Effect of a Brain Based Learning Program on Students' Use and Recognition of Self-Advocacy Skills

Megan Maynard
Philadelphia College of Osteopathic Medicine, meganha@pcom.edu

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EFFECT OF A BRAIN BASED LEARNING PROGRAM ON STUDENTS USE AND RECOGNITION OF SELF-ADVOCACY SKILLS

By Megan Maynard

Submitted in Partial Fulfillment of the Requirements for the Degree of Doctor of Psychology

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DEPARTMENT OF PSYCHOLOGY

Dissertation Approval

This is to certify that the thesis presented to us by Megan Maynard on the 17th day of May, 2016, in partial fulfillment of the requirements for the degree of Doctor of Psychology, has been examined and is acceptable in both scholarship and literary quality.

Committee Members' Signatures:

Chairperson

Chair, Department of Psychology
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Abstract

Students' abilities to employ self-advocacy skills have a wide research base; however, the research behind the use of students' self-advocacy skills used in conjunction with brain-based learning theory has not been widely explored. This is also true when one considers the population of children who have been studied; it is particularly true about those who have been diagnosed with language-based learning disabilities. This study, conducted using archival data at an independent school in the Philadelphia suburbs, used a variety of statistical methods to determine whether or not a brain-based learning self-advocacy program would increase students identified with a language based learning disabilities use and recognition of self-advocacy skills in the classroom. The only significant finding was that students did increase their knowledge and understanding of self-advocacy, post program.
# Table of Contents

Acknowledgements ............................................................................................................................................... .iii

Abstract ....................................................................................................................................................................... iv

Table of Contents ...................................................................................................................................................... v

List of Tables ............................................................................................................................................................ vii

Chapter 1: Introduction ......................................................................................................................................... 1

  Statement of the Problem ......................................................................................................................................... 1

  Purpose of the Study .................................................................................................................................................... 4

  Research Question ........................................................................................................................................................ 4

Chapter 2: Review of the Literature ................................................................................................................. 6

  Introduction .................................................................................................................................................................... 6

  Learning Disabilities ................................................................................................................................................... 6

  Self-Advocacy Defined ............................................................................................................................................. 11

  Self-Advocacy Components ................................................................................................................................... 13

  Explicit Instruction of Self-Advocacy ................................................................................................................ 17

  Self-Advocacy and the IEP ..................................................................................................................................... 18

  Brain Based Learning Theory .................................................................................................................................. 19

  Memory ........................................................................................................................................................................... 27

  Self-Regulation ............................................................................................................................................................ 29

  Self-Monitoring .......................................................................................................................................................... 32

  Self Realization ........................................................................................................................................................... 34

  Attention ........................................................................................................................................................................ 36

  Emotions ........................................................................................................................................................................ 37

  Summary ........................................................................................................................................................................ 39

Chapter 3: Methods .............................................................................................................................................. .40
Source of Data .................................................................40
Characteristics of Participants ........................................40
Self-advocacy Program Used to Produce the Archived Data 41
Measures Used in the Self-Advocacy Program Study ........43
Analyses Conducted with the Self-Advocacy Program Data 44
Procedure ...........................................................................55

Chapter 4: Results...............................................................57
Student Knowledge of Self-Advocacy ..............................57
Academic Strengths and Challenges .................................57
Strategies for Handling Confusion ..................................59
Identification of Strategies to Handle Difficult Tasks ........60
Identification of Helpful Strategies ..................................61
Feelings Related to Academic Challenges .......................63
Self-Reporting Learning Difference .................................64

Chapter 5: Discussion.........................................................66
Summary of the Findings ..................................................66
Limitations of the Study ...................................................67
Implications for Future Research ......................................68

References ........................................................................70
List of Tables

Table 1 - Classes Most Frequently Listed by Students as Easy and Hard
Chapter 1: Introduction

Statement of the Problem

Brain based learning theory and its influence in the field of education is becoming more evident in the publication of research-based strategies for use by educators. Research in the field of brain-based learning is a combined pool of research that encompasses neuroscience, biology, psychology and the field of education (Connell, 2009). Leaders in the field are applying this research to design educational strategies. Eric Jenson, a leading proponent of brain-based education, defines brain-based learning as “learning in accordance with the way the brain is naturally designed to learn” (Jensen, 2008, p. 4). With the emphasis shifting to the use of research-based learning strategies in the field of education, brain based learning research has a high level of applicability to the educational process.

Brain Based Learning There is a substantial body of literature that identifies the importance of understanding how the brain learns in order to educate students and how to best apply that knowledge to research-based strategies (Berninger & Richards, 2002; Posner & Rothbart, 2006; Sousa, 2011; Jensen, 2005 & 2008). Brain based learning allows teachers to identify a particular theory that they can use to underlie their teachings in the classroom. Caine and Caine (1995) illustrated how to apply brain based learning to the process of learning and teaching. They focus on learning in a meaningful way as opposed to a more traditional approach of memorization of facts (Caine & Caine, 1995). The model allows educators to tie information that is presented to the students to a larger purpose and understanding, as opposed to teaching isolated bits of information that are not connected to a larger concept. The twelve steps of brain based learning, formulated
by Caine and Caine (1995), allow educators to reach a more diverse set of learner, affirming the notion that not all students learn the same way and allowing educators to teach in a multitude of ways (Connell, 2009).

Brain based learning focuses on how the brain takes in information and emphasizes the different processes involved in learning. The focus on what each part of the brain does, allows students to connect to their learning and how they receive, perceive and act on their learning (Jensen, 2008). Jensen (2008) emphasizes the numerous cycles that the brain goes through in relation to learning and introduces the idea that there is an optimal time for learning for students. He elaborates on this concept by instructing educators to help students become aware of the best time for their learning, emphasizing the need for students to advocate for themselves (Jensen, 2008). Brain based learning theory provides a theoretical model that can be used to help students better understand who they are as learners and how to best advocate for themselves.

The incidences of students identified with learning disabilities have increased steadily over the years; therefore, the need for diversified teaching methods. This particular population often requires instruction with non-traditional methods in order to access learning. Connell (2009) explains that brain-based learning theory is applicable to both general education students and to those with special needs. Brain based learning, according to Connell (2009), allows educators to modify their teaching methods to accommodate students’ needs. Brain-based learning encourages educators to move beyond traditional teaching methodologies and re-conceptualize their teaching methods to ensure they are able to reach all students by focusing on meaningful learning (Caine & Caine, 1990). The inclusion of brain based learning theory allows students to understand
not only how they learn but also why they learn. It allows educators to help students gain a greater understanding of strengths and weaknesses in regard to learning and also what to do about these.

**Self-Advocacy** Self-advocacy has been well researched and documented since the 1950s and this has continued into the 1980s with a focus on individuals with disabilities (Test, Fowler, Wood, Brewer & Eddy, 2005). Izzo and Lamb (2002) noted that the educational literature has established the importance of developing the self-advocacy skills of students with disabilities. At the same time, the educational literature reveals that self-advocacy skill instruction is typically not included in direct instruction for students with disabilities (Izzo & Lamb, 2002). Although some self-advocacy programs have been developed for students of high school age, few if any programs exist that focus on fostering the development of the self-advocacy skills of younger students (Algozzine, Browder, Karvonen, Test, & Wood, 2001).

Literature investigating self-advocacy in students illustrates the fact that students need direct instruction in self-advocacy (Wehmeyer, 2002). A study conducted by Izzo and Lamb (2002) found that students with learning disabilities who received their education in a supportive learning environment are unable to identify their strengths and needs when they leave that supportive environment and are expected to be independent.

Students with learning disabilities are a particular population for whom self-advocacy skills are the most crucial. These students struggle academically and often struggle with comorbid diagnoses of attention difficulties or anxiety (Pastor & Reuben, 2008). Research into the use of self-advocacy programs in schools has focused primarily
on high school age students and has not focused on the use of brain based learning theory to educate younger students.

**Purpose of the Study**

Although research has investigated the influence of self-advocacy programs for students in the educational setting, little has been done in the way of research on self-advocacy for younger aged students or on the use of programs that utilize a brain based learning approach to advocacy. The current study will investigate the effects of a brain based self-advocacy program used with students identified with language based learning disabilities and comorbid ADHD.

**Research Question**

The current study will address the following research question:

Does participation in a six session program that utilized a brain-based approach to teaching about self-advocacy result in positive changes in students’, teachers’ and program facilitator’s perceptions of students’ knowledge of self-advocacy, in students’ knowledge of personal academic strengths and weaknesses, and in students’ knowledge of adaptive strategies for handling academic challenges?

**Specific Research Hypotheses**

The specific hypotheses that will be subjected to statistical analysis are as follows:

Hypothesis 1: Students’ awareness of the definition of self-advocacy will increase from pre-program to post-program.

Hypothesis 2: The degree of consistency between the student’s and the teacher’s perceptions about the academic strengths of the student will increase from pre-program to post-program.
Hypothesis 3: The degree of consistency between the student's and the teacher's and/or the psychologist's perceptions about the academic challenges of the student will increase from pre-program to post-program.

Hypothesis 4: Students will self-report and teachers and the program facilitator will report an increase in the number of questionnaire responses that identify effective strategies for handling classroom situations that cause confusion.

Hypothesis 5: Students will self-report and teachers and the program facilitator will report an increase on the number of questionnaire responses indicating that students identify effective strategies for handling difficult tasks.

Hypothesis 6: Students will self-report and teachers and the program facilitator will report an increase on the number of questionnaire responses indicating that students identify helpful classroom strategies.

Hypothesis 7: Students will self-report and teachers and the program facilitator will report an increase in the number of questionnaire responses indicating that students are comfortable with asking teachers for help with difficult academic tasks.

Hypothesis 8: Students will self-report and teachers and the program facilitator will report an increase in the number of questionnaire responses indicating that students are at ease with telling others about their learning differences.
Chapter 2: Review of the Literature

Introduction

Self-advocacy program research has focused primarily on the use of programs to educate students at an older age, particularly during high school. Although these skills are important to learn at any age, it is particularly important for students with learning disabilities to learn how and why they need to use self-advocacy skills during their time in school. Brain based learning theory gives educators and researchers the ability to connect the way in which students learn to the real-life application of learning in the classroom, educating students about the reasons why it is they learn the way that they do, and empowering them to use research based strategies to enrich their learning. This is particularly important for students who have been identified for special education services. Direct instruction of self-advocacy skills has not been emphasized in the school environment; research, however, has suggested that the direct instruction of these skills will allow children to be more successful students and advocate themselves and their learning.

Learning Disabilities

Although self-advocacy skills are important for all students to acquire and master while in school, they are even more critical for students who qualify for special education services due to the nature of their disabilities and the impact these have on their ability to access learning. Brain based learning theory allows educators to connect students’ difficulties to concrete meanings and allows them to understand the “why” of how they learn. After a student is identified as eligible for special education services, however, there is a greater chance for success both academically and emotionally. Sousa (2008)
explains that students with learning disabilities who have been exposed to strategy based instruction achieved at a higher rate than students who were not exposed to strategy based instruction.

