Honors Thesis Proposal

For

Central Auditory Processing: Tier III Cognitive-Academic Reading Interventions and Implications

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Introduction

During the past several years, there have been many significant changes to the nation’s educational system. This includes the Response to Intervention (RTI) Model, which has been recently adopted through the nation’s special education law. Individuals with Disabilities Education Act (Florida’s Multi-tiered System of Supports, 2012). The main goals of the RTI model, also known as Multi-Tiered System of Support (MTSS), is to decrease the number of students who may be referred to special education for additional service, provide high-quality research based instruction with progress monitoring and adjustments based on students’ needs, and increase the number of intervention and prevention opportunities available to students (National Center on Response to Intervention, 2012). One unique subgroup of the student population that may benefit from increased intervention and progress monitoring is comprised of students who have been diagnosed with central auditory processing disorder (CAP). Individuals identified for CAP exhibit a variety of challenges including those associated with auditory or sound discrimination and language processing. Children and adolescents who are diagnosed with CAP are studied in a variety of domains across academic literature, including but not limited to: Elementary Education, Special Education, Speech-Language Pathology, and Psychology. While the unique lens of each of these fields offers varied insights regarding potential interventions that have and could be used to support students with a CAP diagnosis; it seems as though increased communication and collaboration across these disciplines is warranted. This thesis will combine, organize, and synthesize research and practices from these four different areas related to Central
Auditory Processing Disorder in an effort to appropriately inform and prepare educators on how to implement interventions for the Tier III and learning disabled population.

**Background**

According to the American Speech-Language Hearing Association, many individuals are affected by Central Auditory Processing Disorder (CAP). Approximately 60% of school-aged children are initially identified for CAP difficulties and will outgrow this condition; however, there are still a significant number of children who will have difficulties processing auditory information later on in life (ASHA, 2012). A CAP diagnosis is given to children who hear typically, but have a delay or distortion of sound as it moves from the ear to the brain. Most diagnosed cases also have difficulty with language processing, and this provokes challenges in one’s social and academic life. Related difficulties include remembering multi-task directions, discriminating and decoding subtle differences in sounds and words, staying attentive in noisy environments, and basic language skills (auditory output-organization). The associated symptoms in Central Auditory Processing Disorder are very similar to Pervasive Developmental Disorder and Attention Deficit Hyperactivity Disorder. and children with CAP are often misdiagnosed (ASHA, 2012). However, according to the Center for Hearing and Communication, the specific characteristics that set children with Central Auditory Processing Disorder apart from ADHD and PDD are the following: 1) having trouble following more than one direction at a time, 2) commonly verbalizing “Huh?” or “What?” and needing information repeated. 3) poor memory for words and numbers, 4) difficulty with complex language such as word problems or a long story, 5) difficulty expressing complex speech, and 6) trouble with reading comprehension related tasks.
Parents of children with CAP may have their child evaluated by a teacher, psychologist, audiologist, and/or speech language pathologist. Early intervention is crucial for individuals that may be affected by Central Auditory Processing Disorder. One particular psychological academic achievement test that has been linked to the evaluation and effective intervention design for children with CAP, is the Wechsler Intelligent Scale for Children-Fourth Edition (WISC) (Wechsler, 2003).

Due to potential academic challenges, CAP students may be placed in RTI Tier II or Tier III intervention groups in the schools. The intentions of the Response to Intervention System are admirable and have a strong empirical basis and implication. RTI is based on a multi-tier system. Students who are in Tier II and Tier III receive supplemental services in addition to the core instruction. Students who are academically and/or behaviorally struggling below their grade level, are placed in Tier III. They receive specialized academic interventions, 180 minutes a day of instruction based on their particular academic needs, alternative education plans, and behavior intervention plans if applicable. These students are monitored more frequently and may be referred to special education services if progress is not met within the six week time frame (Florida’s Multi-Tiered System of Supports, 2012). However, research on the effectiveness of special education is variable. Additionally, the students that are qualified for special education services have a wide range of learning and behavioral difficulties.

**Methodology**

In order to examine 1) Central Auditory Processing Disorder, 2) cognitive-academic reading interventions, and 3) the application the WISC sub-sections, an interdisciplinary, multi-phase literature review will be conducted. First, the epidemiology
of individuals diagnosed with Central Auditory Processing will be examined. Articles and studies will be drawn from books, academic journals, and databases in the fields of Elementary Education, Special Education, Speech Language Pathology, and Psychology. Once this research is synthesized, further review of reading-cognitive academic interventions and learning environment techniques based on the cognitive and social deficits typically associated with CAP will be conducted. Constructs initially identified for review, as specifically related to challenges associated with central auditory processing disorder include: 1) comprehension, 2) decoding, 2) memory retrieval, and 4) phonological awareness. Literature maps (Creswell, 2003) will be used to organized and graphically represent the constructs, interventions, and connections between disciplines that are identified over the course of the review (see initial Literature Map in Figure 1, on pg #10).

