scale for Children, Third
Edition (WISC-III), the Wechsler Intelligence Scale for Children, Fourth Edition (WISC-
IV), the Wechsler Preschool and Primary Scale of Intelligence, Third Edition (WPPSI-
III), the Woodcock Johnson III-Test of Cognitive Skills (WJ III COG), and the Wechsler
Individual Achievement Test-Second Edition (WIAT-II). These studies conducted during and after standardization of the KABC-II provided evidence of the relationship between the KABC-II and these instruments, particularly other measures of cognitive ability (Kaufman & Kaufman, 2004).

**Sampling Procedures**

The process began with pursuit of research project approval from the Institutional Review Board (IRB) at The Ohio State University. Approval to conduct the research project within Head Start classrooms and federal partnership sites was also sought from the CDCFC, Inc. governing board and KinderCare district managers. Once approval was obtained from all governing authorities, access to subjects was solicited through contact with the Head Start and federal partnership center directors and coordinators. Each center director and coordinator was contacted in person at which time the purpose and procedures of the study were explained to them. Upon their agreement to participate, the CDCFC Inc. on-line data management system was used to identify all children who met the study age requirements. Teachers of eligible students were provided with a sealed envelope consisting of an invitation letter (See Appendix A) and two copies of the consent form (See Appendix B) to be sent home with each of the age-eligible children. Permission slips were returned to the center and placed in a lockbox located in the main office. Children, whose parents did not return the slips, were excluded from the study whereas children, for whom parental consent was received, were scheduled for two assessment sessions which took place on two separate occasions no more than one week apart. To protect children’s confidentiality, all information was coded with an
alphanumeric code and the children’s names were not listed on any protocols. All assessments were conducted by one examiner in an accessible location in the child’s school at times designated by the teacher to be non-disruptive and convenient. Tests were administered according to standardized procedures. The first test administration entailed administration of the BBCS-3: R to half of the children and administration of the KABC-II to the other half of the children. The second test session entailed administration of the second measure. If a child appeared fatigued during the test administration, breaks were provided in order to capture the child’s best performance. Children were given stickers at the conclusion of each testing session and a certificate of completion and magnet at the conclusion of the second testing session.

**Threats to Validity**

As with any research study, there are several threats to internal validity that could potentially impact this study’s findings. First, subject characteristics can affect the validity of the study in that children selected may vary from each other in ways that influence the results (Wallen & Fraenkel, 2001); therefore, it was important to ensure that the subjects were as similar to each other as possible in order to minimize the effects of these differences on the findings. One characteristic which was considered in this study was socioeconomic status (SES). Because the home environment is a factor in the development of children’s language skills and this study involves the assessment of language skills, children’s SES level has the potential to confound the assessment results. However, because the children in this study are enrolled in Head Start services, the effect of SES is controlled to a great extent since families are required to meet specific income
guidelines in order for their children to be eligible for these services and only a small percentage of children may come from homes which are over-income and even in those cases, the incomes are low enough that the children meet the requirement for reduced-price lunches.

Another variable that was considered was English language proficiency. Because one of the measures used in this study assesses receptive language, it is important that children, whose primary language is not English, have had adequate exposure to English language concepts so that their assessment results reflect their understanding of these concepts and not the degree of their English language acquisition. As a result, if children were not considered proficient in their receptive and expressive English language skills as determined by their teachers or families, they were excluded from the study since limited language proficiency could confound the results.

Other subject characteristics were more difficult to control. For example, number of years in Head Start or a KinderCare program could affect assessment results because children who have been in one of these programs since 3 years of age have been exposed to a pre-academic curriculum longer than children who may have begun at 4 years of age. In addition, children attending a full-day of programming may have received more exposure to the concepts assessed than children who were attending a half day program. Two additional subject characteristics which were more difficult to control included children’s race/ethnicity and gender. Because many of the Head Start centers are located in urban areas where there is a heavy concentration of ethnic minority children, the sample did not reflect current U.S. demographics. In addition, because the study involves
a convenience sample whose participation in the study was dependent on parental permission and because there was a limited time frame during which the children were available for testing, it was not possible to ensure that the sample consisted of equal numbers of males and females.

Another threat to internal validity involves testing or the effects that result from children’s reaction to being tested (Fortune & Reid, 1999). For example, if children experience difficulties during the first test administration, they may be reluctant to participate in a second testing section or may put forth less effort due to the previous experience. In addition, there are items on the BBCS-3: R in which opposite concepts are presented during the course of testing. As a result, the risk exists that children may be indirectly provided with information or cues that aid them in answering other test questions even though the children may not be familiar with the concepts.

A third threat to internal validity involves location. When comparable locations are not available for testing all of the children, aspects of the location in which testing is conducted may affect the children’s responses (Wallen & Fraenkel, 2001). As a result, it is important to arrange for testing to take place in locations that are comparable in terms of factors such as noise level, lighting, temperature, proximity to their peers, and physical arrangement of the room. Although this is possible at centers where extra rooms are available for testing, some centers may be limited in extra space; therefore, children at these sites may be tested in locations where distractions are present that may interfere with their ability to focus and to adequately demonstrate their knowledge base.
An additional threat to validity involves data collector characteristics, meaning the person collecting the data may unconsciously distort the data in a way that skews the results (Wallen & Fraenkel, 2001). Although some data collector characteristics such as gender, race, and age are difficult to control, it is possible to minimize other effects by following the standardization procedure for each assessment administered and by monitoring body language and facial expressions thereby reducing the risk of providing children with hints that influence their decisions during the testing process.

Maturation can also affect the internal validity of a study in that changes may occur within the subjects that are simply a function of the passage of time (Ary, Jacobs, Razavieh, & Sorensen, 2006). Because circumstances arise that may prevent the administration of an entire measure in one testing session, the potential exists for children to be exposed to new concepts between the two test administrations that result in the children receiving higher scores than they would have attained if the entire measure had been administered in one testing session.

Finally, history can pose a threat to internal validity in correlational studies. This involves the influence of specific events occurring between the first and second test administrations that are unrelated to the independent variable but affect the dependent variable (Campbell & Stanley, 1963). Because it is impossible to anticipate the vast number of events that can occur between test administrations, it is important to keep track of any events such as illnesses, family crises, or prolonged absences that may have influenced the children’s performance as well as to minimize time lengths between
testing session in order to reduce the likelihood of a significant event occurring that could potentially impact children’s performance from one testing session to the next.

In addition to internal validity threats, there are also external validity threats which influence the extent to which a research study’s results can be generalized. In this study, the absence of random sampling is such a factor because there is no guarantee that the sample available for this study reflects the larger population of children and as such, limits the applicability of the results. However, given that this study is exploratory in nature, the results provide an avenue for future replication that can be conducted within the framework of an experimental study using random sampling (Wallen & Fraenkel, 2001).

**Variables**

Investigation of a relationship between the scores on the BBCS-3: R and the KABC-II entails the use of categorical variables. The first independent variable is score category on the BBCS-3: R SRC and TC composites. This variable has two categories, Delayed or lower indicating a score falling in the Delayed or Very Delayed range and Average or higher indicating a score in the Average, Advanced or Very Advanced range. The second independent variable is the score category on the KABC-II Sequential, Simultaneous, and Learning scales and Mental Processing Index. This variable also has two categories: a score of Below Average or lower indicating a score in the Below Average or Lower Extreme range and a score of Average or higher indicating a score in the Average, Above Average and Upper Extreme range. The dependent variable is the
frequency count or the number of children who scored in each of the dichotomous categories on the two assessments.

Although the BBCS-3: R School Readiness (SRC) and Total Test (TC) Composite Scores as well as the KABC-II Sequential (Seq), Simultaneous (Sim), and Learning (L) scale scores and the Mental Processing Index (MPI) are based on a mean of 100 and SD of 15, the test developers differ in terms of their interpretation of the score that separates children scoring in the average range from those scoring in the delayed/below average range. While scores of 85 on the BBCS-3: R are considered delayed, the same score on the KABC-II is considered as falling within the average range; therefore, in following the test developers’ scoring interpretations, the cutoff for a delayed score on the BBCS-3: R was 85 while for the KABC-II, the cutoff for a below average score was 84.