**Diagnostic criteria.** According to the Diagnostic and Statistical Manual of Mental Disorders, a specific learning disability is defined as a “neurodevelopmental disorder with biological origin that is the basis for the abnormalities at a cognitive level that are associated with the behavioral signs of the disorder” (American Psychiatric Association, 2013). “The biological origin includes an interaction of genetic, epigenetic, and environmental factors, which affect the brain’s ability to perceive or process verbal or nonverbal information efficiently and accurately” (American Psychiatric Association, 2013). This definition encompasses the many factors that influence a child’s learning abilities. The most important factor to consider is the child’s ability to acquire early academic skills during the developmental years (American Psychiatric Association, 2013). The National Joint Committee on Learning Disabilities adopted a definition of a learning disability in 1990. Their definition states, “Learning disabilities is a general term that refers to a heterogeneous group of disorders manifested by significant difficulties in the acquisition and use of listening, speaking, reading, writing, reasoning, or mathematical abilities. These disorders are intrinsic to the individual, presumed to be due to central nervous system dysfunction, and may occur across the lifespan” (National Joint Committee on Learning Disabilities, 1991, pp. 108). These early academic skills include reading, reading comprehension, writing, and computation skills (American Psychiatric Association, 2013). Although children develop early motor skills in a typical manner, these early academic skills need to be explicitly taught to young children. A specific
learning disorder will cause a disruption in the acquisition of these skills, causing students to fall behind their peers (American Psychiatric Association, 2013). Although students may struggle with certain concepts or the acquisition of certain skills, a child with a specific learning disability will continue to struggle in a persistent manner and will fall even further behind his or her peers.

Another factor that evaluators must take into consideration when assessing a student for identification of a specific learning disorder is how far his or her academic performance is from peers of the same age (American Psychiatric Association, 2013). If a student requires an extreme amount of support in order to sustain his or her academic achievement, a child may be exhibiting signs of a specific learning disorder (American Psychiatric Association, 2013). It is imperative that these students are identified early in order to provide necessary interventions to address the student’s academic deficits. The DSM-5 also specifies four reasons indicating that the learning disorders are “specific” in their nature. These reasons include that the source of the deficit cannot be tied to an intellectual disability or other neurological disorder; that these types of learning disorders affect students who exhibit typical levels of cognitive functioning; that environmental factors cannot be accounted as the source of the deficits, and that the learning deficits may be found in one academic area (American Psychiatric Association, 2013). Formal assessment both of cognitive and of academic skills is required in order to determine if a child is eligible for special education services under IDEA.

**Diagnostic Codes.** The DSM-5 and Individuals with Disabilities Act (IDEA) outline the specific requirements necessary to qualify for a learning disability diagnosis. The psychoeducational evaluation must include assessment in cognitive, academic, and
social domains in order to fully assess a student's disability. If a student is displaying academic difficulties for at least six months, without response, despite interventions in the mainstream classroom, a student may qualify for one of the three specified domains under a specific learning disability (American Psychiatric Association, 2013). IDEA also specifies that the disability cannot be attributed to "a visual, hearing or motor disability, mental retardation, emotional disturbance, cultural factors, environmental or economic disadvantage or limited English proficiency" (Individuals with Disabilities Act, 2014).

The three main domains are reading, writing and mathematics; there are also specific skills within the domains such as reading fluency, basic reading skills, reading comprehension, mathematics calculation and problem solving (Individual with Disabilities Act, 2014).

**Reading.** In the academic domain of reading, there are three specific skills areas in which students can demonstrate difficulties. These include: word reading accuracy, reading rate or fluency, and reading comprehension (American Psychiatric Association, 2013). Dyslexia is a term that is used more frequently when a private psychoeducational evaluation is conducted; however, it is used to explain a distinct model of reading difficulties in the area of accurate or fluent word recognition, poor decoding skills and poor spelling skills. The DSM-5 recommends that if the term dyslexia is utilized, that the examiner also specifies any additional skills with which the student may be displaying difficulties (American Psychiatric Association, 2013).

**Written expression.** For the academic domain of written expression, there also are three specific areas in which students can demonstrate difficulty with acquiring skills. These skills include: spelling, grammar, punctuation accuracy, and clarity or organization
of written expression (American Psychiatric Association, 2013). These types of
difficulties will present in the classroom for a student who is displaying learning
challenges; there are specific academic assessments utilized to assess the deficit in this
student when he or she is compared with same age peers. In conjunction with the
psychoeducational evaluation, an occupational therapy evaluation also may be conducted
to rule out any motor difficulties that may be contributing to the difficulties with the
acquisition of written expression skills.

**Mathematics.** In the academic domain of mathematics, there exist four specific
areas in which students can display deficits in skill acquisition. These areas are number
sense, memorization of arithmetic facts, accurate or fluent calculation and accurate math
reasoning (American Psychiatric Association, 2013). There is also an alternative term
called dyscalculia to describe a deficit in mathematics. This specific term refers to
deficits related to processing numerical information, acquisition of mathematical facts
and the display of fluent calculation skills (American Psychiatric Association, 2013).
This specific term is more commonly used to diagnose students who have undergone
psychoeducational evaluation through a private practitioner; however, it is still relevant to
the school system.

**Comorbidity.** Although it is critical to acquire an accurate understanding of a
student’s cognitive and academic deficits or skill acquisition, it is also critical to include
social and emotional information that may be influencing their skill acquisition and
impeding their learning. To this end, an evaluator must include measures related to social
and emotional skills in the evaluation process. Researchers suggest that approximately
three to seven percent of children can be identified with a diagnosis of Attention Deficit

BRAIN BASED LEARNING

Hyperactivity Disorder (ADHD) (Barkley, 1998; DuPaul and Stoner, 2003). Due to the high prevalence rate of ADHD, some students may be referred for evaluation due to ADHD-related difficulties as well as learning difficulties (DuPaul and Stoner, 2003). Sousa (2007) defines attention deficit hyperactivity disorder as a “syndrome that interferes with an individual’s ability to focus (inattention), regulate activity level (hyperactivity), and inhibit behavior (impulsivity) (pp. 49). Pastor and Reuben (2008) examined the prevalence of students identified with ADHD or a learning disability alone and of those identified with ADHD and learning disabilities combined. Within their study sample, they found that approximately 5% of children were diagnosed with ADHD only; 5% were diagnosed with a learning disability only, and 4% were diagnosed with both ADHD and a learning disability. DuPaul and Stoner (2003) suggest that the dual diagnosis of ADHD and a learning disability can be explained by the genetic factors associated with the two conditions. In order for a child to benefit the most fully from his or her academic setting, these deficits also must be acknowledged and addressed through interventions in the school setting.

Self-Advocacy Defined

Self-advocacy is a term that has multiple meanings, depending on how one tries to apply it. There are several perspectives on the nature and definition of self-advocacy (Test, Fowler, Wood, Brewer & Eddy, 2005; Field, 1996; Hartman, 1993). Hartman (1993) defines self-advocacy as, “the student understands his or her disability, is as aware of the strengths as of the weaknesses resulting from the functional limitation imposed by the disability, and is able to articulate reasonable need for academic or physical accommodations” (p. 40). In order for a student to understand his or her disability, he or
she must be educated in what that disability is and how it affects his or her learning. The next step would be to help the student identify the areas that are strengths and those areas on which he or she needs to work. The most important part of Hartman’s definition involves the student’s ability to articulate the need for the requested accommodations. This definition naturally leads to an educational approach that links brain based learning theory to specific learning strategies that take into account students’ specific strengths and weaknesses and related needs. Students who are able to self-advocate for themselves will know what they need to help them succeed and will use their knowledge and skills to obtain it.

In regard to education, self-advocacy is crucial to the success of students, those in regular education and those that also meet criteria for special education services. General education teachers have a responsibility to ensure that all students have access to the general education curriculum regardless of disability. With this in mind, it is even more important for students identified for special education services to recognize their strengths and to advocate for their areas of need.

In order for students to advocate for themselves, they initially must know the reasons why they are doing so. This requires that students having an understanding of their unique cognitive and emotional strengths and weaknesses and the related needs. Brain based learning theories allows for this type of instruction. Students are instructed in the importance of the different parts of their brains and how these connect to their learning strengths and weaknesses and related needs. This allows for a more comprehensive view of students’ needs. If students are aware of their learning strengths
as well as their learning weaknesses, they are more capable of utilizing self-advocacy skills in the classroom.

Another important factor to take into account is whether or not students believe that they have the ability to influence outcomes despite their disabilities or that they cannot influence outcomes because of their disabilities. Dweck and Yeager (2012) presented research related to mindsets that promote resilience for students. They focused on whether or not students believed that one's intelligence was fixed or was something that one could change in terms of one's academic challenges. Believing that things can be changed through effort enables students to believe that their academic challenges are something that they can overcome and helps to determine the level of resiliency of those students. Dweck and Yeager (2012) argue that students' mindsets are malleable and are something that can be changed in order to build resilience. This type of approach to education allows the strengthening of the connections between students' understanding of their strengths and weaknesses and how these affect their learning and also the strategies that they can utilize to overcome their weaknesses. The greater certainty those students have, believing that they possess the ability to overcome the academic challenges they face, the more likely they are to utilize self-advocacy strategies and display resiliency in the face of academic challenges.

Self-Advocacy Components

Although it is important for all students to understand their unique cognitive strengths and weaknesses and the strategies that work best for them, it is even more important for those students who are eligible for special education services. The main priority of education is for students to succeed; however, it is difficult for many to attain success if
they are not aware of their strengths and weaknesses and related needs. Research suggests that students who are helped directly to identify and understand their particular cognitive and emotional strengths and weaknesses and related needs are more able to access their learning. Research has shown that the development of self-advocacy skills is crucial to the successful transition of individuals to post secondary education and to the work force (Test, Fowler, Wood, Brewer & Eddy, 2005). However, a gap exists because many of these skills are not directly and explicitly taught to students during their educational careers.

Although studies have been conducted regarding self-advocacy and education, a gap still remains in a concrete framework for the skills to be taught to younger students (Field, 1996; Fiedler & Danneker, 2007; Test, Fowler, Brewer & Wood, 2005). In order to fill that gap, Test, Fowler, Wood, Brewer, and Eddy (2005), conducted a literature review to develop a conceptual framework for self-advocacy instruction to be utilized by educators. The researchers identified four components necessary for students to engage their self-advocacy skills fully. These critical components include: “knowledge of self, knowledge of rights, communication and leadership” (Test et al., 2005, p. 45).