Research has shown that the WISC enables educators and psychologists to highlight specific areas of cognitive deficits in executive function among individuals with CAP and design appropriate interventions based on the scored data from the WISC (Maerlender, 2010). This thesis will further examine how certain subtests of the WISC (Symbol Search, Coding, Arithmetic, and Digit Span subsections) highlight the cognitive deficits in CAP and how these areas correlate with the reading cognitive-academic constructs identified above. Matrices and tables will be designed to effectively organized and demonstrate possible correlations between the WISC subtests and identified reading interventions. The academic interventions studied will only focus on K-12 students who have either been diagnosed with Central Auditory Processing Disorder or demonstrate specific challenges consistent with CAP processing deficits. The review of studies will be
limited to those with a population, who did not have a hearing impairment and who spoke
English as their primary language.

**Initial Review of Literature**

After conducting preliminary research on the auditory and language processing
deficits possessed by individuals with Central Auditory Processing Disorder, articles
across the four main disciplines have consistently included similar key terminology.
These terms consist of: auditory perception, sound discrimination, phonological
awareness, memory retrieval, and decoding. Further research shows that combined
weakness in these vital cognitive areas have a significant impact on one’s ability and rate
of comprehension. The initial constructs under review and a preliminary overview of
each are included below:

**Comprehension:** Comprehension is the foundation for effective and successful reading.
Comprehension requires strong working-memory and higher level thinking skills. The
fundamental skills needed for comprehension is efficient use and application of decoding,
fluency, and vocabulary. Since individuals are affected by Central Auditory Processing
have academic and social difficulty in these fundamental reading areas, this has a direct
negative impact on both their verbal and written comprehension ability.

**Decoding:** Decoding is one of the fundamental cognitive processes needed for effective
comprehension of text. When one is able to hear themselves say words, one is better able
to understand them. Individuals who have Central Auditory Processing Disorder have
difficulty with sound discrimination, and auditory perception. Therefore, these
individuals tend to struggle with appropriately applying letter-sound relationships, vowel
digraphs, and diphthongs. These individuals often get frustrated with the prolonged
duration of time it takes to read a given passage of text.

Memory Retrieval: Individuals with Central Auditory Processing Disorder have trouble
with both long and short term memory. These individuals have a hard time following
more than one direction at a time and with multi-task verbal directions. These individuals
frequently need directions either written or repeated. Without intervention, theses
students may not be able to remember and appropriately sequence or re-tell stories after
hearing and/or reading it themselves. It is not due to their attentive ability, but their
deficit in their information processing system. Memory-retrieval and comprehension are
directly related.

Phonological awareness: Phonological awareness refers to an individual’s awareness of
the sound structure of language. Individuals diagnosed with Central Auditory Processing
have difficulty discriminating sounds and pushing them back together. Intervention in
phonological awareness enables these individuals to retrain their brain in how to
manipulate and process sound, by working with a variety of vowel and consonant
pictures.
Author’s Note

I became interested in this topic because of my own diagnosis of Central Auditory Processing Disorder. In second grade, I performed poorly on the Florida Comprehensive Assessment Test, and my parents noticed that I was having trouble with multi-tasking and auditory processing. I was diagnosed with Central Auditory Processing Disorder and was given an Individualized Education 504 Plan. At first, I was discouraged by this academic and personal challenge. In both the home and school environment, it was difficult for me to remember verbal multi-task directions and discriminating subtle differences in sounds and words. However, over time, I developed my own learning strategies to compensate for my CAP. Although I was able to develop my own learning strategies, I still have auditory and language processing difficulties. At times, this still does have an impact on my social and academic performance. Changes in the current educational system and the Response to Intervention Model have started to require teachers to integrate specialized academic plans and interventions in the general education classroom. Not all general education teachers may have the professional knowledge of interventions that are appropriate for the learning disabled population. As a future educator, my hope is to help my students overcome any learning obstacle, whether it be a disability, behavioral difficulty, or personal issue. I especially hope to be able to reach out to those students with Central Auditory Processing Disorder that may need to develop their own learning strategies and receive appropriate academic support.
Figure 1: Literature Map

**Key Terms:**

- Reading strategies for students affected by Learning Disabilities
- Therapy/Remediation Techniques
- Comprehension
- Processing Speed
- Sound Discrimination
- Visual Verbal Integration Training
- Short/Long Term Memory Retrieval
- Auditory Perception
- Phonological Awareness
- WISC: observed and analyzed cognitive deficiencies in Symbol Search, Arithmetic, and Digit Span
- Qualitative Data: changes in student organization, listening, reading, speaking, writing
- Auditory Processing: What happens when a sound is not interpreted properly. The child hears typically, but as sound moves from the ear to the brain there is distortion and/or delay of the signal, bringing challenges to everyday hearing and listening tasks (including socially and academically in the above listed areas).

**Major Issues:**

- The need for better collaboration between Psychologists, Speech-Language Pathologists, and Teachers in applying brain-based research to the classroom and interventions that work for all students, especially those that are in Tier III of RTI and those that are learning disabled.
- The process in developing consensus on a clear definition and diagnostic tools that avoid lack of reliability and validity in test batteries
- Over-diagnosis/misclassification of individuals with Central Auditory Processing Disorder

**Key Sources:**

- Reading Reflex: Carmen & Geoffrey McGuinness
- Teaching With the Brain in Mind: Eric Jensen
- The Psychology of Reading: Eleanor Gibson & Henry Levin
- Brain Matters: Translating Research into Classroom Practice: Patricia Wolfe
- PsychInfo Database
- Communication Disorders: CINAHL: Plus with Full Text
- Florida Center for Reading Research
- What Works Clearinghouse
- Phono Graphix
- National Center for Learning Disabilities
References