Data Analysis

Because the purpose of this research study was to evaluate suppositions regarding the existence of relationships between two categorical variables where each individual in the sample is measured on two separate variables, the chi-square test was used. In using this test, there are several basic assumptions. First, both variables must have either a nominal or ordinal modeling type meaning that the Fit Y by X platform treats both of these types of variables as classification variables and analyzes them the same way (Lehman, O’Rourke, Hatcher, & Stepanski, 2005).

Secondly, the observations are always assumed to be independent of each other meaning that each subject can only contribute to one cell of the contingency table. Use of
the chi-square test is not appropriate in situations where subjects can produce responses that could be classified in more than one category or contribute to more than one frequency count to a single category (Gravetter & Wallnau, 2007).

Finally, a third assumption involves the cell frequency counts. A standard rule of thumb is to avoid using the chi-square test for tables with expected cell frequencies less than 1, or when more than 20% of the cell tables have expected cell frequencies less than 5 (Cochran, 1954). When this occurs, there is a risk that the chi-square tests statistic can be distorted.

Data analysis for this study was conducted using Predictive Analytic SoftWare (PASW) Version 18.0 formerly known as SPSS. Because the present study examines whether a relationship exists between two categorical variables, the chi-square test of independence was selected as the test statistic. The process began with a statement of the null and research hypotheses as well as selection of level of significance. For this study, there were eight null hypotheses tested as follows:

For the BBCS-3: R SRC

$H_0$ = The variables KABC-II Sequential category and BBCS-3: R SRC category are independent

$H_0$ = The variables KABC-II Simultaneous category and BBCS-3: R SRC category are independent

$H_0$ = The variables KABC-II Learning category and BBCS-3: R SRC category are independent
$H_0 = \text{The variables KABC-II MPI category and BBCS-3: R SRC category are independent}$

For the BBCS-3: R TC

$H_0 = \text{The variables KABC-II Sequential category and BBCS-3: R TC category are independent}$

$H_0 = \text{The variables KABC-II Simultaneous category and BBCS-3: R TC category are independent}$

$H_0 = \text{The variables KABC-II Learning category and BBCS-3: R TC category are independent}$

$H_0 = \text{The variables KABC-II MPI category and BBCS-3: R TC category are independent}$

Each null hypothesis for the chi-square test of independence states that the two variables being measured are independent; that is, for each individual, the value obtained for one variable is not related to the value obtained for the second variable (Gravetter & Wallnau, 2007). This means that if the two variables are truly independent, the cell frequencies will be determined solely by random chance (Healey, 2007). The alternative hypotheses, on the other hand, state that classification into a particular category on one variable will influence classification into a particular category on the second variable. Therefore, for the current research study, the alternative hypothesis states that a relationship exists between categories of scores children receive on the KABC-II scales/global score and categories of scores children receive on the BBCS-3: R composites. All statistical hypotheses were tested at a .05 alpha level.
The process began with the creation of cross tabulations for each data set. The crosstabs consisted of two variables, BBCS-3: R scores and KABC-II scores, which were divided into two categories. The BBCS-3: R scores were categorized as delayed or lower and as average or higher while the KABC-II scores were categorized as below average or lower and as average and higher. Calculation of the chi-square test statistic began with computation of the expected values of the two nominal variables using the following formula:

\[ E_{i,j} = \frac{\sum_{k=1}^{c} O_{i,k} \sum_{l=1}^{r} O_{l,j}}{N} \]

Where:

- \( E_{i,j} \) = Expected value for chi-square test of independence
- \( \sum_{k=1}^{c} O_{i,k} \) = Sum of the \( i \)th row in the chi square test of independence
- \( \sum_{l=1}^{r} O_{k,j} \) = Sum of the \( j \)th column in the chi square test of independence
- \( N \) = Total number in the chi square test of independence

The calculation of expected values provides an ideal frequency distribution that represents the null hypothesis.

After calculating the expected value, the chi-square test for independence statistic is used to measure the discrepancy between the research data and each of the null hypotheses that was used to generate the expected frequencies (Gravetter & Wallnau, 2007). The following formula is used to calculate this test statistic:

\[ \chi^2 = \sum_{i=1}^{r} \sum_{j=1}^{c} \frac{(O_{i,j} - E_{i,j})^2}{E_{i,j}} \]
Where:

\[ \chi^2 \] = Chi-Square test of Independence

\[ O_{ij} \] = Observed value of two nominal variables for the Chi-Square test of Independence

\[ E_{ij} \] = Expected value of two nominal variables for the Chi-Square test of Independence

In order to determine the level of significance associated with the calculated chi-square statistic, the degree of freedom was calculated using the following formula:

\[ DF = (r-1)(c-1) \]

Where:

DF = Degree of freedom for the Chi-Square test of Independence

r = number of rows in the Chi-Square test of Independence

c = number of columns in the Chi-Square test of Independence

The final step was to evaluate the data that tests for significance in order to make a decision regarding each of the null hypotheses. This requires an examination of the \( p \) value for the calculated chi-square which is the probability that the deviation of the observed scores from those expected is due to sampling error. If the \( p \) value for the calculated chi square is \( p > .05 \), the difference between the observed and expected scores is small enough that chance alone accounts for the difference. In this case, the null hypothesis is the best explanation for the results obtained. If the \( p \) value for the calculated chi square is \( p < .05 \), the null hypothesis is rejected on the basis that some factor other than chance is involved for the deviation between the scores to be so great. In this study, rejection of the null hypothesis is considered as evidence of a relationship between
BBCS-3: R and KABC-II scores thereby providing support for the use of the BBCS-3: R as a screener of potential learning risk factors.

**Summary**

This chapter began with a rationale for the present study and provided a description of variables as well as an overview of the sampling method, instrumentation, data collection process, and data analysis procedures. The variables researched in this study are two score categories for the BBCS-3: R SRC and TC composites, delayed or lower and average or above, and two score categories for the KABC-II Sequential, Simultaneous, and Learning scales and Mental Processing Index, below average or lower and average or above. Because the variables are categorical, the research method selected utilizes cross-tabulation and chi-square analysis in order to examine relationships between scores of the two measures and address the eight hypotheses proposed. The following chapter provides an overview of the study sample characteristics and a summary of the research findings.
Chapter 4: Results

The purpose of this study was to explore the relationship between the Bracken Basic Concept Scale-3: Receptive (BBCS-3: R), a measure of receptive language, and the Kaufman Assessment Battery for Children-Second Edition (KABC-II), a measure of processing and cognitive abilities in children and adolescents, in order to determine if the BBCS-3: R can be used as a preschool screener of risk factors associated with learning problems. Because assessment scores were grouped into categories based on their classification as either Average or higher or Below Average/Delayed or lower, the chi-square test of independence was selected for statistical analysis since it provides a means of assessing relationships between categorical variables. Six chi-square test analyses were computed to assess relationships between the BBCS-3: R Composite scores, the School Readiness (SRC) and Total Test (TC), and each of the three KABC-II scales, Sequential, Simultaneous, and Learning. Two additional chi-square test analyses were computed in order to examine relationships between the BBCS-3: R composite scores, the SRC and TC, and the KABC-II Mental Processing Index (MPI). All statistics were reported with an alpha level of .05.

This chapter provides an overview of sample characteristics as well as findings for each of the research hypotheses. First, descriptive statistics are presented to provide information regarding the demographic characteristics of the sample population. This is followed by a presentation of the results of statistical analyses and data reports. For each
research hypothesis, a chi-square test statistic was computed in order to assess the likelihood that the observed frequencies of scores match the expected frequencies; thus, providing evidence of any relationships between the two assessment scales and the likelihood that the relationships occurred by chance. This information could then be used as evidence of the BBCS-3: R’s ability to identify potential learning risk factors in the preschool population.

**Characteristics of the Sample**

The participants in this study were children enrolled in full or half-day programs at four Columbus Development Council of Franklin County (CDCFC) Inc. Head Start centers or the full-day programs at three CDCFC Inc. federal partnerships. Of the 232 children at these centers who met the chronological age requirement and were recruited for participation in the study, signed permission slips were received for 115 of them. Of those children, two were unable to participate due to limited English language proficiency, two were unable to participate due to disabilities that prevented them from fully participating in the assessments, two were only present for the administration of one assessment, and nine were unable to participate in the study due to poor attendance or their disenrollment from their program prior to initiation of the assessment. This resulted in a final sample consisting of 100 children. Of those children, 34% were from center 1, 28% were from center 2, 12% were from center 3, 10% were from center 4. 9% were from center 5. 4% were from center 6, and 3% were from center 7. An analysis of gender found that of 54% of these children were male and 46% were female.
An examination of children’s age at time of testing found a 20-month age span between the youngest and oldest children assessed. While the youngest participants were 48 months of age, the oldest children were 68 months of age. The largest numbers of children were assessed at 54 months and the average age at time of testing was 58 months (See table 4.1).