**Knowledge of Self.** The first component, knowledge of self, is critical for any student, disabled or not, in order for a student to be successful. Knowledge of self can be described as knowing one’s own strengths and areas of need as well as learning style and how one learns best (Test et al, 2005). Many students are not taught this explicitly nor are they taught how to identify this about themselves during their time in school. If they are asked to identify these things about themselves, it is typically through a self-reflection and not through explicit instruction. An argument can be made that teaching these skills
explicitly to students at an earlier age will lead to a more successful educational career. A study conducted by Durlak, Rose and Bursuck (1994) investigated, with high school students identified with learning disabilities, whether or not self determination skills could be acquired through direct and explicit instruction, following which the students would transition to the general education classroom. More specifically, researchers investigated whether or not the students were able to state their specific disabilities, explain how these affected their academic and social abilities, and explain the accommodations that would be helpful to them, including how to work with their teachers to ask for those accommodations (Durlak, Rose & Bursuck, 1994). Results of the study suggest that explicit instruction in self-determination skills will result in the students acquiring the necessary skills to self-advocate for their educational needs (Durlak, Rose, & Brusuck, 1994).

Knowledge of Rights. The second component, knowledge of rights, is also something that most students are not exposed to until transition times during their IEP meetings. Many students are not aware of their rights under the Individuals with Disabilities Act (IDEA) or the Americans Disabilities Act (ADA), and many will not be asked to know their rights until they enter the workforce or enter secondary education during which they must ask for accommodations. This leaves students susceptible to failure without the safety net of adult assistance. This area is also crucial for students to understand in order to advocate for themselves in situations in which it is necessary, such as in the work place or in college courses.

Communication. The third component that Test et al. (2005) identified as part of their self-advocacy framework was communication. They defined communication as the
ability of students to communicate effectively regarding their rights and areas of strength and needs (Test et al., 2005). Without the first two components in place, communication regarding the student as a learner or the types of accommodations they would require would not be possible. Communication also extends to how students speak about themselves to others. If a student is unable to explain his or her strengths and needs clearly as well as his or her rights as an individual, that student will face many more roadblocks than necessary. Researchers have also emphasized the importance of distinguishing between aggressive communication and assertive communication. Durlak, Rose and Bursuck, (1994) included a component of teaching effective communication strategies to the students utilized in their study, with the opportunity for feedback from teachers. Without explicit instruction in this area, many students may come across to individuals as aggressive as opposed to being assertive and asking for their needs to be met.

Leadership. The final component that Test et al. (2005) identified as part of their self-advocacy framework was leadership. Leadership was defined as the ability to learn roles and dynamics of a group and to be able to function appropriately in that group (Test et al., 2005). Although leadership is an important component to the self-advocacy framework, without the first three components, an individual would not be able to be a leader in a particular group without first recognizing his or her strengths and needs. Leadership in terms of self-advocacy is viewed as crucial when a student is a participant in his or her IEP meetings or transition meetings. However, this does not happen until student is sixteen years of age, leaving education and programming decisions prior to this to adults who may not understand the student as a learner.
Along with these critical components, students must also develop an internal locus of control, meaning that they have the opportunity to make decisions for themselves and act on those decisions (Izzo & Lamb, 2002). This is particularly important for students identified with disabilities because they are limited in their abilities to choose and to make decisions for themselves (Izzo & Lamb, 2002). It is more likely that the adults in a student’s life will make decisions for him or her or come to the “rescue” rather than let the student fail (Durlak, Rose & Bursuck, 1994). It is also unreasonable to assume that a student would know how to navigate certain types of situations without having had exposure and without having been taught how to problem solve through such situations prior to their occurrence (Durlak, Rose, and Bursuck, 1994). If students do not feel that they have control over the decisions in their lives, it is difficult for them to understand the importance of advocating for themselves.

**Explicit Instruction of Self-Advocacy**

Although no research has been reported on the use of self-advocacy programs for elementary age students, some researchers have investigated the effectiveness of self-advocacy programs at the high school level. Wehmeyer, Palmer, Agran, Mithaug and Martin (2000) introduced a model of teaching which incorporates principles of self-determination to promote students’ levels of independence. They investigated the use of this model with a group of students who had been diagnosed with disabilities, with learning or social and emotional diagnoses. It was concluded that this particular model of instruction was beneficial in assisting teachers to enable students to take control of their own learning (Wehmeyer et al., 2000). This model allowed students to identify their locus of control and take control of their learning experiences.
Self-Advocacy and the IEP

In a typical public school model, teachers must implement the goals that were set forth in a student’s IEP and must revisit the goals each year in order to assess progress. The difficulty with this is that students do not play a role in the development of their goals or even have an understanding of what these goals are or what they mean for them educationally. There is an age at which a student may begin to participate in his or her IEP meeting that has been set forth by law; however, students younger than fourteen are unable to participate in this learning process. The conceptual framework that was developed by Test et al. (2005), incorporating the twelve brain based principles developed by Caine et al. (2009), allows starting point for educators to include students in their educational processes. By focusing on the four elements of the framework, including the principles, and incorporating these into the students’ IEP goals, allows a focused acquisition of these skills and allows an opportunity for the student to take ownership of their learning. By teaching students the skills necessary to self-advocate for themselves and understand who they are as learners, they understand how to be their own support systems and are able to have a greater involvement in choices made regarding their education (Whatley, 2006).

Gloria Campbell-Whatley (2006) argues that student instruction in self-advocacy and self-determination skills should begin early in the students’ educations. She cites Wehman and Kregel (2004), who argue that the skills should be taught at different stages as the student matures (Whatley, 2006). Students should be taught awareness of their skills in the elementary years, meaning they should be taught to explore their areas of strength and areas of need (Whatley, 2006). Students with learning disabilities will need
guidance and support in recognizing their learning difficulties and their areas of strength. Utilizing a brain based learning theory approach will help educators instruct students in their strengths and in areas of need, allowing students to connect their strengths and needs to their own brain. Allowing students to connect their academic struggles to concrete information about how their brain works and how it processes information allows abstract information to become more concrete and malleable.

Although the creation of self-advocacy programs has created progress in the field, the number of programs that address students’ skills at a younger age is still relatively small. Programs that are based in brain based learning theory are also relatively non-existent. The elementary years are a crucial time period during which to educate students about how they learn and what their brain does for them. The development of self-advocacy programs that are rooted in brain based learning theory will address this hole in the current research.

**Brain Based Learning Theory**

The application of brain based learning theory to self-advocacy programming enables educators to help students understand the functions of the brain and how it processes information. Caine and Caine (1994) explain that brain based learning theory involves recognizing how the brain learns and organizes information to make learning meaningful. Many current self-advocacy programs do not focus on the students’ understanding of their brains and how their brains process information. Brain based learning theory allows educators to bridge the gap between how a student learns and the reasons why they need to advocate for themselves in their education.
BRAIN BASED LEARNING

Brain Based Learning (BBL) explores the connection between the fields of neuroscience and education. Research into how the brain changes with learning and the effects of injuries on the brain has enabled a greater understanding and application of brain-based theories to education. The field of brain-based learning has allowed many disciplines to come together and to combine their efforts. These fields include neuroscience, neurology, medicine and psychology, as well as education (Connell, J.D., 2009).

Brain based learning can be defined as “learning in accordance with the way the brain is naturally designed to learn” (Jensen, 2008, p. 4). A more important aspect of brain based learning theory is that it involves the application of research based strategies and interventions within the field of education (Connell, J.D., 2009). As Jensen (2005) describes it, the brain will learn most optimally in the best environment, meaning the environment that allows a student to understand the why’s of what he or she is doing.

Sousa (2007) emphasizes the application of brain-based learning, particularly for students diagnosed with learning disabilities. When students with learning disabilities are able to connect their areas of struggle with their brains, it allows them to gain a better understanding of who they are as learners.

According to Jensen’s (2005) description, the brain will learn most optimally in the best environment, meaning the environment that allows students to understand the why’s of what they are doing (p. 6). The brain is constantly searching for meaning and if educators are able to show students the connection between what they are learning and the reason behind it, there is a greater chance of success. Caine, Caine, McClintic, and Klimek (2009) have continued the progression of the concept of brain based learning and
have constructed twelve learning principles that educators must take into account when designing their instruction. A major component of this learning theory involves educating students about how their brains work and the meaning behind this, creating a more powerful learning experience. Caine et al. (2009) also place emphasis on the development of students' executive functions in conjunction with teachers’ applications of brain-based teaching principles. Sousa (2007) stresses this particularly for students diagnosed with learning disabilities because of their difficulties with learning and managing their school expectations.

**Learning Principles.** The first learning principle can be defined as the understanding that learning involves the physiology of the body (Caine, Caine, McClintic and Klimek, 2009). At the root of this, is that learning involves the brain, mind and body working in an integrated way in order for meaningful learning to take place. This allows educators to focus on integrating their students’ senses, movements and actions to allow for meaningful connections to be made (Caine et al., 2009). Many educators in the current day find it difficult to break out of the routines of teaching facts and rote information due to the demands of standards and assessments; however, students must have repeated exposure to new material and be fully engaged in their experiences in order for the content to become a natural part of their environment (Caine et al., 2009).

The second learning principle that is emphasized involves the understanding that the brain and mind is social and requires recognition of this in the way that educators teach. Neuroscience research illustrates the importance of social relationships to an individual’s stress levels and the influence these can have on the synaptic connections formed in the brain (Caine et al, 2009). Caine et al. (2009) illustrates in their research that
students who feel disconnected and experience isolation are less likely to be invested in their learning and to suffer from socially isolating behaviors such as bullying (p. 59). It is imperative for educators to engage their students' social needs in the classroom in order for learning to occur.

The third learning principle that Caine et al. (2009) emphasize involves the theory that children are more engaged in their learning when they understand the meaning behind what they are learning. In order for educators to reach their students, they must acknowledge students' interests in order for the students to become engaged in the material (Caine et al., 2009). Sousa (2007) emphasizes the fact that in order for learning to occur, two criteria must be met: sense and meaning. He defines meaning as “relevancy”, meaning that students must make a connection between the new information and themselves (Sousa, 2007, p. 13). He also emphasizes the fact that students must be given time to process this new information, often referred to as rehearsal (Sousa, 2007).

Although students search for meaning in their learning, they are also constantly searching for patterns to organize and conceptualize the new information (Caine et al., 2009). When an educator can attach new information to information that the student has previously learned, the student has a much higher success rate of maintaining the new learning. Educators have the important task of connecting novel information to previously learned material to facilitate the student’s ability to create a pattern and organize information (Caine et al., 2009). This applies to the field of education because students hold onto information when it is taught in a contextual manner as opposed to rote facts that have no connections to their knowledge base (Jensen, 2008). Students who
are able to connect new information to prior learning are better able to apply that learning in another context.

The fifth learning principle builds on the recognition of patterning for students' success in learning. It emphasizes the importance of students' emotional state when they are in the classroom. When educators recognize students' emotional states, they are more able to reach their students in an effective manner. The learning experience for the students must be one that is enriched and takes their emotions into consideration. Jensen (2008) explains that learning is part of an interactive process and when information is presented in a way that allows for generalization and the ability to apply to a known context, there is greater possibility of success that the information will be learned and stored. Educators have the important task of recognizing where students are developmentally in terms of their self-awareness and self-regulation in order to provide an emotionally safe place for them to learn.

