

Fetal Alcohol Spectrum Disorder and Reading Comprehension: What Works and What  
Does Not?

By

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## Chapter I: Introduction

Imagine yourself a 14 year old, eighth-grade student recently diagnosed with FASD (Fetal Alcohol Spectrum Disorder); a label has been issued explaining why you are different. Your parents tell you receiving a diagnosis is good: now your family, friends, doctors, psychiatrists, school councilors, and teachers can better understand and meet your needs. You're not certain you agree. The realization that you have special needs evokes myriad of emotions: fear, anxiety, anger, frustration, and confusion. You're envious of the people around you who do not have to face the challenges you do on a daily basis.

Painfully aware of the differences that exist between yourself and your classmates, you seek to simply blend in. You attempt to relate to your classmates by discussing your new basketball hat (all the eighth-grade boys wear them). As you enter the ELA class, your teacher asks you to quiet down, but you don't listen because you feel relief and elation at having found a commonality with your peers. You eventually sit down at your desk and the lesson begins. The teacher places a reading passage before you, only allowing you a short time to read the entire text; she then calls your name, asking you to describe the problem the characters are facing. You stare at her not knowing what to say because you can read most of the words in the passage, yet understanding the story is a struggle. You frantically begin to reread the passage, hoping to glean any information to satisfy your teacher's request. Your teacher then says, "Can someone who actually attempted to read the passage answer the question?" The people that you had found common ground with ten minutes ago are now laughing at you. You feel angry, embarrassed, and misunderstood. Due to emotional dysregulation, you cry throughout the

remainder of ELA class, all of math class, and part of the way through science, until you are sent to the principal for being a distraction to your peers. When you return home for the day, you are still upset, but you cannot organize your thoughts and memories to clearly communicate with your mother what transpired at school.

### **Purpose**

Recounted by the case study participant (who will be referred to as “Aiden” for the purposes of this study) and his mother, this scenario exemplifies some of the daily challenges experienced by individuals with FASD. The academic needs caused by FASD are equally as complex and challenging as the social-emotional needs of individuals receiving an FASD diagnosis. Although this case study focuses upon one participant only, his experiences may be globalized when exploring not only the nature of FASD, but also how FASD can impact literacy learning. The purpose of this research is to aid teachers and school professionals in understanding why students with FASD display unique literacy learning needs, and how specific teaching and learning strategies such as task-structure and memory strategies impact those needs. In particular, the questions “What specific reading comprehension strategies best address the literacy learning needs of students diagnosed with mild-moderate FASD?” and “What specific reading comprehension strategies does current research indicate may address the literacy needs of the case study participant?” guided the research of this case study.

### **Rationale**

This topic is of great personal importance because Aiden is my brother; familial relation to the participant provides this research a unique perspective encompassing not

just the challenges and successes experienced by individuals with FASD in an academic setting, but also within the home. Albeit objectivity is of utmost importance, some limitations exist in the form of personal bias due to the familial connection between the researcher and the participant. Regardless, the aim to remain objective was of utmost importance as research pertaining to Aiden was conducted.

From a teacher and educator's perspective, this research is of great importance because Fetal Alcohol Spectrum Disorder (FASD), though completely preventable, exists as one of the leading causes of developmental delays and birth defects worldwide. The Center for Disease Control and Prevention (2015) reported an estimated 2% to 5% of the United States population received an FAS diagnosis (Data and Statistics). As educators, the task of teaching students with FASD is daunting, yet students with FASD can achieve academic and interpersonal success when specific strategies are utilized and a safe learning environment is provided (Harpur, 2001, p.150). As stated above, this case study not only informs educators of the nature of FASD, but also answers the research questions: "What specific reading comprehension strategies best address the literacy learning needs of a student diagnosed with mild-moderate FASD?" and "What particular strategies does current research indicate may address the literacy needs of the case study participant?" Additionally, the impact of specific task-structure and memory strategies for teaching and learning are explored.

## **Research Problem**

It has been my experience that teacher and educator awareness regarding FASD and its impact on student learning is lacking. In particular, Aiden's school teachers have demonstrated a severe lack of understanding regarding FASD and its classroom implications. For example, a teacher asked Aiden why he bothered studying for a test, because "you won't be able to remember anything you study, anyways." Additionally, my special education teacher preparation program was extremely limited in providing me any training regarding planning for the needs of students with FASD. As the incidence of Fetal Alcohol Spectrum Disorder increases, educators and teachers must not only become knowledgeable of the nature of FASD, but also employ targeted strategies to meet the varied needs of individuals receiving the diagnosis. The purpose of my research is not to condemn educators and teachers, but rather to aid them in understanding why students with FASD display unique literacy learning needs, and how task-structure and memory strategies impact those needs. In Aiden's case, the impact of literacy strategies (teaching and learning), in connection with reading comprehension is explored; task structure and memory strategies have been selected.