Table 4.1

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>5</td>
<td>5.0</td>
</tr>
<tr>
<td>48.00</td>
<td>5</td>
<td>5.0</td>
</tr>
<tr>
<td>49.00</td>
<td>3</td>
<td>3.0</td>
</tr>
<tr>
<td>50.00</td>
<td>7</td>
<td>7.0</td>
</tr>
<tr>
<td>51.00</td>
<td>7</td>
<td>7.0</td>
</tr>
<tr>
<td>52.00</td>
<td>9</td>
<td>9.0</td>
</tr>
<tr>
<td>53.00</td>
<td>8</td>
<td>8.0</td>
</tr>
<tr>
<td>54.00</td>
<td>11</td>
<td>11.0</td>
</tr>
<tr>
<td>55.00</td>
<td>5</td>
<td>5.0</td>
</tr>
<tr>
<td>56.00</td>
<td>1</td>
<td>1.0</td>
</tr>
<tr>
<td>57.00</td>
<td>3</td>
<td>3.0</td>
</tr>
<tr>
<td>58.00</td>
<td>7</td>
<td>7.0</td>
</tr>
<tr>
<td>59.00</td>
<td>6</td>
<td>6.0</td>
</tr>
<tr>
<td>60.00</td>
<td>3</td>
<td>3.0</td>
</tr>
<tr>
<td>61.00</td>
<td>2</td>
<td>2.0</td>
</tr>
<tr>
<td>62.00</td>
<td>3</td>
<td>3.0</td>
</tr>
<tr>
<td>63.00</td>
<td>5</td>
<td>5.0</td>
</tr>
<tr>
<td>64.00</td>
<td>8</td>
<td>8.0</td>
</tr>
</tbody>
</table>
As shown in Table 4.2, demographic data on race/ethnicity indicates the children in the sample were predominantly African American (63%) with Caucasian children comprising the next large racial/ethnic group (23%). The remaining members of the sample were Multi-racial (7%), Hispanic (3%), Asian (2%), and American Indian (2%).
In terms of demographic data regarding socioeconomic status (SES), the majority of the children (74%) were income-eligible which meant that they were receiving Head Start services on the basis of their families meeting federal poverty income guidelines. The remaining children (26%) comprised the over-income group which meant that their families’ incomes were above the federal poverty guidelines and their enrollment in Head Start was contingent upon a co-payment for services. For the purpose of this study, income-eligible children were considered low (SES) and children who were not income-eligible were considered as having income above the federal poverty guidelines.

**Research Question 1A**

What is the probability that children with scores in the Delayed or Very Delayed categories of the BBCS-3: R SRC will also demonstrate scores in the Below Average or Lower Extreme categories of the KABC-II Sequential scale?

This research question examined the likelihood that a significant relationship exists between children scoring in the delayed categories of the BBCS-3: R SRC and in the below average categories of the KABC-II Sequential scale. A relationship between delayed scores of the two measures would suggest that receptive language delays, as assessed by the five-subtest BBCS-3: R SRC, are associated with deficits in sequential processing skills. To determine if such a relationship exists, a cross tabulation was computed using BBCS-3: R SRC and KABC-II Sequential scale scores (See Table 4.3).
Table 4.3

*SRC and Sequential Categories Cross Tabulation*

<table>
<thead>
<tr>
<th>Seq_Category</th>
<th>SRC_Category</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average or above</td>
<td>Count</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>Expected Count</td>
<td>58.7</td>
</tr>
<tr>
<td>Below average or lower</td>
<td>Count</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Expected Count</td>
<td>10.4</td>
</tr>
<tr>
<td>Total</td>
<td>Count</td>
<td>69</td>
</tr>
<tr>
<td></td>
<td>Expected Count</td>
<td>69.0</td>
</tr>
</tbody>
</table>

Based on the chi square test statistic results, a significant relationship was found between the scores with $\chi^2 (1, N = 100) = 10.495, p = .001$ (See Table 4.4); therefore children who scored in the delayed categories of the BBCS-3: R SRC were also likely to score in the below average categories of the KABC-II Sequential scale.
Table 4.4

*Chi-Square Tests*

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>10.495a</td>
<td>1</td>
<td>.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity Correction</td>
<td>8.625</td>
<td>1</td>
<td>.003</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>9.681</td>
<td>1</td>
<td>.002</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fisher's Exact Test</td>
<td></td>
<td></td>
<td></td>
<td>.002</td>
<td>.002</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>10.390</td>
<td>1</td>
<td>.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 4.65.
b. Computed only for a 2x2 table

**Research Question 1B**

What is the probability that children with scores in the Delayed or Very Delayed categories of the BBCS-3: R TC will also demonstrate scores in the Below Average or Lower Extreme categories of the KABC-II Sequential scale?

Because the BBCS-3: R allows for calculation of two different composite scores depending on the subtests administered, it was also important to examine the relationship between the BBCS-3:R TC and the KABC-II scale scores in order to determine if there were any differences in the relationships between the two BBCS-3: R composite scores and each of the KABC-II scales. For this research question, it was proposed that a
significant relationship exists between children scoring in the delayed categories of the BBCS-3: R TC and in the below average categories of the KABC-II. A cross-tabulation was computed using BBCS-3: R TC and KABC-II Sequential scale scores as shown in Table 4.5.

Table 4.5

TC and Sequential Categories Cross Tabulation

<table>
<thead>
<tr>
<th>Seq_Category</th>
<th>Average or above</th>
<th>Delayed or lower</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>66</td>
<td>19</td>
<td>85</td>
</tr>
<tr>
<td>Expected Count</td>
<td>62.1</td>
<td>23.0</td>
<td>85.0</td>
</tr>
<tr>
<td>Count</td>
<td>7</td>
<td>8</td>
<td>15</td>
</tr>
<tr>
<td>Expected Count</td>
<td>11.0</td>
<td>4.1</td>
<td>15.0</td>
</tr>
<tr>
<td>Total</td>
<td>73</td>
<td>27</td>
<td>100</td>
</tr>
<tr>
<td>Expected Count</td>
<td>73.0</td>
<td>27.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Based on the chi-square test results, a significant relationship exists between the scores with $\chi^2 (1, N = 100) = 6.209, p = .013$; thus, children scoring in the delayed categories of the BBCS-3: R TC, were also likely to score in the below average categories on the KABC-II Sequential scale (See Table 4.6).
Table 4.6

*Chi-Square Tests*

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>6.209a</td>
<td>1</td>
<td>.013</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity Correction</td>
<td>4.736</td>
<td>1</td>
<td>.030</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>5.596</td>
<td>1</td>
<td>.018</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fisher's Exact Test</td>
<td></td>
<td></td>
<td></td>
<td>.024</td>
<td>.018</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>6.147</td>
<td>1</td>
<td>.013</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 4.05.
b. Computed only for a 2x2 table

**Research Question 2A**

What is the probability that children with scores in the Delayed or Very Delayed categories of the BBCS-3: R SRC will also demonstrate scores in the Below Average or Lower Extreme categories of the KABC-II Simultaneous scale?

This research question examined the likelihood that a significant relationship exists between children scoring in the delayed categories of the BBCS-3: R SRC and in the below average categories of the KABC-II Simultaneous scale. If such a relationship was found, it would suggest that in addition to assessing receptive language delays, the BBCS-3: R is also capable of distinguishing deficits in visual processing. To determine if
such a relationship exists, a cross tabulation was computed using BBCS-3: R SRC and the KABC-II Simultaneous scale scores (See Table 4.7).