The sixth principle involves recognition that the brain processes information in parts and in wholes at the same time (Caine et al., 2009). As described previously, the brain is constantly seeking out patterns and meaning, and in doing so is taking in information in little bits and in whole parts. In teaching, instruction should begin with exposing the students to the larger message of the content and then digging into the smaller parts. Caine et al. (2009) explain this as allowing students to gain a greater understanding of the meaning of what they are learning in order to draw connections to prior knowledge. Educators must focus on building foundational skills and also linking these foundational skills to the larger concepts to which they connect (Caine and Caine, 1990; Connell, 2009). The concept of brain-based learning allows educators to use
neuroscience to educate themselves and their students about how their brains learn. Teaching students about their brains and how this connects to how they learn will only enhance the learning experience and allow students a deeper understanding of who they are, further developing their self-realization capacities.

The capacity to pay attention to information and to the environment is crucial to learning, whether it involves school or real-life experiences. The seventh principle focuses on educators recognizing the need for lessons to engage students' attention and interests in order for them to fully understand the information and context. When educators engage students’ executive functions, they invoke students’ needs to make decisions and attend to their environments, which allows them to engage fully in their context of the lesson (Caine et al., 2009). Many factors are involved in students’ abilities to pay attention including novelty, emotion, meaning, patterning, helplessness and peripheral perception (Caine et al., 2009). When all of these modalities are taken into account, students are more successful in their learning.

Self-monitoring and knowledge of strengths and areas of need are crucial to the success of a student. The eighth principle emphasizes the importance of students’ abilities to reflect and monitor their own learning so that they are able to take control of their learning (Caine et al., 2009). Learning occurs all of the time, whether through an activity that involves direct attention to solving a problem or requires thoughtful process in order to develop and understand an idea or theory fully. This principle provides evidence for the basis of brain based learning theory and the recognition of students' strengths and areas of need as part of their education.
Caine et al. (2009) investigate the mysteries of the memory stores in the brain to illustrate the importance of principle nine. Many cognitive psychologists and neuroscientists have spent many years of research quantifying and defining the multiple memory stores used in the brain. Caine et al. (2009) argue that educators must distinguish between memory seen as an archive, a place from which students pull information, and memory that needs to be used in the moment and utilized to make decisions. Although educators focus on rote memorization of facts, students struggle to retain it when this type of information is not presented in a given context or tied to prior meaning. Caine et al. (2009) argue that rote learning is necessary, but that it does not engage the executive functions to allow for deeper learning.

All human beings develop in a similar way, although no one person develops at the same rate or in the same way as another. This can also be applied to learning. Caine et al. (2009) argue that educational systems base students' progress on their ages; however, they argue that this is inaccurate, given the variability in students' development of skills. They also explain that even a "normal" development can vary by months or even by years and it is critical for educators to understand this when involved in the placement of students (Caine et al., 2009). Principle nine focuses on the development of executive functions in students and the "typical development" of these skills. Educators must remember that although learning is developmental, so are the skills that students must acquire in order to learn.

Educators must take the development of skills such as executive functions into account when they are designing their lessons and instruction; however, they also must take the students' emotions and perception of their strengths and needs into
consideration. The threat of fear or of being wrong is one that hinders many students in their learning, particularly students who struggle with their learning. The eleventh principle illustrates the importance of educators providing a supportive and safe environment for students to engage fully in the learning process. When a student feels a threat or is stressed in his or her learning environment, the brain is not able to process information properly (Caine et al., 2009).

Students have the same capacities and functions in their brains; however, their brains are uniquely organized and involve many different interests, abilities, and talents that must be taken into consideration when planning instruction. Caine et al. (2009) emphasize two important factors that must be taken into consideration. The first factor involves the development of executive functions both for the educators and for the students so they can cope and manage the situations that their environment presents. The second factor recognizes that both educators and students must be cognizant of their own strengths and needs in order to recognize successfully those situations in which they may need help or may need to be taught strategies to navigate (Caine et al., 2009). Educators must be aware of areas where their students' executive function capacities are well-developed as well as areas where they are under-developed in order to address their students' needs.

Caine and Caine's twelve principles highlight the importance of having knowledge of the brain and how its development functions in educating students. Educators must be taught the different parts of the brain that are crucial to students' success and strategies to enhance those areas that students may struggle with. When
educators teach with the brain in mind, they allow for an optimal learning experience for their students.

**Memory**

Research into the memory and its many mysteries has evolved and changed in recent decades. Sousa (2011) defines learning as the process by which individuals acquire knowledge, defining memory as the process by which that information is retained for the future (p. 83). Jensen emphasizes the importance of focusing on the process of memories as opposed to focusing on the particular locations that memories occur in the brain. This type of approach allows educators to craft their teaching methods to fully utilize the brain’s capacity to retain information and skills. Learning not only increases students’ information capacity and skills but also increases the size of their brain cells, the branches and the types of complex networks that they can form (Sousa, 2001).

When learning occurs, the brain goes through physical and chemical changes in order for that information to be stored. Sousa (2011) identifies seven operations that occur, involving other complex process systems located in the brain, when learning happens. These seven operations involve the brain’s ability to “select, process, encode, store, retrieve, and act” (Sousa, 2011, p. 83). While these processes are occurring, the cells of the brain are undergoing physical and chemical changes in order to store and retrieve the new information. Jensen’s explanation about how memories are formed is similar to Sousa’s. Jensen (2008) explains that memories are initially formed through sensory stimulation, which is then registered in the brain. Those experiences are prioritized based on their meaning and the hierarchy of processes in the brain. Neurons
are then activated and transmit information due to chemical changes. The connections are strengthened by repetition and emotions (Jensen, 2008).

Research into places where memories are stored has revealed that memories are not stored in one particular place in the brain, but rather, they are stored in pieces and distributed throughout different parts of the brain (Sousa, 2011). When students are able to store memories that have multiple connections, it is more likely that they are able to apply that knowledge to another learning experience. Jensen (2008) illustrates the idea that different locations in the brain are responsible for particular types of memories. For example, the pre-frontal cortex has been implicated in short-term memory storage and the cerebellum has been identified as the storage for procedural learning, reflexive learning and conditioned responses (Jensen, 2008). As educators, it is important that knowledge of these areas of the brain is considered when identifying students’ difficulties and conceptualizing strategies to assist them in their learning.

Similar to Caine et al. (2009) and their investigation into the importance of engaging senses while teaching, Jensen (2008) argues that memories are more likely to be retrieved successfully if they can be retrieved under the same state in which they were formed. Engaging the senses allows students to tie new learning and information to previous concepts and contexts to strengthen the memory. Jenson illustrates the fact that when senses are engaged in learning, multiple memory pathways are engaged in order to facilitate the memory storage (Jensen, 2008). According to Jensen (2008), the two types of pathways that are involved in retaining memories are the implicit and explicit pathways. Jensen describes these as learning information automatically or learning information by effort (Jensen, 2008). He emphasizes the importance of educators
focusing their teaching on context driven instruction, which will allow optimal learning for students (Jensen, 2008).

Sousa’s model of memory formation varies from those described by Jensen. Sousa (2011) describes the stages of memory as “sensory/immediate, working and long-term memory” (p. 86). He continues to break down the different types of memory even further into declarative and nondeclarative memory, which involves specific types of memories and learning (Sousa, 2011). Without this type of knowledge, it would be difficult to understand the types of difficulties that students may face in their learning and retrieval.

Retention must also be taken into consideration when discussing a student’s difficulties with learning. Sousa (2011) defines retention as “the process whereby long-term memory preserves learning in such a way that it can locate, identify, and retrieve it accurately for the future” (p. 91). If a student is displaying difficulty with his or her ability to retain or to retrieve information, one must consider many multiple factors such as initial learning, how information was presented, social/emotional factors and the student’s ability to attend consciously to the information or retrieval of information. A focus on the frontal lobe illustrates the importance of rehearsal for students to retain new learning (Sousa, 2011).

**Self-Regulation**

Self-regulation is an area of interest for many researchers in the field of education as well as in the fields of behavior and neuroscience. There are varying definitions that can be applied to self-regulation depending on how it is being applied to a certain situation. Educators face the challenge of attempting to identify and foster students’ self-
regulation skills in the classroom. However, educators must also understand how self-regulation skills develop, as well as how to foster the many components involved in self-regulation.

A study conducted by Martha Leticia Gaeta Gonzalez (2013) investigated the development and effect of the classroom environment on students’ goal directed learning through self-regulation. She explains self-regulated learning as a “self-directed process in which students transform their mental abilities into academic skills” (p. 46). Zimmerman defines self-regulation as “the degree to which students are metacognitively, motivationally, and behaviorally active participants in their own learning process” (p. 167). Students must engage fully in their learning processes in order to develop their self-regulation to the fullest extent.

McCloskey’s writings on executive functions highlight the importance of self-regulation and the components that are affected and controlled by it (McCloskey, VanDivner & Perkins, 2009; McCloskey & Perkins, 2012; McCloskey, Gilmartin, and Stanco-Vitanza 2014). This is particularly important for educators as they work with students in their classrooms who display difficulties with their self-regulation. Executive functions are defined as “directive capacities that are responsible for a person’s ability to engage in purposeful, organized, strategic, self-regulated, goal-directed processing of perceptions, emotions, thoughts, and actions. They cue the use of other mental capacities such as reason, language and visuospatial representation” (McCloskey, et.al., 2009, p. 15). In order for educators to assist students in the development of their self-regulation skills, it is important for them to understand the development of these skills and their influence on a students’ performance. McCloskey et al. (2014) have identified thirty-
three capacities that are directly tied to students' self-regulation skills. Self-regulation capacities are the processes that allow one to successfully navigate day-to-day activities. Students who display difficulties in certain areas may have underdeveloped self-regulation capacities.

The four domains identified by McCloskey et al. (2009) to explain the specific areas in which self-regulation is involved include Perception, Cognition, Emotion and Action; functioning within these domains is not always consistent. Although students may be able to direct their emotions and thoughts, they may display difficulty with directing their actions. It is important for educators to understand how the use of executive functions can vary by domain of functioning in order to intervene effectively with students that are experiencing difficulties with self-regulation.

Students' use of self-regulation executive functions can also vary by Arena of Involvement. McCloskey and colleagues (McCloskey et. al, 2009, McCloskey & Perkins, 2012; McCloskey et. al., 2014) have identified 4 separate Arenas of Involvement within which students may apply executive functions. These arenas include the Intrapersonal, Interpersonal, Environment and Symbol System (Academic).

The Intrapersonal Arena involves the use of executive functions to cue and direct how one perceives, feels, thinks and acts toward oneself; the Interpersonal Arena involves how one perceives, feels, thinks and acts toward others. The Environment Arena involves how one perceives, feels, thinks and acts in interactions both with natural and with man-made environments. The Symbol System Arena involves how one perceives, feels, thinks and acts when engaged with academic tasks such as reading, writing, and the use of mathematics. It is important for students to understand how their
use of self-regulation executive functions can vary, based on the domain of functioning (perception, feeling, thought, and action) within each Arena of Involvement. Understanding their own challenges as well as their strengths can facilitate the use of strategies to overcome areas of need and to advocate for help when needed.