## **Summary**

The academic, social-emotional, and behavioral challenges associated with FASD are vast; however, teachers and educators alike can positively impact the learning of students diagnosed with FASD by utilizing targeted teaching and learning strategies. The purpose of this study is to aid teachers and educators regarding the nature of FASD and the correlated impact on literacy learning, focusing specifically on reading comprehension development.

## Chapter II: Literature Review

### Introduction

As the incidence of Fetal Alcohol Spectrum Disorder increases, educators must not only become knowledgeable of the nature of FASD, but also employ targeted strategies to meet the varied needs of individuals receiving the diagnosis. The purpose of this research is not to condemn educators, but rather to aid them in understanding why students with FASD display unique literacy learning needs, and how task-structure and memory strategies may address such needs. Regarding Aiden, the impact of literacy strategies (teaching and learning) in connection with reading comprehension, is explored. Task structure and memory strategies have been selected. My questions guiding this research are as follows:

- “What specific reading comprehension strategies best address the literacy learning needs of a students diagnosed with mild-moderate FASD?”
- “What specific reading comprehension strategies does current research indicate may address the literacy needs of the case study participant?”

A review of current literature focusing on the nature of FASD, the unique literacy needs associated with the diagnosis, and various teaching and learning strategies that may address Aiden’s reading comprehension needs, are discussed. After reviewing current research, three themes emerged: Nature of FASD, Strategies Beneficial to Students Classified as LD also Benefit Students with FASD, and Environmental Factors that Impact Successful Learning. Though the past decade has seen exponential growth of research conducted on FASD in connection with learning disorders, few sources of data

exist concerning FASD and reading comprehension, specifically. As stated previously, this case study seeks to bridge this critical gap in research.

### **Nature of FASD**

Similar to Autism, individuals diagnosed with Fetal Alcohol Spectrum Disorder fall on a spectrum. Dissimilar to Autism (which current research indicates to be largely genetic), the severity of the disorder directly relates to the amount of alcohol consumed, and at what point in pregnancy the alcohol was consumed. Regardless, most individuals with FASD experience and demonstrate learning needs and behaviors unique to the diagnosis. Mitten (2013) states, “FASD refers to a range of diagnosis for physical, cognitive and neurobehavioral disorders that can result from prenatal alcohol exposure.” (p.60) Depending on the severity of damage, individuals with FASD can display outward signs of the disorder, such as small head circumference, low set ears, and specific facial features such as thin lips, wide-set eyes, flattened nose bridge, etc; central nervous system abnormalities exist due to traumatic brain damage caused by alcohol consumption (Duquette, Fullarton, Hagglund, 2006, p.28). The behavioral and academic challenges associated with FASD stem from damage caused to the Frontal Lobes, the portion of the brain responsible for executive functioning (planning, attention, self-regulation and monitoring). Additionally, the Corpus Callosum, the thick joining of nerve fibers connecting the two hemispheres of the brain, is also damaged. (p.28). When the Corpus Callosum is damaged through alcohol consumption the communication between both hemispheres of the brain is disrupted. Ferguson and Ryan (2006) discuss the lasting effects of alcohol exposure: “...permanent brain damage resulting in neurological abnormalities, delay in development, intellectual impairment, and learning/behavioral

disabilities.” (p.363). Additionally, individuals with FASD struggle with memory retention, linking actions and consequences, understanding abstract concepts, and developing interpersonal skills (Harpur, 2001, p.146) (Ryan and Ferguson, 2006, p.363) Understanding the nature of the disruption to typical brain development is paramount: individuals receiving an FASD diagnosis experience exceedingly diverse and challenging academic, social, behavioral, and physical needs that directly impact learning. When planning for the needs of students with FASD, the teaching mantra *know thy student* is of upmost importance.

### **Strategies Beneficial to Students Classified as LD, also Benefit Students with FASD**

Interestingly, teaching and learning strategies utilized to address the literacy needs of students identified as learning disabled can also meet the literacy needs of students diagnosed with FASD. In particular, current research indicates that strategies utilizing meta-cognition are most effective. In addition, current findings indicate that many of the strategies used to enhance memory function in non-FASD children with special needs are effective in children diagnosed with FASD. Rasmussen, Pei, Manji, Loomes, and Andrew (2009) state “Knowing that memory development in FASD children parallels that of other children, evaluation of strategies and programs utilized with other special populations to enhance memory function may also be successful with FASD children.” (p. 213). For example, repetition of information or repeated demonstration exists as a viable teaching strategy to aid in retention of information. Similarly, repeated practice of a skill is an effective learning strategy for students with FASD. Harpur (2001) states, “Another strategy for helping FASD students to strengthen their abilities is to focus on memory tasks...repetition is key. Teachers need to repeat information constantly to help