Table 4.7

*SRC and Simultaneous Categories Cross Tabulation*

<table>
<thead>
<tr>
<th>Sim_Category</th>
<th>SRC_Category</th>
<th>1</th>
<th>2</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average or above</td>
<td>Count</td>
<td>66</td>
<td>19</td>
<td>85</td>
</tr>
<tr>
<td></td>
<td>Expected Count</td>
<td>58.7</td>
<td>26.4</td>
<td>85.0</td>
</tr>
<tr>
<td>Below average or lower</td>
<td>Count</td>
<td>3</td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Expected Count</td>
<td>10.4</td>
<td>4.6</td>
<td>15.0</td>
</tr>
<tr>
<td>Total</td>
<td>Count</td>
<td>69</td>
<td>31</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Expected Count</td>
<td>69.0</td>
<td>31.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Calculation of the chi-square test statistic indicates that a significant relationship exists between the scores with $\chi^2(1, N = 100) = 19.809, p < .000$; therefore, children, who score in the delayed categories of the BBCS-3: R SRC, were very likely to score in the below average categories on the KABC-II Simultaneous scale (See Table 4.8).
Table 4.8

*Chi-Square Tests*

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>19.809</td>
<td>1</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity Correction</td>
<td>17.205</td>
<td>1</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>18.480</td>
<td>1</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fisher's Exact Test</td>
<td></td>
<td></td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>Linear-by-Linear</td>
<td>19.611</td>
<td>1</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>Association</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 4.65.
b. Computed only for a 2x2 table

**Research Question 2B**

What is the probability that children with scores in the Delayed or Very Delayed categories of the BBCS-3: R TC will also demonstrate scores in the Below Average or Lower Extreme categories of the KABC-II Simultaneous scale?

As with the BBCS-3: R SRC, it was also proposed that a significant relationship exists between children scoring in the delayed categories of the BBCS-3: R TC and in the below average categories of the KABC-II Simultaneous scale. A cross-tabulation was computed using the BBCS-3: R TC and the KABC-II Simultaneous scale scores (See Table 4.9).
The results of the chi-square test indicate that a significant relationship exists between the scores with $\chi^2 (1, N = 100) = 9.705, p = .002$; thus, children scoring in the delayed categories of the BBCS-3: R TC, were also likely to score in the below average categories on the KABC-II Simultaneous scale (See Table 4.10).
Table 4.10

**Chi Square Tests**

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>9.750a</td>
<td>1</td>
<td>.002</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity Correctionb</td>
<td>7.880</td>
<td>1</td>
<td>.005</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>8.693</td>
<td>1</td>
<td>.003</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fisher's Exact Test</td>
<td></td>
<td></td>
<td>.004</td>
<td>.004</td>
<td></td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>9.653</td>
<td>1</td>
<td>.002</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 4.05.
b. Computed only for a 2x2 table

**Research Question 3A**

What is the probability that children with scores in the Delayed or Very Delayed categories of the BBCS-3: R SRC will also demonstrate scores in the Below Average or Lower Extreme categories of the KABC-II Learning Scale?

This research question examined the likelihood that a significant relationship exists between children scoring in the delayed categories of the BBCS-3: R SRC and in the below average categories of the KABC-II Learning scale. Unlike the other KABC-II scales that target a specific processing skill, the KABC-II Learning scale examines the effectiveness of several processes working in sync. This scale assesses the ability to store and retrieve both newly and previously learned information, a process which is reliant on
the efficient coordination of sequential abilities to listen and organize information step by step, simultaneous processing to examine, organize and recall visual information, and planning abilities to prioritize the information. If a relationship between the two assessment scales exists, it suggests that deficits in receptive language are related to the coordination of multiple cognitive processes as well as with deficits in long term memory as assessed by the Learning scale. To determine if such a relationship exists, a cross tabulation as shown in Table 4.11 was computed using BBCS-3: R SRC and the KABC-II Learning scale scores.

Table 4.11

**SRC & Learning Categories Cross Tabulation**

<table>
<thead>
<tr>
<th>Learn_Category</th>
<th>SRC_Category</th>
<th>Count</th>
<th>Expected Count</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average or above</td>
<td>1</td>
<td>66</td>
<td>63.5</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>26</td>
<td>28.5</td>
<td></td>
</tr>
<tr>
<td>Below average or lower</td>
<td>Count</td>
<td>3</td>
<td>5</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Expected Count</td>
<td>5.5</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>Count</td>
<td>69</td>
<td>31</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Expected Count</td>
<td>69.0</td>
<td>31.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Calculation of the chi-square test statistic found that a significant relationship exists between the scores with $\chi^2 (1, N = 100) = 4.034, p = .045$; therefore, children, who scored in the delayed categories of the BBCS-3: R SRC, were likely to score in the below average categories on the KABC-II Learning scale (See Table 4.12).
Table 4.12

*Chi-Square Tests*

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>4.034(^a)</td>
<td>1</td>
<td>.045</td>
<td>.045</td>
<td></td>
</tr>
<tr>
<td>Continuity Correction(^b)</td>
<td>2.592</td>
<td>1</td>
<td>.107</td>
<td>.107</td>
<td></td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>3.681</td>
<td>1</td>
<td>.055</td>
<td>.055</td>
<td></td>
</tr>
<tr>
<td>Fisher's Exact Test</td>
<td></td>
<td></td>
<td>.103</td>
<td>.058</td>
<td></td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>3.993</td>
<td>1</td>
<td>.046</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) 1 cells (25.0\%) have expected count less than 5. The minimum expected count is 2.48.

\(^b\) Computed only for a 2x2 table

**Research Question 3B**

What is the probability that children with scores in the Delayed or Very Delayed Categories of the BBCS-3: R TC will also demonstrate scores in the Below Average or Lower Extreme categories of the KABC-II Learning scale?

As with the BBCS-3: R SRC, it was also proposed that a significant relationship exists between children scoring in the delayed categories of the BBCS-3: R TC and in the below average categories of the KABC-II Learning scale. A cross-tabulation was computed as shown in Table 4.13 using BBCS-3: R TC and the KABC-II Learning scale scores.
Table 4.13

TTC and Learning Categories Cross Tabulation

<table>
<thead>
<tr>
<th>Learn_Category</th>
<th>Average or above</th>
<th>Delayed or lower</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Count</td>
<td>71</td>
<td>21</td>
<td>92</td>
</tr>
<tr>
<td>Expected Count</td>
<td>67.2</td>
<td>24.8</td>
<td>92.0</td>
</tr>
<tr>
<td>Below average or lower</td>
<td>Count</td>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>Expected Count</td>
<td>5.8</td>
<td>2.2</td>
<td>8.0</td>
</tr>
<tr>
<td>Total</td>
<td>Count</td>
<td>73</td>
<td>27</td>
</tr>
<tr>
<td>Expected Count</td>
<td>73.0</td>
<td>27.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

The results of the chi-square test indicate that a significant relationship exists between the scores with $\chi^2 (1, N = 100) = 10.165, p = .001$; thus, children scoring in the delayed categories of the BBCS-3: R TC, were also likely to score in the below average categories on the KABC-II Learning scale (See Table 4.14).
Table 4.14

*Chi-Square Tests*

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>10.165a</td>
<td>1</td>
<td>.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity Correctionb</td>
<td>7.690</td>
<td>1</td>
<td>.006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>8.816</td>
<td>1</td>
<td>.003</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fisher's Exact Test</td>
<td></td>
<td></td>
<td>.005</td>
<td>.005</td>
<td></td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>10.063</td>
<td>1</td>
<td>.002</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N of Valid Cases 100

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 2.16.
b. Computed only for a 2x2 table

**Research Question 4A**

What is the probability that children with scores in the Delayed or Very Delayed categories of the BBCS-3: R SRC will also demonstrate scores in the Below Average or Lower Extreme categories of the KABC-II MPI global score?

This research question examined the likelihood that a significant relationship exists between children scoring in the delayed categories of the BBCS-3: R SRC and in the below average categories of the KABC-II MPI, the global score measuring general processing ability. If such a relationship was found, it would suggest that receptive language delays are associated with more global processing deficits. To determine if such
a relationship exists, a cross tabulation as shown in Table 4.15 was computed using BBCS-3: R SRC and the KABC-II MPI scores.