**Self-Monitoring**

McCloskey et al. (2009) defines self-monitoring as a form of self-regulation; it is one of thirty-three different self-regulation executive functions. The development of this executive function follows a similar continuum because it is not fully developed until early adulthood and can vary from individual to individual. It is also important to note that there can be great variability within the development of the individual child’s development of executive function modalities. McCloskey et al. (2009) define monitor as the function, which “cues the activation of appropriate routines for checking the accuracy of perceptions, emotions, thoughts and actions”. McCloskey goes on to explain that an individual may be successful at monitoring his or her emotions, but display difficulty with monitoring his or her actions. For example, a student may have great success in being able to identify and monitor his or her feelings regarding a situation but he or she may have difficulty displaying the appropriate behavior or action in a certain situation. A student may also display difficulty with monitoring the effect of his or her social interactions with others and therefore is unable to correct inappropriate social interactions.

Reid (1996) indicates that many research studies have focused on the usefulness of self-monitoring interventions in the classroom for general education students and have transitioned into a focus on students diagnosed with learning disabilities. These studies
have focused on two types of self-monitoring: self-monitoring of attention and self-monitoring of performance. Reid (1996) states that studies that were analyzed through his study showed that self-monitoring had a positive impact on academic performance. Reid’s (1996) analysis of self-monitoring studies argues that self-monitoring can be effective at protecting students from external distracters. He also argues that one must think of metacognition and self-regulation as two distinct processes, even though they occur simultaneously.

The frontal lobe is responsible for one’s ability to plan and think (Sousa, 2011; McCloskey, Perkins & Van Divner, 2009). This allows individuals to employ rational thinking and executive control to manage and monitor higher-order thinking, direct problem solving, and also to manage the emotional system (Sousa, 2011). It is important to note that this part of the brain is slow to reach maturity and does not fully develop until early adulthood (Dosenbach, et al., 2010). With this understanding, educators can be cognizant of the need for support, and recognize the amount of support that will be required by students who are displaying difficulties with self-regulatory and self-monitoring behaviors.

Self-monitoring interventions can take many forms, such as self-monitoring of attention or self-monitoring of performance and are designed to be dependent on the purpose of the intervention. Interventions can be implemented to address either academic and behavioral difficulties or both at the same time. In order for these interventions to be effective for the students for whom they are implemented, those who are creating them must be knowledgeable about the origination of self-monitoring behaviors in the brain. Self-monitoring allows students the opportunity to recognize their own behaviors as well
as how those behaviors impact others or impede their learning. Ganz (2008) describes students' self-monitoring as a part of self-management, which is a pivotal behavior, meaning that it can influence other behaviors the child might display. The ease of implementation of self-monitoring interventions allows teachers to include these in their classrooms easily, without much training or resources. It is also important for educators to include the students' interests in the choice of a reinforcer for the intervention. Without the students' interests taken into account, the students may not be reinforced to change their behaviors. Ganz (2008) points out that teaching a student how to self-monitor allows teachers to spend more time teaching and less time monitoring and managing behaviors.

**Self Realization**

McCloskey et al. (2009) explain that individuals are able to regulate and direct their self-regulation capacities without recognizing who they are as individuals and who others are as well. Self-awareness and awareness of others is crucial to students' success in education as well as in their lives. If students are unaware of who they are it is extremely difficult for them to understand others as individuals and how their actions influence others.

Self-realization and self-awareness are developmental in their trajectory and some students may develop them at different rates, therefore, demonstrating difficulties in their awareness of themselves or others (McCloskey et al., 2009). Students who do not keep pace with their peers in terms of their self-awareness and self-realization may be unaware of their differences but others may be acutely aware of how different they are from their
peers. The development of self-realization capacities allows students to employ self-
analysis skills. Self-regulation deficits are likely to influence self-realization capacities.

Individuals diagnosed with Attention Deficit Hyperactivity Disorder (ADHD) are
more likely to demonstrate a delay in the development of self-awareness, self-analysis,
long term planning and long-term goal setting (McCloskey, et. al., 2014). These types of
delays will manifest themselves in multiple areas of function for these students; these
may include such functions as their abilities to complete long-term assignments, set goals
for the future or realize when their behaviors are affecting others. This type of
information is important for educators to take into consideration when planning
instruction and strategies for these students.

Self-realization is closely related to self-determination. Eisenman and Tascione
(2002) investigated the responses of high school students diagnosed with learning
disabilities who were exposed to a self-realization intervention presented through a
general education curriculum. Themes emerged from the researchers findings related to
the misconceptions regarding special education and the disabilities associated with it.
Researchers discovered that students had a superficial fund of knowledge about their
disabilities, therefore, making it difficult for them to discuss these with their teachers or
peers (Eisenman & Tascione, 2002). It was also discovered during the data collection and
analysis that students did not recall speaking with an adult regarding their disabilities in
the school setting. Participants also reported feelings of embarrassment and anger when
they spoke with peers regarding their disabilities (Eisenman & Tascione, 2002). Through
this study, it was determined that students benefit from direct instruction in self-
determination to strengthen their self-realization, particularly students who have been diagnosed with a learning disability.

**Attention**

The ability to pay attention and focus has been widely researched throughout the history of education as well as research that involves the brain. From that research, much has been discovered regarding the areas of the brain that control individuals’ abilities to control and maintain their attention. Jensen (2008) describes attention as an act that requires that we orient, engage, and maintain each appropriate neural network while also suppressing other type of distracters. McCloskey, Perkins and Van Divner (2009) discuss attention in terms of executive function capacities. Jensen (2008) argues that students will have difficulty with maintaining their levels of attention in the classroom unless they find and perceive that there is value in paying attention.

Jensen (2008) describes attention from the viewpoint of the brain constantly searching for meaning. He emphasizes the idea that it is important to remember that educators either can have students’ attention or students can be attempting to make meaning out of what they are learning, but that the two are not simultaneous acts (Jensen, 2008). Processing speed must also be taken into account when considering a student’s attentional capacity. Jensen (2008) argues that students’ ability to attend is dependent on the level of background knowledge and the level of complexity of the material.

The areas of the brain that are responsible for one’s ability to pay attention are complicated and complex in nature. Not only are certain areas of the brain responsible for this capacity but there are also important neurotransmitters that are at play as well (Jensen, 2008; DuPaul & Stoner, 2003). Jensen (2005) explains that the many areas of the
brain involved in an individual’s ability to pay attention include the prefrontal cortex, the cingulate gyrus, the superior colliculus, right parietal lobe area and the right frontal lobe area. All of these areas play different but crucial roles in how an individual attends to a task. In the case of individuals with ADHD, the prefrontal cortex, which is involved in individuals’ abilities to inhibit and mediate responses, has been studied as an area of the brain that contributes to ADHD symptomatology. McCloskey, Perkins and Van Divner (2009) argue that individuals with ADHD may display difficulties with some of the core identified executive functions; however, it does not mean that the individual’s difficulties are executive function in nature. Understanding the brain structures that are implicated in the attentional system is crucial to understanding how to inform instruction to allow students the best opportunity to learn.

**Emotions**

The understanding of emotions and the role that they play in the availability of a student to learn is important for educators. Knowledge about how emotions originate in the brain and how they are expressed and managed can help educators understand what they can do to connect emotionally with students. Emotions play an important role in a student’s capacity to learn in relation to how they take in information, as well as to how well they can retrieve information. If a student is struggling emotionally, it will be difficult for him or her to function in a classroom. McCloskey, Perkins, & Van Divner (2009) define executive functions as “the mental capacities that enable us to function effectively in the complex physical and cultural environments we have shaped around us” (p. 248). Effective and stable executive function capacities in students will allow them the greatest opportunities for success in school, particularly in terms of their social,
emotional and academic development. Students who are able to utilize their executive functions will find success in their environments.

Emotions are an important factor to consider when understanding students' successes or difficulties in the classroom. The limbic system, primarily the amygdala and the anterior cingulate, among other areas of the brain, has been implicated in the control of emotions (Jensen, 2008). An “emotion center” does not exist in the brain, but is scattered throughout different parts of the brain. Each of these different areas is responsible for a particular response. It is also important to remember that these areas do not work independently of each other and are influenced by chemicals in our brain as well (Jensen, 2005). It is more widely understood that the peptides that control the messages our brain receives, relative to emotions, have a great influence on behavior (Jensen, 2005). Emotional states, such as fear, stress and joy, are crucial to understand in order for students to maximize their educational experiences. If a student is struggling with negative emotions in an academic setting, this will have an impact on his or her ability to be successful.

Educators must also possess an understanding of how emotions not only influence students' behaviors, but also on their abilities to accomplish tasks. As previously discussed, it is important for students’ learning that they understand the reasoning behind what they are learning. It is just as important for educators to elicit the meaning behind the reasons why they want to accomplish certain tasks (Jensen, 2008). Jensen (2008) explains that emotions play specific roles in learning for individuals. Emotions allow learning to bind, to determine what is real and what beliefs and feelings are involved with
learning, to activate long term memory during the learning process and to engage values and belief systems when making decisions (Jensen, 2008).

It would be impossible to discuss the role of emotions in learning without discussing the connection between emotions and self-regulation. Self regulated learners are able to monitor their emotions and use them to facilitate their goal-directed learning. A study conducted by Mega, Ronconi and De Beni (2014) investigated the proposal of a model that links emotions, self-regulated learning and motivation to a students’ academic achievement. The model states that students’ emotions will have an influence on their abilities to display self-regulated learning and motivation (Mega, Ronconi & De Beni, 2014). Results of the study support the theory that emotions, particularly positive emotions, have an influence on students’ self-regulated learning and motivation.

Summary

Self-advocacy and brain based learning theory allow educators to incorporate the importance of students’ knowledge of their strengths and needs and tie this into their abilities to advocate for the accommodations that they may need in the school setting, particularly as they continue through their educational careers. Children identified with learning disabilities are a particular population that benefit from direct instruction in self-advocacy strategies; however, many studies and current programs focus on students who are transitioning to high school, to college or to an occupation. Studies have investigated the influence of brain based learning theory as well as self-advocacy separately; however, there has been little research conducted that incorporates both principles to examine the effect this may have on students’ academic performances, particularly students diagnosed with learning disabilities.
Chapter 3: Methods

This study examined archival data collected during the implementation of a self-advocacy program for fourth grade students.

Source of Data

The source of data was shelf data from a group instructional program conducted at a private school for children with language based learning differences, conducted during the 2013-2014 school year. The program was completed by thirty-four students.

The data used for this study included student, teacher, and program facilitator pre and post program questionnaire responses. The questionnaires asked about students' knowledge of self-advocacy and self-advocacy strategies, as well as student perceptions about themselves as learners. The questionnaire was created specifically for use with the self-advocacy program. Each student, the student's reading teacher and the psychologist who served as program facilitator completed the questionnaire pre and post intervention.

Characteristics of Participants

The students that participated in the self-advocacy program were thirteen females and twenty-one males for a total of thirty-four students. All of the participants had been previously diagnosed with a language-based learning disability. One student who began the program did not complete the program because of a school transfer while the program was running. With regard to the teacher participants, one was male and four were female. All had been teachers at this school for four years.
Self-advocacy Program Used to Produce the Archived Data

The self-advocacy program, “Brain Detectives” comprised six sessions spread out over six weeks during the 2013-2014 school year. The Brain Detectives program was created and developed by the program facilitator to incorporate brain based learning theory into educating the students about themselves as learners and about the purpose of self-advocacy. The program integrates education about the brain and how it is involved in learning with students’ knowledge about their personal strengths and challenges as learners. The program also addressed the concept of self-advocacy and ways that students can advocate for themselves. The sessions were highly structured and designed to build upon previously learned concepts and strategies.

SCHEDULE:
• 6 weeks
• 6 sessions
• 45 minute sessions

Session 1. The first week session introduced the program, “Brain Detectives”, to the students and introduced them to the format of the program. At the end of the session, each student completed a Self-Advocacy questionnaire independently. Each student’s reading teacher also completed a pre-program Self-Advocacy questionnaire for his or her respective students. The psychologist serving as program facilitator also completed a pre-program self-advocacy questionnaire, addressing the self-advocacy capacities of each student in the program. The objective for this session was to introduce the students to the program and to gain information regarding their knowledge of self-advocacy.

Session 2. The second session began with a discussion about the importance of each student knowing who he or she is as a learner and what that knowledge means to
each one’s learning. The students then completed an “I am…” poem activity that involved each student answering questions related to who they were as an individual and as a student. The students worked on these with the help of the facilitator and then shared their poems. The objective of this session was to have the students begin to think about themselves as individuals and what makes each of them unique learners.

Session 3. The third session introduced the students to the brain and some of the major brain structures and their functions. The students engaged in a discussion about what their brains were and why they were important parts of their bodies. The students learned about the cerebrum, cerebellum, brain stem, thalamus and hypothalamus. Models of the brain were then created out of play-doh and specific colors were used for specific parts of the brains to represent what the students had learned. The objective of this lesson was to introduce critical brain structures and their functions to the students and allow them a practical way of retaining the newly learned information.

Session 4. The fourth session introduced the students to the different lobes of their brains as well as to their functions. The students learned about the frontal lobe, occipital lobe, temporal lobe and the parietal lobe and how these are related to learning. The information about the lobes of the cerebral cortex was connected to the information about other parts of the brain that had been introduced during the previous session. The objective of this lesson was to build on previously learned information regarding the major brain structures and to include more information regarding the lobes of the brain and their functions for the students as learners.

Session 5. During the fifth session the students engaged in a discussion about strengths and challenges related to their learning. The term “self-advocacy” was
introduced to the students and was subsequently discussed. The facilitator worked with the students to make connections between their perceived strengths and challenges, the different parts of the brain that may be enabling strengths and parts of the brain that may be creating challenges. The students wrote down their strengths and challenges and discussed them with a peer. The objective of this lesson was for the students to identify their own strengths and challenges as learners and to tie that information into their newly acquired understanding of the brain and self-advocacy.

Session 6. The final session involved a review of the students’ strengths and challenges identified during the previous week’s session. The students were asked to identify situations during their day in which they could self-advocate, and they shared recollections of past experiences in which they had advocated for themselves. At the end of the session, the students completed the Self-Advocacy questionnaire. Teachers also were asked to complete the Self-Advocacy questionnaire for each of their students that participated in the program. The objective of the final lesson was to tie together knowledge regarding the students and how to utilize self-advocacy strategies in their learning, based on their identification of strengths and challenges. Data were also obtained regarding the students’ understanding of themselves as learners.

Measures Used in the Self-Advocacy Program Study

Each student completed a self-advocacy questionnaire prior to the start of the first session of the program and after the last session of the program. The reading teacher of each student also completed a questionnaire about his or her perceptions of the student’s ability to self-advocate prior to the first session and after the last session. Additionally, the psychologist serving as program facilitator, who was familiar with all of
the students that were in the program, completed questionnaires indicating her perceptions of each student’s ability to self-advocate prior to the first session and after the final session.

The self-advocacy questionnaire was an 11-item measure designed to assess the students’, teachers’ and program facilitator’s (psychologist’s) perceptions of the students’ use of self-advocacy strategies in the classroom. The questionnaire consisted of open-ended and multiple choice questions.

**Analyses Conducted with the Self-Advocacy Program Data**

The pre-program and post-program questionnaire responses were tabled for each student and analyzed, using descriptive and nonparametric inferential statistical analyses. Specific questions from the pre/post program questionnaire that were well-suited to answer the research question were selected for statistical analysis. Multiple-choice question options were assigned numerical values to enable statistical analysis of responses. The description of variables that follows shows the questionnaire items that were selected for analysis along with the numerical values assigned to each response option to enable analyses. Variable descriptions are organized according to research hypotheses.

**Hypothesis 1:** Students’ awareness of the definition of self-advocacy will increase from pre-program to post-program.

**Hypothesis 1 Variable:** Students’ awareness of the definition of self-advocacy based on questionnaire responses.

**H1 Question:** What does the word self-advocacy mean?
H1 Question Scoring: This item was scored 0 if the student’s written definition of self-advocacy was not accurate or if no definition was offered; this item was scored 1 if the student provided an accurate written definition or explanation of self-advocacy.

Null Hypothesis: The degree of consistency between students’ and the teachers’ and/or the psychologist’s perceptions about the academic strengths of the student did not change from pre-program to post-program.

Hypothesis 2: The degree of consistency between the students’ and the teachers’ perceptions about the academic strengths of the student will increase from pre-program to post-program.

Hypothesis 2 Variable: Degree of consistency of students’ self-realization of academic strengths with teachers’ perceptions of students’ academic strengths based on students’ and teachers’ questionnaire responses.

H2 Question: List those classes in school that are easy for you.

H2 Question Scoring:

- Question was scored 3 if the classes listed by the student were the same as those listed by the teacher.
- Question was scored 2 if student listed 1 more and/or 1 fewer classes than the classes listed by the teacher.
- Question was scored 1 if the student listed two or more classes more than those listed by the teacher or if the student listed 2 or more fewer classes than those listed by the teacher.
- Question was scored 0 if the student’s list did not match at all with the teacher’s list.
Null Hypothesis: The degree of consistency between the student’s and the teacher’s perceptions about the academic strengths of the student did not change from pre-program to post-program.

Hypothesis 3: The degree of consistency between the students’ and the teachers’ perceptions about the academic challenges of the student will increase from pre-program to post-program.

Hypothesis 3 Variable: Degree of consistency of students’ self-realization of academic challenges with teachers’ perceptions of students’ academic challenges (based on students’ and teachers’ questionnaire responses.

H3 Question: List those classes in school that are hard for you.

H3 Question Scoring:

- Question was scored 3 if the classes listed by the student were the same as those listed by the teacher.
- Question was scored 2 if student listed 1 more and/or 1 fewer classes than the classes listed by the teacher.
- Question was scored 1 if the student listed two or more classes more than those listed by the teacher or if the student listed 2 or fewer classes than those listed by the teacher.
- Question was scored 0 if the student’s list did not match at all with the teacher’s list.

Null Hypothesis: The degree of consistency between the student’s and the teacher’s and/or the program facilitator’ perceptions about the academic challenges of the student did not change from pre-program to post-program.
Hypothesis 4: Students will self-report and teachers and the program facilitator will report an increase in the number of questionnaire responses that identify effective strategies for handling confusing classroom situations.

Hypothesis 4 Student Response Variable: Students' self-reported strategies for handling confusion based on questionnaire responses.

H4 Student Question and Scoring:

If I am sitting in class and I am confused:

a. I look around the room (0)
b. I call my mom (0)
c. I raise my hand and say I don't want to do this (0)
d. I sit quietly until a teacher comes (0)
e. I raise my hand and ask for help (1)

Null Hypothesis: The number of students self-reporting a change from an ineffective pre-program strategy (0) to an effective post-program strategy (1) is equal to the number of students self-reporting a change from an effective pre-program strategy (1) to an ineffective post-program strategy (0).

Hypothesis 4 Teacher Response Variable: Teacher report of student strategies for handling confusion based on questionnaire responses.

H4 Teacher Form Question and Scoring:

If the student is sitting in class and is confused:

a. He/she looks around the room (0)
b. He/she calls his/her mother (0)
c. He/she raises his/her hand and says he/she doesn't want to do it (0)
d. He/she sits quietly until a teacher comes (0)
e. He/she raises his/her hand and asks for help (1)
Null Hypothesis: The number of teacher reports of students changing from an ineffective pre-program strategy (0) to an effective post-program strategy (1) is equal to the number of teacher reports of students changing from an effective pre-program strategy (1) to an ineffective post-program strategy (0).

Hypothesis 4 Program Facilitator Variable: Program facilitator’s report of student’s strategy for handling confusion based on program facilitator’s questionnaire responses.

H4 Program Facilitator Form Question and Scoring:

If the student is sitting in class and is confused:

a. He/she looks around the room (0)
b. He/she calls his/her mother (0)
c. He/she raises his/her hand and says he/she doesn’t want to do it (0)
d. He/she sits quietly until a teacher comes (0)
e. He/she raises his/her hand and asks for help (1)

Null Hypothesis: The number of psychologist’s reports of students changing from an ineffective pre-program strategy (0) to an effective post-program strategy (1) is equal to the number of psychologist reports of students changing from an effective pre-program strategy (1) to an ineffective post-program strategy (0).

Hypothesis 5: Students will self-report and teachers and the program facilitator will report an increase on the number of questionnaire responses that identify students’ effective strategies for handling difficult tasks.

Hypothesis 5 Student Variable: Students’ self-reported strategies for handling difficult tasks based on student questionnaire responses.

H5 Student Form Question and Scoring:
When something is hard for me, I:

a. Leave the room (0)
b. Ask the teacher (1)
c. Go into the closet (0)
d. Crawl under my desk (0)
e. I raise my hand and ask for help (1)

Null Hypothesis: The number of students self-reporting a change from an ineffective pre-program strategy (0) to an effective post-program strategy (1) is equal to the number of students self-reporting a change from an effective pre-program strategy (1) to an ineffective post-program strategy (0).

Hypothesis 5 Teacher Variable: Teacher reports of student strategies for handling task difficulty based on teacher questionnaire responses.

H5 Teacher Form Question and Scoring:

When something is hard for the student, he/she:

a. Leaves the room (0)
b. Asks the teacher (1)
c. Goes into the closet (0)
d. Crawls under a desk (0)
e. He/she raises his/her hand and asks for help (1)

Null Hypothesis: The number of teacher reports of students changing from an ineffective pre-program strategy (0) to an effective post-program strategy (1) is equal to the number of teacher reports of students changing from an effective pre-program strategy (1) to an ineffective post-program strategy (0).