Table 4.15

*SRC and MPI Categories Cross Tabulation*

<table>
<thead>
<tr>
<th>MPI_Category</th>
<th>SRC_Category</th>
<th>1</th>
<th>2</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average or above</td>
<td>Count</td>
<td>67</td>
<td>20</td>
<td>87</td>
</tr>
<tr>
<td></td>
<td>Expected Count</td>
<td>60.0</td>
<td>27.0</td>
<td>87.0</td>
</tr>
<tr>
<td>Below average or lower</td>
<td>Count</td>
<td>2</td>
<td>11</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Expected Count</td>
<td>9.0</td>
<td>4.0</td>
<td>13.0</td>
</tr>
<tr>
<td>Total</td>
<td>Count</td>
<td>69</td>
<td>31</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Expected Count</td>
<td>69.0</td>
<td>31.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Calculation of the chi-square test statistic indicates that a significant relationship between the scores exists with $\chi^2(1, N = 100) = 20.081, p < .000$; therefore, children, who scored in the delayed categories of the BBCS-3: R SRC, were very likely to score in the below average categories on the KABC-II MPI (See Table 4.16).
Table 4.16

**Chi-Square Tests**

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>20.081</td>
<td>1</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity Correction b</td>
<td>17.304</td>
<td>1</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>18.848</td>
<td>1</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fisher's Exact Test</td>
<td></td>
<td></td>
<td>.000</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>19.881</td>
<td>1</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N of Valid Cases

100

a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 4.03.
b. Computed only for a 2x2 table

**Research Question 4B**

What is the probability that children with scores in the Delayed or Very Delayed categories of the BBCS-3: R TC will also demonstrate scores in the Below Average or Lower Extreme categories of the KABC-II MPI global score?

As with the BBCS-3: R SRC, it was also proposed that a significant relationship exists between children scoring in the delayed categories of the BBCS-3: R TC and in the below average categories of the KABC-II MPI. A cross-tabulation as shown in Table 4.17 was computed using BBCS-3: R TC and the MPI scores.
Table 4.17

(MPI and TC Categories Cross Tabulation)

<table>
<thead>
<tr>
<th>MPI_Category</th>
<th>TTC_Category</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average or above</td>
<td>Count</td>
<td>Delayed or lower</td>
<td>Total</td>
</tr>
<tr>
<td>Average or above</td>
<td>70</td>
<td>17</td>
<td>87</td>
<td></td>
</tr>
<tr>
<td>Below average or lower</td>
<td>3</td>
<td>10</td>
<td>13</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>73</td>
<td>27</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

The results of the chi-square test indicate that a significant relationship exists between the scores with $\chi^2 (1, N = 100) = 18.895, p < .000$; thus, children scoring in the delayed categories of the BBCS-3: R TC, were also likely to score in the delayed categories on the KABC-II MPI (See Table 4.18).
Table 4.18

*Chi-Square Tests*

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig. (2-sided)</th>
<th>Exact Sig. (2-sided)</th>
<th>Exact Sig. (1-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>18.895&lt;sup&gt;a&lt;/sup&gt;</td>
<td>1</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Continuity Correction&lt;sup&gt;b&lt;/sup&gt;</td>
<td>16.095</td>
<td>1</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>16.657</td>
<td>1</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fisher's Exact Test</td>
<td></td>
<td></td>
<td>.000</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>18.706</td>
<td>1</td>
<td>.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N of Valid Cases: 100

---

*a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 3.51.

b. Computed only for a 2x2 table

---

**Summary**

This chapter provided details regarding the results of this study which examined whether relationships exist between the BBCS-3: R composite scales and three scale scores and one global index score of the KABC-II. Six chi-square analyses were computed to assess relationships between the BBCS-3: R SRC and TC and the KABC-II Sequential, Simultaneous, and Learning Scales. Each of the null hypotheses tested presumed that no significant relationship between the scores of the two measures would be found; however, the results of this study found that for each composite of the BBCS-3: R and each scale of the KABC-II, significant relationships exist. Therefore, the null hypotheses tested could be rejected at the $p < .05$ level. Two additional analyses were
conducted to examine the relationships between the BBCS-3: R composite scores and the KABC-II MPI, the global processing index. Again each of the null hypotheses tested presumed that no relationship exists between these scores. Results of these analyses also found significant relationships; therefore, the null hypotheses were rejected at the $p < .05$ level. All of these analyses indicate the presence of a relationship between the BBCS-3: R and the KABC-II suggesting that the BBCS-3: R can be used as a screening measure to identify young children exhibiting learning risk factors.
Chapter 5: Discussion

Despite strong evidence regarding the benefits of early identification of children with special needs, uncertainty exists whether such early identification is possible for young children exhibiting learning risk factors. This has resulted from differences among professionals regarding the nature of learning problems and the need for demonstrated academic failure before such identification can be made; however, studies have found that learning problems are neurobiological in nature (Fiedrowicz, 1999) which means that identification of such problems is possible long before children experience years of academic failure. A key indicator of later learning difficulties is early language deficits and although research studies have shown that language delays, particularly in receptive language, are related to children’s subsequent identification of learning problems, the identification of instruments that can detect such risk factors has not been pursued. As a result, this study examined the relationship between the Bracken Basic Concept Scale-Revised, Third Edition (BBCS-3: R), a receptive language measure, and the Kaufman Assessment Battery for Children, Second Edition (KABC-II), a measure of processing and cognitive abilities in children, in order to determine if relationships exist between the scores of these measures thus providing evidence that the BBCS-3: R can be used as a preschool screener of risk factors associated with learning problems.
While the previous chapter presented the results of the statistical analyses, the current chapter will extend these findings by discussing how the results support the research questions that guided this study. In addition, limitations of the study will be presented as well as recommendations for future research.

Study Sample Demographics

In this study, there were three factors that were considered due to their potential impact on the findings. The first of these was socioeconomic status (SES). Because research has established that differences in language development exist based on SES level, it was important to consider the influence of this factor since one of the measures administered to the children, the BBCS-3: R assesses receptive language. Because participation in Head Start requires that families meet certain income guidelines, the majority of the children came from homes with incomes at or below the federal poverty guidelines; however, Head Start is also permitted to accept a small percentage of children from families who are considered as over-income. For this study, approximately one fourth of the sample came from homes with income levels above the federal poverty guidelines; however the incomes of these families are also typically low. Therefore, it is possible that the results obtained by the children in this sample may be different from a sample of children who come from higher SES home environments. As a result, the effects of SES cannot be completely ruled out.

A second factor considered was ethnicity and race. Because limited English proficiency and degree of acculturation can confound the results of any language-based assessment, it was important to ensure that multicultural children in this study had a solid
understanding of the English language and exhibited a strong degree of acculturation. Considering these factors increased the likelihood that the assessment results were reflective of the children’s true abilities and not factors associated with their multicultural status. As a result, two children, for whom permission was obtained, were not tested due to their English language proficiency status and unfamiliarity with the U.S. culture. In addition, the impact of ethnicity and race was considered in the selection of assessments. During the standardization process, the BBCS-3: R and KABC-II underwent rigorous evaluation of their ability to provide sound results for multicultural children and as a result, these instruments were selected, in part, in order to ensure that the potential for cultural bias was minimized.

Despite measures taken to address effects of race/ethnicity on the assessment results, it is possible that these effects were confounded by factors associated with socioeconomic status. Therefore, effects considered attributable to race/ethnicity may have actually resulted from children’s lower SES level instead.

Finally, gender must be considered when assessing children for identification of potential learning risk factors. Research on special education placement has shown that boys tend to be over-identified as having learning disabilities while girls tend to be under-identified. As a result, it is important to consider potential gender bias in any process that evaluates children for learning problems. Although the limited scope of this study prevented the ability to address this issue in the current study, future studies of this type may consider evaluating the process to ensure that gender bias is not an issue when using the BBCS-3: R for identification of children exhibiting learning risk factors.
Major Findings

In order to discuss the major findings of this study, each set of research questions examining the BBCS-3: R composite scales in relation to a specific KABC-II scale is addressed individually.

Research question one

RQ1A. What is the probability that children with scores in the delayed or very delayed categories of the BBCS-3: R SRC will also demonstrate scores in the below average or lower extreme categories of the KABC-II Sequential scale?

RQ1B. What is the probability that children with scores in the delayed or very delayed categories of the BBCS-3: R TC will also demonstrate scores in the below average or lower extreme categories of the KABC-II Sequential scale?