Hypothesis 5 Program Facilitator Variable: The program facilitator’s reports of students’ strategies for handling task difficulty based on program facilitator’s questionnaire responses.

H5 Program Facilitator Form Question and Scoring:
When something is hard for the student, he/she:

a. Leaves the room (0)
b. Asks the teacher (1)
c. Goes into the closet (0)
d. Crawls under a desk (0)
e. He/she raises his/her hand and asks for help (1)

Null Hypothesis: The number of program facilitator’s reports of students changing from an ineffective pre-program strategy (0) to an effective post-program strategy (1) is equal to the number of program facilitator’s reports of students changing from an effective pre-program strategy (1) to an ineffective post-program strategy (0).

Hypothesis 6: Students will self-report and teachers and the program facilitator will report a post-program positive increase in the number of questionnaire responses indicating helpful classroom strategies identified by students.

Hypothesis 6 Student Variable: Students’ self-reported identification of helpful strategies based on student questionnaire responses.

H6 Student Form Question and Scoring:

The following is a list of some strategies. Circle the ones that you think would be helpful for you.

a. Hiding my paper (0)
b. Go to the bathroom (0)
c. Raise my hand to ask for help (1)
d. Call my mom (0)
e. Ripping up my paper (0)
f. Going to the nurse (0)
g. Crawling under my desk (0)
h. Putting my coat on (0)
i. Circling words I don’t understand (0)
j. Taking a deep breath (1)
k. Asking a friend for help (1)
Null Hypothesis: The number of students self-reporting a change from an ineffective pre-program strategy (0) to an effective post-program strategy (1) is equal to the number of students self-reporting a change from an effective pre-program strategy (1) to an ineffective post-program strategy (0).

Hypothesis 6 Teacher Variable: Teacher reports of strategies that students are likely to identify as helpful based on teacher questionnaire responses.

H6 Teacher Form Question and Scoring:

The following is a list of some strategies. Circle the ones that you think this student would identify as being helpful.

a. Hiding my paper (0)
b. Go to the bathroom (0)
c. Raise my hand to ask for help (1)
d. Call my mom (0)
e. Ripping up my paper (0)
f. Going to the nurse (0)
g. Crawling under my desk (0)
h. Putting my coat on (0)
i. Circling words I don't understand (0)
j. Taking a deep breath (1)
k. Asking a friend for help (1)

Null Hypothesis: The number of teacher reports of students changing from an ineffective pre-program strategy (0) to an effective post-program strategy (1) is equal to the number of teacher reports of students changing from an effective pre-program strategy (1) to an ineffective post-program strategy (0).

Hypothesis 6 Program Facilitator Variable: The program facilitator’s reports of strategies that students are likely to identify as helpful based on program facilitator’s questionnaire responses.

H6 Program Facilitator Form Question and Scoring:
The following is a list of some strategies. Circle the ones that you think this student would identify as being helpful.

   a. Hiding my paper (0)
   b. Go to the bathroom (0)
   c. Raise my hand to ask for help (1)
   d. Call my mom (0)
   e. Ripping up my paper (0)
   f. Going to the nurse (0)
   g. Crawling under my desk (0)
   h. Putting my coat on (0)
   i. Circling words I don't understand (0)
   j. Taking a deep breath (1)
   k. Asking a friend for help (1)

Null Hypothesis: The number of psychologist's reports of students changing from an ineffective pre-program strategy (0) to an effective post-program strategy (1) is equal to the number of psychologist's reports of students changing from an effective pre-program strategy (1) to an ineffective post-program strategy (0).

Hypothesis 7: Students will self-report and teachers and the program facilitator will report an increase in the number of questionnaire responses indicating students' comfort with asking teachers' for help with difficult academic tasks.

Hypothesis 7 Student Variable: Students' self-reported feeling about needing help from a teacher based on student questionnaire responses.

H7 Student Form Question and Scoring:

When I need help from a teacher, I feel:

   a. Embarrassed (0)
   b. Frustrated (0)
   c. Happy (0)
   d. Comfortable asking for help (1)
Null Hypothesis: The number of students reporting a positive change in feeling about needing help from a teacher (0 to 1) is equal to the number of students reporting a negative change in feeling about needing help from a teacher (1 to 0).

Hypothesis 7 Teacher Variable: Teachers' reports about students' feelings about needing help from a teacher based on teacher questionnaire responses.

H7 Teacher Form Question and Scoring:

When this student needs help from a teacher, he/she feels:

    a. Embarrassed (0)
    b. Frustrated (0)
    c. Happy (0)
    d. Comfortable asking for help (1)

Null Hypothesis: The number of teacher reports indicating a positive change in students' feelings about needing help from a teacher (0 to 1) is equal to the number of teacher reports not indicating a positive change in students' feelings about needing help from a teacher (1 to 0 or 0 to 0).

Hypothesis 7 Program Facilitator Variable: Program Facilitator's reports about students' feelings about needing help from a teacher based on program facilitator's questionnaire responses.

H7 Program Facilitator Form Question and Scoring:

When this student needs help from a teacher, he/she feels:

    a. Embarrassed (0)
    b. Frustrated (0)
    c. Happy (0)
    d. Comfortable asking for help (1)
Null Hypothesis: The number of psychologist’s reports indicating a positive change in students’ feelings about needing help from a teacher (0 to 1) is equal to the number of psychologist’s reports not indicating a positive change in students’ feelings about needing help from a teacher (1 to 0 or 0 to 0).

Hypothesis 8: Students will self-report and teachers and the program facilitator will report an increase in the number of questionnaire responses indicating students’ ease with telling others about their learning differences.

Hypothesis 8 Student Variable: Students’ self-reported ease with telling others about his/her learning difference based on student questionnaire responses.

H8 Student Form Question and Scoring:

It is easy for me to tell others about my learning difference.

   a. Yes (3)
   b. Sometimes (1)
   c. Most of the time (2)
   d. Never (0)

Null Hypothesis: The number of students reporting an increase in ease of telling others about his or her learning difference is equal to the number of students reporting a decrease in ease of telling others about his or her learning difference.

Hypothesis 8 Teacher Variable: Teacher reports of students’ ease with telling others about their learning differences based on teacher questionnaire responses.

H8 Teacher Form Question and Scoring:

It is easy for this student to tell others about his/her learning difference.

   a. Yes (3)
   b. Sometimes (1)
   c. Most of the time (2)
   d. Never (0)
Null Hypothesis: The number of teacher reports of students increasing their ease in telling others about their learning differences is equal to the number of teacher reports of students decreasing their ease in telling others about their learning differences.

Hypothesis 8 Program Facilitator Variable: Program Facilitator’s reports of students’ ease with telling others about their learning differences based on program facilitator’s questionnaire responses.

H8 Program Facilitator Form Question and Scoring:

It is easy for this student to tell others about his/her learning difference.

a. Yes (3)
b. Sometimes (1)
c. Most of the time (2)
d. Never (0)

Null Hypothesis: The number of psychologist’s reports of students increasing their ease in telling others about their learning differences is equal to the number of psychologist’s reports of students decreasing their ease in telling others about their learning differences.

Procedure

The questionnaire responses of the students, teachers, and program facilitator were analyzed to determine if there was a significant change in student, teacher and program facilitator perceptions about students’ understanding of their own learning strengths and challenges and their ability to advocate for themselves.

Statistical Analyses

The student, teacher and program facilitator questionnaire data were collected and entered into an excel file to remove identifiers and to prepare for data scoring and analysis. The questionnaire responses were scored according to the criteria described in
the previous section. Data were analyzed using SPSS. The Wilcoxon Matched-Pairs Signed-Ranks Test and The Sign Test were utilized to test individual hypotheses.
Chapter 4: Results

In this chapter, results of the analyses of student, teacher and program facilitator questionnaire responses are presented.

Student Knowledge of Self-Advocacy

Hypothesis 1: Students’ awareness of the definition of self-advocacy will increase from pre-program to post-program.

The first research hypothesis investigated students’ knowledge and awareness of the definition of self-advocacy. This hypothesis was tested, using the scored student questionnaire responses to the question: “What does the word self-advocacy mean?” The null hypothesis for this question indicated that the students’ responses did not change from pre-program to post-program.

One hundred percent of the students were unable to produce an accurate definition of self-advocacy prior to the start of the program. After the program, sixty-one percent of the student respondents were able to provide an accurate definition of self-advocacy. The nonparametric Sign Test indicated a statistically significant post-program increase in student knowledge of the definition of the term “self-advocacy” (Sign Test Value = 0; \( p = 0.001 \)).

Academic Strengths and Challenges

Hypothesis 2: The degree of consistency between the students’ and the teachers’ perceptions about the academic strengths of the student will increase from pre-program to post-program.

The second hypothesis that was tested involved the students’ and teachers’ perceptions of the students’ academic strengths. This hypothesis was tested by comparing
student responses to the question: “List classes in school that are easy for you.” to teacher responses to the question: “List classes in school that are easy for this student.”

The degree of consistency between student and teacher perceptions of the students’ academic strengths did not change for 16 of the 34 (47%) students in the study. The degree of consistency increased for 8 students (24%) and decreased for 10 students (29%).

A Wilcoxon Match Paired Signed test was conducted to evaluate the change in consistency of student and teacher perceptions. The results indicated that the changes in the degree of consistency between student and teacher perceptions of academic strengths was not statistically significant (obtained T value of 72.5 greater than the critical T value of 28 at p = .01).

Hypothesis 3: The degree of consistency between the students’ and the teachers’ perceptions about the academic challenges of the student will increase from pre-program to post-program.

The third hypothesis that was tested involved the students’ and teachers’ perceptions of the students’ academic challenges. This hypothesis was tested by comparing student responses to the question: “List classes in school that are hard for you.” to teacher responses to the question: “List classes in school that are hard for this student.”

The degree of consistency between student and teacher perceptions of the students’ academic challenges did not change for 18 of the 34 (53%) students in the study. The degree of consistency increased for 7 students (21%) and decreased for 9 students (26%).
A Wilcoxon Match-Paired Signs test was conducted to evaluate whether changes in degree of consistency of perceptions about challenging classes were statistically significant. The results indicated that the changes in the degree of consistency between student and teacher perceptions of academic challenges was not statistically significant (obtained T value of 55 greater than the critical T value of 16 at \( p = .01 \)).

Table 1 shows the classes most frequently cited as easy and most frequently cited as hard by the students.

Table 1

<table>
<thead>
<tr>
<th>Classes Most Frequently Listed by Students as Easy and Hard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy</td>
</tr>
<tr>
<td>Math</td>
</tr>
<tr>
<td>Club</td>
</tr>
<tr>
<td>Wilson</td>
</tr>
<tr>
<td>Reading</td>
</tr>
<tr>
<td>Writing</td>
</tr>
</tbody>
</table>

Strategies for Handling Confusion

Hypothesis 4: Students will self-report and teachers and the program facilitator will report an increase in the number of questionnaire responses that identify effective strategies for handling classroom situations that cause confusion.