These research questions focused on the presence of relationships between scores in the delayed categories of the BBCS-3: R SRC and TC composites and scores in the below average categories of the KABC-II Sequential scale. The Sequential scale assesses the ability to take in, retain, quickly retrieve, and arrange information in an orderly way (Reynolds & Fletcher-Janzen, 2009). It involves analysis, progression from simple to complex, organization of information, and linear deductive thinking and is influenced by the ability to recognize and comprehend auditory information. Sequential processing is essential in performing a variety of school-related activities including mathematics in which problem-solving, calculations, and learning math facts are dependent upon the ability to follow a series of steps as well as reading in which memorization of letters of the alphabet and learning the association of sounds, in order,
with the letters of the words requires arranging information in serial order. It is also involved in activities such as writing, remembering formulas, taking notes, and following specific directions. Sequential processing is used to put words and thoughts together and to organize materials. When children experience deficits in these skills, it can affect their performance across subject areas in school.

In this study, the existence of a relationship between delayed and below average scores of the BBCS-3: R and KABC-II would suggest that in addition to identifying receptive language delays, the BBCS-3: R is also able to detect deficits in sequential processing. Based on the chi square test analyses conducted, a significant relationship was found between delayed BBCS-3: R SRC scores and below average KABC-II Sequential scores as well as between delayed BBCS-3: R TC scores and below average KABC-II Sequential scores. This suggests that BBCS-3: R SRC and TC composite scores are sensitive to sequential processing deficits associated with the KABC-II Sequential scores; thus, providing evidence of the BBCS-3:R’s utility as a preschool screener of potential short-term memory deficits.

**Research question two**

RQ2A: What is the probability that children with scores in the Delayed or Very Delayed Categories of the BBCS-3: R SRC will also demonstrate scores in the Below Average or Lower Extreme categories of the KABC-II Simultaneous scale?

RQ2B: What is the probability that children with scores in the Delayed or Very Delayed Categories of the BBCS-3: R TC will also demonstrate scores in the Below Average or Lower Extreme categories of the KABC-II Simultaneous scale?
These research questions examined potential relationships between scores in the delayed categories of the BBCS-3: R SRC and TC, and scores in the below average categories of the KABC-II Simultaneous scale. According to Naglieri (1999), simultaneous processing involves the ability to solve problems by visualizing how separate elements are interrelated into a conceptual whole. It enables a person to organize visual information into meaningful patterns and to understand how the patterns change as they move through space. This type of processing is important in academic tasks such as learning the shapes of letters and numbers, deriving meaning from pictures, charts, and maps, understanding the main idea of stories and comprehending meaning from paragraphs. It can take a number of forms including problems with visual discrimination which impairs the ability to distinguish between similar letters and shapes, visual figure-ground discrimination which impedes the ability to distinguish a printed character from its background, and visual sequencing which affects that ability to distinguish the order of words or images. It can also involve impairment in visual closure, visual motor processing and spatial relationships. Children with simultaneous processing deficits often perform well during early school years but begin to experience academic difficulties as the demands associated with higher level math reasoning and reading comprehension become greater.

If relationships are found between delayed and below average scores of the BBCS-3: R and KABC-II, it would suggest that in addition to identifying receptive language delays, the BBCS-3: R is also sensitive to deficiencies in simultaneous processing when verbal and nonverbal information is paired. The results of the statistical
analyses conducted for this study found significant relationships between delayed BBCS-3: R SRC scores and below average KABC-II Simultaneous scores as well as between delayed BBCS-3: R TC scores and below average KABC-II Simultaneous scores. This suggests that as a measure that requires children to integrate verbal and visual information, the BBCS-3: R’s composite scores are sensitive to potential visual processing deficits associated with the KABC-II Simultaneous scores; therefore providing evidence of the BBCS-3: R’s utility as a screener of potential visual processing skill deficits.

**Research question three**

**RQ3A:** What is the probability that children with scores in the Delayed or Very Delayed Categories of the BBCS-3: R SRC will also demonstrate scores in the Below Average or Lower Extreme categories of the KABC-II Learning scale?

**RQ3B:** What is the probability that children with scores in the Delayed or Very Delayed Categories of the BBCS-3: R TC will also demonstrate scores in the Below Average or Lower Extreme categories of the KABC-II Learning scale?

These research questions focused on the presence of relationships between scores in the delayed categories of the BBCS-3: R SRC and TC, and scores in the below average categories of the KABC-II Learning scale. According to Kaufman, Lichtenberger, Fletcher-Janzen & Kaufman (2005), the Learning scale assesses the ability to integrate multiple cognitive processes including the use of sequential abilities to listen and organize information, the use of simultaneous processing to examine, organize and recall visual information, and the use of planning abilities to prioritize information. The abilities
assessed by this scale are critical to success in school because they enable children to learn new information, to retain information, to recall information on tests, and to recall rote facts.

In this study, the existence of relationships between delayed and below average scores of the BBCS-3: R and KABC-II Learning scale would suggest that in addition to isolating receptive language delays, the BBCS-3: R is also capable of detecting deficits in the integration of sequential, simultaneous, and planning cognitive processes and the ability to access information from long-term memory. As proposed, the chi square test analyses found significant relationships between delayed BBCS-3: R SRC scores and below average KABC-II Learning scale scores as well as between delayed BBCS-3: R TC scores and below average KABC-II Learning scale scores. This suggests that both BBCS-3: R composite scores are sensitive to deficits associated with the KABC-II Learning scale; therefore providing evidence of the BBCS-3: R’s utility as a screener of cognitive processing integration and long-term memory deficits.

**Research question four**

**RQ4A.** What is the probability that children with scores in the Delayed or Very Delayed Categories of the BBCS-3: R SRC will also demonstrate scores in the Below Average or Lower Extreme categories of the KABC-II MPI global score?

**RQ4B.** What is the probability that children with scores in the Delayed or Very Delayed Categories of the BBCS-3: R TC will also demonstrate scores in the Below Average or Lower Extreme categories of the KABC-II MPI global score?
These research questions focused on the presence of relationships between scores in the delayed categories of the BBCS-3: R SRC and TC, and scores in the below average categories of the KABC-II Mental Processing Index (MPI). The KABC-II permits the calculation of two different global constructs. The first of these, the MPI, measures general mental processing ability from the Luria perspective and excludes measures of acquired knowledge and the second one is Fluid-Crystallized Index (FCI) which measures general cognitive ability from the Cattell-Horn-Carroll (CHC) perspective and includes the administration of subtests that measure acquired knowledge/crystallized ability. According to Kaufman and Kaufman (2004), the CHC model is recommended for situations in which children are being evaluated for suspected problems in reading, written expression, and mathematics while the Luria model is recommended when assessing children with known or suspected language disorders. With a wealth of research providing evidence that a relationship exists between early language disorders and later academic difficulties and learning problem identification, it would seem that the same theoretical model selected for children with language disorders should be used for children suspected of experiencing learning problems; however, this is not the case. Because the CHC model is preferred in situations where a learning problem is suspected, the initial 25% of the study sample was administered the two additional subtests that permit the calculation of the FCI in order to determine if there were any significant differences between the MPI and FCI scores. The two global scores for each child were calculated and compared with no significant difference found between them. As a result, the remainder of the sample was only administered the subtests required for calculation
of the MPI. While the two additional subtests required for calculation of the FCI may provide additional information that is beneficial when assessing an older child suspected of a learning problem, it does not provide the same benefits for preschoolers who have had little exposure to general knowledge and whose performance can be impacted by lengthy assessment sessions.

In this study, the existence of relationships between delayed and below average scores of the BBCS-3: R and KABC-II MPI would suggest that as a measure of receptive language, the BBCS-3: R is also capable of detecting global processing deficits as measured by the MPI. As proposed, the chi square test analyses found significant relationships between delayed BBCS-3: R SRC scores and below average KABC-II MPI scores as well as between delayed BBCS-3: R TC scores and below average KABC-II MPI scale scores. This suggests that both BBCS-3: R composite scores are indicative of processing deficits associated with the KABC-II MPI; therefore providing evidence of the BBCS-3: R’s utility as a preschool screener of learning risk factors.

**Conclusions**

This study investigated the potential use of the BBCS-3: R as a preschool screener of learning risk factors. As an established measure of cognitive processing, the KABC-II provided a means of determining the effectiveness of the BBCS-3: R in making such determinations. The data from this study provided evidence of significant relationships between the composite scores of the BBCS-3: R and the Sequential scale of the KABC-II suggesting that the BBCS-3: R is able to detect potential deficits in sequential or short-term memory processes. Similarly, significant relationships were found between the
composite scores of the BBCS-3: R and the Simultaneous scale of the KABC-II suggesting that the BBCS-3: R is able to identify potential deficits in simultaneous or visual processing. As measures of the integration of several cognitive processes, the KABC-II Learning scale scores were also found to be significantly related to BBCS-3: R scores providing evidence of the BBCS-3: R’s ability to detect deficits in the operation of several cognitive processes working together and long-term memory. In addition, the data provided evidence of a significant relationship between the composite scores of the BBCS-3: R and the Mental Processing Index of the KABC-II suggesting that the BBCS-3: R is able to detect global deficits in cognitive functioning. These relationships were found when comparing the KABC-II scales or global index to the ten-subtest BBCS-3: R Total Composite as well as to the five-subtest BBCS-3: R School Readiness Composite. These results suggest that in addition to its utility as a measure of receptive language, the BBCS-3: R is capable of detecting deficits in cognitive processing as early as preschool age.

**Implications**

As previously mentioned, despite strong evidence regarding the benefits of early identification of children with special needs, there exists reluctance among practitioners in pursuing early identification of young children exhibiting learning risk factors. This is due, in part, to beliefs about the nature of learning disabilities as well as concerns regarding the ability to accurately identify learning risk factors in young children. However, by definition, a specific learning disability is a disorder in one or more of the basic processes involved in understanding or in using language, spoken or written, that
may manifest itself in an imperfect ability to listen, speak, think, read, write, spell or do mathematical calculations (U.S. Department of Education, 2010). As the definition states, these learning problems involve disorders in psychological processing which, as research studies have found, makes them neurobiological in nature and thus, identifiable long before children experience failure in school and develop secondary problems as a result of this. While early identification may be challenging, it is critical if children are to receive interventions that can increase the likelihood of their experiencing sustained academic success.

Although identification of learning risk factors in young children cannot be made on the basis of performance on academic tasks, research studies have provided another means by which such identification can be made. Over the past three decades, a wealth of research studies has been conducted on the impact of early language deficits providing strong evidence of the relationship between early delays in language and later learning difficulties. In particular, receptive language deficits in isolation as well as in conjunction with expressive language deficits have been found to have a strong relationship with later learning problems. This relationship provides a means by which young children can be screened for potential learning risk factors. By screening young children with a measure of receptive language, children who score below the mean can then be provided with interventions in an attempt to remediate their difficulties. If after provision of interventions, the children don’t make consistent gains in their areas of weakness, they can then be provided with more comprehensive evaluation to determine if a true learning disability exists.
The BBCS-3: R is a commonly used measure of receptive language that can be used with young children. In order to determine its effectiveness as a screener of learning risk factors, its composite scores were examined in relation to scores on the KABC-II, a measure of cognitive processing. The BBCS-3: R provides two composite scores, the School Readiness Composite (SRC) consisting of five subtests that can be administered in 10-15 minutes and the Total Composite (TC) consisting of ten subtests that can be administered in 30-40 minutes. These composites take far less time to administer than the KABC-II or similar cognitive measures which can take over an hour to administer. This reduced time frame is critical when trying to achieve an accurate assessment of young children’s cognitive functioning, especially since younger children, by nature of their development, possess shorter attention spans.

In this study, significant relationships were found between the BBCS-3: R SRC and TC composite scores and the Sequential, Simultaneous, and Learning scales of the KABC-II as well as between the BBCS-3: R composite scores and the KABC-II MPI. These findings suggest that the BBCS-3: R can be used as a quick preschool screener of learning risk factors. For children who score in the delayed categories of this measure, interventions can be implemented to address deficit areas and if needed, more comprehensive assessment can be conducted in order to determine if a learning disability exists. In this manner, at-risk children are identified at an early age which reduces the likelihood that they will experience school failure, and differentiation of instruction in introductory math, pre-reading and writing at the preschool level can be implemented in order to assist these children in acquiring knowledge of basic skills needed for school
entry. With increased emphasis placed on student performance in elementary school, it is more critical than ever for children to enter school ready to learn and to ensure that at-risk children have been identified early and provided with interventions that will assist them in acquiring the skills needed to be successful in school and improving their overall academic functioning.

Limitations

The present study has certain limitations that need to be taken into account when considering the study and its contributions. First, the use of a nonprobability, convenience sampling was a limitation in that the research study sample differed in a number of ways from the general Head Start population as well as the general population of children. Although there are over fifty Head Start centers and federal partnerships that were available for participation in the study, nine were selected for participation based on location and center directors’ willingness to participate in the study. Of those, parental consent forms were only received for children who attended seven of those centers. Because the centers participating in this study may have differed from the CDCFC Head Start centers and partnerships as a whole, it is possible that the results may have been influenced by factors within the participating centers such as differences in teaching style, curriculum or teacher-student ratio. In addition, because participation in this study was voluntary, it is quite possible that differences exist between the children for whom consent was received and those for whom permission was not received.

Use of a convenience sample also affected characteristics of the children participating in the study and generalizability of the findings to the greater population of
children. Two thirds of the children in this study were African American and almost three-fourths of the children lived with families whose incomes were at or below the federal poverty guidelines. As a result, the sample was not representative of the general population of children in terms of socioeconomic status or ethnic/racial composition.

Another limitation of this study involves the absence of data regarding number of years the children participated in a preschool program and the type of program they attended. Because one aspect of this study was to determine if there were any differences in the effectiveness of the BBCS-3: R SRC and BBCS-3: R TC in distinguishing children exhibiting learning risk factors, any factors that could potentially affect these composite score results should be considered. In this study, both the BBCS-3: R SRC and TC were determined to be equally effective in identifying at-risk children; however, because the Receptive SRC can be administered in a shorter time frame than the Receptive TC, it is likely that given the option, for efficiency, the Receptive SRC is more likely to be administered. The potential problem that exists is that the scores on the Receptive SRC may be a reflection of the amount of time children have been exposed to school readiness concepts rather than actual receptive language deficits affecting the acquisition of these concepts. Some may argue that this is taken into account through the established test norms; however, in order to ensure that the results accurately reflect children’s abilities, it is also important to consider the number of years a child has attended a preschool program and the type of program, whether it is a half day or full day program, since some children receive very limited exposure to school readiness concepts within their home environments and this lack of experience could negatively impact that Receptive SRC
scores. For this reason, although slightly longer to administer, the BBCS-3: R TC may provide a more accurate reflection of children’s receptive language skills since it is comprised of additional subtests in addition to the SRC that assess general concepts to which children are more likely to have received exposure from a very young age.

A final limitation involves interpretability of the KABC-II Sequential, Simultaneous, and Learning scales. Scale interpretability involves numbers that have are set for specific age groups that distinguish meaningful subtest score differences from those that are so great that the scale does not meaningfully represent the child’s ability in that domain. Scales that are not interpretable are those in which the difference between the highest and lowest subtest scale score occurred in less than 10% of the normative sample (Kaufman, et al., 2005). Although interpretability does not mean that scale is invalid, it raises questions regarding reasons for the significant differences in performance on the subtests that comprise that scale. In a small number of cases, children’s scale scores did not meet the criteria for interpretability. An examination of the interpretability of the scales across the sample found no significant differences which would suggest that the interpretability of any one scale was not a problem for the sample as a whole; however, the fact that some children obtained scale scores that were not interpretable suggests that additional steps should be taken to determine the reasons for these results. Rather than broadly suggesting that a child exhibits deficits in a particular processing area as was done for this study, a scrutiny of differences between specific skills demanded by the subtests should be conducted in order to more accurately identify
processing area weaknesses that are problematic for the child. In this manner, interventions can more accurately target those specific areas.

**Recommendations for School Psychologists and Early Childhood Educators**

Because delayed identification of learning risk factors not only results in children experiencing years of academic failure but also secondary problems such as loss of motivation and poor self-esteem, it is important to identify these risk factors as early as possible. With research establishing the relationship between early receptive language delays and later learning problems, school psychologists and early childhood educators have the opportunity to identify young children who may be at risk by implementing a screening process using a measure of receptive language. Children who are identified through this process can be provided with interventions that can increase the likelihood of their experiencing future academic success and decrease the chance of their developing secondary problems that inhibit their learning and result in a lack of interest in school.