The fourth hypothesis that was tested involved the students’ and teachers’ and program facilitator’s perceptions of the students’ selections of effective strategies for
handling classroom situations that cause confusion. Student, teacher and program facilitator responses were analyzed separately.

Twenty-five students (73%) self-reported no change in the selection of effective strategies; only 7 students (21%) self-reported an increase in the selection of effective strategies and 2 students (6%) self-reported a decrease. Teacher responses indicated that 27 students (79%) were not likely to have changed their selections of effective strategies; teacher responses indicated that 4 students (12%) were likely to have increased their selections of effective strategies and 3 students (9%) were likely to have decreased these. Program facilitator responses indicated that 18 students (52%) were not likely to have changed their selections of effective strategies; teacher responses indicated that 8 students (24%) were likely to have increased their selections of effective strategies and 8 students (24%) were likely to have decreased these.

Student, teacher and program facilitator responses were analyzed, using the nonparametric Sign Test. Results of all three analyses indicated no statistically significant difference between pre-program and post-program questionnaire responses of students (Obtained Value = 2, p = .18), teachers (Obtained Value = 3, p = .10) the program facilitator (Obtained Value 4, p = .39).

Identification of Strategies to Handle Difficult Tasks

Hypothesis 5: Students will self-report and teachers and the program facilitator will report an increase on the number of questionnaire responses that identify students’ effective strategies for handling difficult tasks.

The fifth hypothesis that was tested involved the students’ and teachers’ and program facilitator’s perceptions of the students’ selections of effective strategies for
Student, teacher and program facilitator responses could not be analyzed due to a lack of sufficient variance in responses from pre-program to post-program. All of the students were able to identify and select a response indicating effective handling of difficult tasks prior to the start of the program and all of the students again were able to identify these same effective strategies at the end of the program. Teacher and program facilitator responses indicated that most students could identify effective strategies both pre and post program. The few students that were rated as not being able to identify effective strategies were rated in the same way pre and post-program, resulting in a lack of variance from pre to post program.

Identification of Helpful Strategies

Hypothesis 6: Students will self-report and teachers and the program facilitator will report an increase on the number of questionnaire responses indicating that students identify helpful classroom strategies.

The sixth hypothesis that was tested involved the students’ and teachers’ and program facilitator’s perceptions of the students’ selections of strategies that would be helpful to use in the classrooms. Student, teacher and program facilitator responses were analyzed separately.

The question provided options to the respondent to identify strategies that would be helpful to them. Options a, b, d, e, f, g, h, and i were scored 0 because they reflected actions that do not represent the effective use of self-advocacy; options c, j, and k were scored 1 because they reflected actions likely to reflect the effective use of self-advocacy.
Scores could vary from 0 to 3 depending on the number of effective and/or ineffective strategies selected by the respondents to represent their perceptions of the strategies most likely to be used by the student. In the cases in which students that selected both effective and ineffective strategies, each ineffective strategy choice cancelled out an effective strategy choice so that the student’s score was the number of positive strategies selected that were not cancelled out by a negative strategy choice.

Twelve students (35%) self-reported increases in selection of positive strategies; 13 students (38%) self-reported no increase or decrease in positive strategy selection, and 9 students (27%) self-reported a decrease in positive strategy selection. Teachers indicated that 8 students (24%) were likely to have increased their selections of positive strategies; teachers indicated that 15 students (44%) were likely to have no increase or decrease in positive strategy selections, and teachers indicated that 11 students (32%) were likely to have decreased their selections of positive strategies. The program facilitator indicated that 15 students (44%) were likely to have increased their selections of positive strategies; the program facilitator indicated that 13 students (38%) were likely to have no increase or decrease in positive strategy selections, and the program facilitator indicated that 6 students (18%) were likely to have decreased their selections of positive strategies.

Student, teacher and program facilitator responses were analyzed, using the Wilcoxon Matched-Pairs Signed-Ranks test. Results of all three analyses indicated no statistically significant difference between pre-program and post-program questionnaire responses of students (obtained T value of 121.5 greater than the critical T value of 43 at p = .01), teachers (obtained T value of 88 greater than the critical T value of 32 at p =
and the program facilitator (obtained T value of 52 greater than the critical T value of 43 at \( p = .01 \)).

**Feelings Related to Academic Challenges**

Hypothesis 7: Students will self-report and teachers and the program facilitator will report an increase in the number of questionnaire responses indicating that students are comfortable with asking teachers for help with difficult academic tasks.

The seventh hypothesis tested students’ and teachers’ and the program facilitator’s perceptions of students’ comfort with needing help from a teacher. Students, teachers and the program facilitator were asked to choose from four options related to their comfort levels in asking a teacher for help. Options a, b, and c were scored 0 because they reflected a lack of comfort with asking for help and therefore did not reflect the effective use of self-advocacy; option d was scored 1 because it reflected comfort with asking for help and therefore was likely to reflect the effective use of self-advocacy.

Twenty-three students (68%) self-reported no change in their comfort with asking teachers for help with difficult academic tasks; 6 teachers (76%) indicated that students did not change in their comfort with asking for help, and the program facilitator indicated that 31 students (91%) did not change in their levels of comfort with asking teachers for help.

Student, teacher and program facilitator responses were analyzed, using the nonparametric Sign Test. Results of all three analyses indicated no statistically significant difference between pre-program and post-program questionnaire responses of students (Obtained Value = 4, \( p = .75 \)), teachers (Obtained Value = 1, \( p = .07 \)) and the program facilitator (Obtained Value 3, \( p = .23 \)).
Self-Reporting Learning Difference

Hypothesis 8: Students will self-report and teachers and the program facilitator will report an increase in the number of questionnaire responses indicating that students are at ease with telling others about their learning differences.

The eighth hypothesis tested students’ and teachers’ and the program facilitator’s perceptions of the extent to which students were at ease with telling others about their learning differences. Three of the response options indicated varying degrees of ease and one of the options indicated a lack of ease with telling others about their learning differences.

Sixteen students (47%) self-reported no change in their levels of ease with telling others about their learning differences; similarly, teachers and the program facilitator rated 16 students (47%) as being unlikely to have changed their levels of ease with telling others about their learning differences. Eleven students (32%) self-reported an increase in their levels of ease with telling others about their learning differences; in contrast, teachers rated only 5 students (15%) as being likely to have increased their levels of ease and the program facilitator rated 8 students (24%) as being likely to have increased their levels of ease with telling others about their learning differences.

Student, teacher and program facilitator responses were analyzed, using the Wilcoxon Matched-Pairs Signed-Ranks test. Results of all three analyses indicated no statistically significant difference between pre-program and post-program questionnaire responses of students (obtained T value of 64.5 greater than the critical T value of 23 at p = .01)); teachers (obtained T value of 35 greater than the critical T value of 28 at p =
.01)), and the program facilitator (obtained T value of 70 greater than the critical T value of 28 at p = .01)).
Chapter 5: Discussion

This chapter includes a summary of the analyses, a discussion of the findings and related hypotheses and limitations. In addition, recommendations for future research are offered and implications for individuals working with children and youth are provided.

Summary of the Findings

The purpose of the present study was to examine the effect of a brain-based self-advocacy program with children diagnosed with language-based learning disabilities. This study sought to investigate whether or not there would be an increase in the students' knowledge of self-advocacy as well as an increase in their use of self-advocacy strategies in the classroom after the completion of a six-session brain-based self-advocacy program. Eight specific hypotheses were generated and student, teacher and program facilitator responses to a pre and post program questionnaire were analyzed to test these hypotheses, using nonparametric statistical tests of significance.

Results of the current study indicated that there was a significant increase in students' knowledge of self-advocacy from pre to post program. This was the only hypothesis that was found to show a statistically significant result, positive change from pre to post program. Students’ knowledge of academic strengths and challenges, students’ knowledge of strategies for handling confusion, students ability to identify difficult tasks, identification of helpful strategies, feelings related to academic challenges and students’ ease with discussing their learning differences with others did not yield statistically significant changes from pre to post program.

The results of the study were dependent on the answers to the questions that were included on the questionnaire that were then completed by the students, teachers and
program facilitator. Due to the poor design of the survey and the included questions, the results of the study and lack of statistical significance found for more than one of the research questions was disappointing, but not surprising. A better-designed questionnaire may have elicited more statistically significant results to the proposed research questions. The levels of self-awareness among the student participants also could have had an effect on how they responded to the questions regarding their learning behaviors; this could have led to insignificant results.

Limitations of the Study

Limitations of the current study include the specificity of the population that was utilized for the study as well as the small sample size. The study participants were drawn from a single private school in eastern Pennsylvania.

Perhaps the most critical limitation of the study was the poor design of the survey that was used to examine the effectiveness of the program. The questions were poorly worded and response options often failed to capture information that was relevant to expected changes in students' perceptions and behaviors. The questions that were included in the self-advocacy questionnaire, therefore, were unable to address, directly, the underlying hypotheses that the study set out to investigate.

Another limitation of the current study is the fact that the program facilitator was the psychologist who developed the program used in the study and was also the investigator who conducted the study of the effectiveness of the program. The psychologist also had in-depth knowledge of the students' cognitive profiles, which could have led to a bias delivery of the program to focus on those students who may have greater needs in the area of ADHD and self-advocacy. As the sole psychologist in the
school in which the program was delivered, the psychologist also had knowledge of the students' academic progress as well as their social and emotional needs, which resulted in difficulty with objectivity in the delivery of the program and in responding to the questionnaire.

Similar concerns arise regarding the teachers who participated in rating the students. All of these teachers had knowledge of the students' profiles as well as knowledge of their academic and social emotional functioning, making it difficult for them to be unbiased respondents to questions about the pre and post program status of the students involved in the study.

**Implications for Future Research**

As research into the area of self-advocacy and brain based learning continues, studies involving students’ knowledge of themselves as learners and the influence that this exerts on their performances in the classroom will continue to be necessary. Recommendations for future studies would involve a larger sample size of students and, possibly, utilization of an additional population of students who had not been identified to investigate if a difference exists between their understanding of themselves as learners and the understanding of those who have been identified with disabilities.

Another possible inclusion for future research would be to investigate the educational requirements for teachers regarding brain based learning theory in their training programs. This would be another avenue for exploration in whether or not teachers are adequately trained in understanding of the development of the brain and its implications on learning for their student population.
The questionnaire used in analyzing the programs’ effectiveness proved to be inadequate for this purpose. Therefore, a new questionnaire would need to be constructed; this would include questions that targeted the specific hypotheses related to the significance of the self-advocacy program. It may also be useful to have someone without knowledge of the student population deliver the program to the students and respond to the questionnaire in order to eliminate any possible bias that may exist.
References


*Educational Leadership*, 43-47.


Children, 72 (1), 101-125.