**Future Research**

The results of this study provide an opportunity to examine the relationship between two commonly used assessments with the preschool population, the Bracken Basic Concept Scale-Third Edition: Receptive (BBCS-3: R) and the Kaufman Assessment Battery for Children, Second Edition (KABC-II). The findings expand previous research linking early language delays to later learning problems by providing evidence that a measure of early receptive language can be used to identify learning risk factors before children begin their formal education. In response to the limitations and findings of this study, the following suggestions for future research are recommended.
Future studies should focus on replicating the results using a sample that is representative of the general population. If similar results are obtained, this will provide strong evidence of a relationship between the BBCS-3: R and the KABC-II as well as the BBCS-3: R’s ability to identify children exhibiting learning risk factors. In addition, future studies should take into consideration the effects of gender, ethnicity/race, and socioeconomic status. Because in special education placement, boys are identified for learning disabilities at greater rates than girls, it is important to determine if the assessment process used to identify learning risk factors accurately reflects children’s abilities and not some bias that exists in the measures or the overall process. In addition, future research should examine whether the results are replicable with ethnically and racially diverse children. Because the majority of the students in this study were African-American, it is important to determine if the two measures used are equally effective for children of other ethnic/racial compositions. Similarly, with most of the children in the study coming from low income homes, it is also important to conduct additional research in order to determine if the measures are equally effective for children from higher SES homes who may have experienced language development that differed from their low SES counterparts.

Because administration time for the Receptive SRC is much shorter than the Receptive TC making it a more appealing screening tool, future research should examine the relationship between the BBCS-3: R SRC and the KABC-II scales taking into consideration the length of time children have been in a preschool program as well as the type of program. If the BBCS-3: R SRC is shown to be an effective screener regardless of
these factors, it would provide a very quick means of identifying children exhibiting learning risk factors.

**Summary**

This present study served as a preliminary investigation of the relationship between the BBCS-3: R, a receptive language measure and the KABC-II, a cognitive and processing measure, in order to determine whether the BBCS-3: R can be used as a screener to identify children exhibiting potential learning risk factors. Based on the statistical analyses conducted, initial results suggest that the BBCS-3: R can be used for this purpose; thus, providing an efficient means of identifying at-risk children prior to school entry and facilitating the implementation of interventions that can boost the likelihood of their experiencing future academic success. With increasingly more rigorous academic expectations being placed on children in younger grades, it is critical that children begin school with the necessary foundational skills. Implementing a preschool screening process to identify children exhibiting learning risk factors allows for the implementation of interventions and differentiated instruction that will assist these children in the acquisition of needed foundational skills which, in turn, will increase the likelihood of their being able to meet academic demands placed on them as they progress through school.
References


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Appendix A

Parent Invitation Letter
Dear Parents & Guardians,

Your child’s Head Start Center is participating in a research study with The Ohio State University School Psychology Program. The study is designed to look at the ability of a preschool assessment to predict risk factors for future learning problems. We are asking for your permission to include your child in the study.

Involvement in the study would require your child to work one on one with a school psychology doctoral student for two sessions during which time your child would be administered two assessments, one that looks at children’s understanding of language and basic concepts such as colors and another that looks at children’s thinking processes. All assessments will take place during the regular school day. The information we gather will help us to determine if risk factors for learning problems can be identified before children begin formal schooling. All of your child’s answers will be kept confidential and in no way will influence the services your child received at the Head Start center.

If you are willing to allow your child to participate, please sign one copy of the enclosed permission slip, seal it in the enclosed envelope and place it in the lockbox located in the
office area at your child’s Head Start center. The other copy is for your records. Although we are excited about this project and hope you will choose to allow your child to participate, your child is not required to participate in the study.

If you have any questions about the project or your child’s participation, please feel free to contact the project director, Dr. Antoinette Miranda or the project coordinator, Meg Hiss.

Thank you!

__________________________  __________________________
Antoinette Miranda, PhD      Meg Hiss, M.A.
Project Director             Project Coordinator
614-292-5909                 hiss.3@buckeyemail.osu.edu
amiranda@ehe.osu.edu
Appendix B

Consent form
The Ohio State University Parental Permission

For Child’s Participation in Research

Study Title: Concurrent Validity of the Bracken Basic Concept Scale-3: Receptive (BBCS-3: R) and the Kaufman Assessment Battery for Children, Second Edition (KABC-II) in Identification of Learning Risk Factors

Researcher: Margaret I Hiss

This is a parental permission form for research participation. It contains important information about this study and what to expect if you permit your child to participate.

Your child’s participation is voluntary.

Please consider the information carefully. Feel free to discuss the study with your friends and family and to ask questions before making your decision whether or not to permit your child to participate. If you permit your child to participate, you will be asked to sign this form and will receive a copy of the form.

Purpose: The purpose of this study is to investigate the relationship between two assessments, the Bracken Basic Concept Scale-3: Receptive (BBCS-3: R) and the Kaufman Assessment Battery for Children –Second Edition in order to determine if the BBCS-3: R can be used as a screener of potential learning difficulties.

Procedures/Tasks: Your child will meet with an OSU graduate student two times for
approximately one hour each time at their preschool setting. Your child will participate in
two different tests, one at each session. One test is called The Bracken Basic Concept
Scale-3: Receptive. It measures children’s understanding of language and concepts they
learn in preschool such as colors, numbers, and shapes. Your child will be presented with
a group of pictures. A concept such as a shape name will be presented orally and your
child will be asked to point to the answer from the group of pictures. The second test is
called the Kaufman Assessment Battery for Children –Second Edition. This test measures
thinking processes and involves a number of different activities. For example, you child
will be presented with a picture of a fish, plant, or shell and will have to identify that
picture from a group of pictures. Your child will also be presented with a series of
numbers and will need to repeat the numbers back in the same order as presented. These
tasks will provide information about your child’s ability to understand and use
information that is presented both verbally and visually. The tasks involve a lot of hands
on activities that are interesting and fun for young children. At the end of the two
sessions, you child will receive a certificate for their effort and some stickers.

**Duration:** Two, 1 hour sessions.

Your child may leave the study at any time. If you or your child decides to stop
participation in the study, there will be no penalty and neither you nor your child will lose
any benefits to which you are otherwise entitled. Your decision will not affect your
future relationship with The Ohio State University.
Confidentiality:

Efforts will be made to keep your child’s study-related information confidential. However, there may be circumstances where this information must be released. For example, personal information regarding your child’s participation in this study may be disclosed if required by state law. Also, your child’s records may be reviewed by the following groups (as applicable to the research):

- Office for Human Research Protections or other federal, state, or international regulatory agencies
- The Ohio State University Institutional Review Board or Office of Responsible Research Practices

Participant Rights:

You or your child may refuse to participate in this study without penalty or loss of benefits to which you are otherwise entitled. If you or your child is a student or employee at Ohio State, your decision will not affect your grades or employment status. If you and your child choose to participate in the study, you may discontinue participation at any time without penalty or loss of benefits. By signing this form, you do not give up any personal legal rights your child may have as a participant in this study.

An Institutional Review Board responsible for human subjects research at The Ohio State University reviewed this research project and found it to be acceptable, according to applicable state and federal regulations and University policies designed to protect the
rights and welfare of participants in research.

**Contacts and Questions:**

For questions, concerns, or complaints about the study or if you feel your child has been harmed by participation, you may contact Antoinette Miranda at 614-292-5909.

For questions about your child’s rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.

**Signing the parental permission form**

I have read (or someone has read to me) this form and I am aware that I am being asked to provide permission for my child to participate in a research study. I have had the opportunity to ask questions and have had them answered to my satisfaction. I voluntarily agree to permit my child to participate in this study.

I am not giving up any legal rights by signing this form. I will be given a copy of this form.

_____________________________  ________________________________
Printed name of subject
Printed name of person authorized to provide permission for subject

Signature of person authorized to provide permission for subject

Relationship to the subject

Date and time

Investigator/Research Staff

I have explained the research to the participant or his/her representative before requesting the signature(s) above. There are no blanks in this document. A copy of this form has been given to the participant or his/her representative.

Printed name of person obtaining consent

Signature of person obtaining consent

Date and time