ensure that some of it has been encoded.” (p. 8) Repetition can be used to help increase the memory-retention of vocabulary words in students with FASD, thus aiding in reading comprehension. Though memory development in students with an FASD diagnosis and neurotypical students progresses similarly (Barnes & Johnston, 2008, p. 125) (Mutz, Willoughby, & Wood, 1998, p.698), many individuals with FASD find retrieving previously learned information and utilizing working-memory (short-term memory) challenging. The long-term memory of individuals with FASD are generally sufficient, rather the process of recalling previously stored information is often problematic (Crocker and Mattson, 2011, p.1114). Equally problematic, alcohol damage to the Frontal Lobes of the brain directly impacts short-term memory function, thus disrupting the storing of information from short-term to long-term memory. Teachers often activate their students’ background knowledge to aid comprehension of new content, yet for students with FASD, this technique may be ineffective because students may be unable to recall the pertinent information.

Task structure strategies also exist as a viable approach by which to meet the learning needs of students with FASD. Harvey and Goudvis suggest a strategy titled “Following the Inner Conversation: Leaving Tracks”. The purpose of the strategy is to teach metacognitive skills (referred to as the ‘inner voice’) and leave tracks of thinking (p. 78). The student writes down her questions, reactions, and connections on a sticky note as she reads. The student can then look back at the thoughts she made while reading. (p. 79). Buckley and Kalberg (2007) assert, “Specific task structuring is also beneficial. This is extremely useful in the success of the child with FASD in that task structuring provides a clear system for the child to follow.” (p. 283). Research conducted by Jessica L.

Hagaman and Robert Reid (2008) suggests another strategy referred to the “R.A.P” paraphrasing strategy. This task-structure strategy is carried out as such: First, read the paragraph, then ask, “What’s the main idea?” and include two supporting details; last, put it in my own words. (p. 223) Similar to the “Leaving Tracks” strategy, the “R.A.P” strategy promotes meta-cognitive exercise to overcome reading comprehension challenges. The impact of task-structure and memory strategies in relation to the case study participant’s reading comprehension is explored.

### **Environmental Factors that Impact Successful Learning**

#### *Physical Space and Learning Tools*

When planning for the needs of students with special needs, the learning environment can be must be considered. Room layout, visuals of classroom expectations, the composition of learning groups, clutter, etc. can aid or detract from student learning. Students receiving an FASD diagnosis benefit from deliberate planning of the classroom environment. Edmonds and Crichton (2008) state, “Delivering individual learning for diverse needs takes thoughtful planning and adequate resources” (p.62). While challenging, planning for the diverse needs of students with FASD is well worth the effort: planning for the physical space of students with FASD is a critical piece that impacts learning.

Previously stated, the challenging behavior associated with FASD greatly impacts student learning. The impact of FASD on working memory is significant: students with an FASD diagnosis typically struggle to abide by classroom rules or procedures, not because the individual desires to disrupt or evade learning, but rather the nature of the pathology makes following behavior or task guidelines difficult. Visual aids such as a

checklist or classroom expectation posters are especially helpful when students are asked to follow classroom rules, or complete a task involving multiple steps. High school students diagnosed with FASD were surveyed by researchers Duquette, Stodel, Fullarton, and Hagglund (2006) to deduce environmental factors that benefit learning. The students' responses supported the conclusion that visuals are beneficial. (p.30). Intentional student grouping is also important: planning whom students with FASD work alongside can greatly enhance learning and the development of collaborative skills. A student who participated in Duquette's survey states, "Predetermine the composition of groups to avoid students' being left out" (p.30).

When planning instruction for the facilitation of learning for students with FASD, another element to consider is planning multisensory lessons: enhancements such as music, audio books, visual aids, and sensory bins create meaningful experiences. Sensory bins containing materials relevant to the lesson not only pique student interest, but also activate multiple portions of the brain simultaneously. Mitten states, "Learning must be multi-sensory and include visual arts, practical and applied arts, apprenticeships, physical activity, outdoor activities, adventures, and field trips, social-interactions, and other forms of experiential learning" (2013, p.64). Mitten continues to explain that engaging students in multi-sensory learning can build neural pathways within portions of the brain damaged by alcohol (p.65). Depending on the student, the incorporation of technology may be beneficial. When discussing the experiences of study participants utilizing technology, Crichton and Edmund noted, "With the support of technology tools and the keen interest of youth for the same, these participants could become more creative in their work" (2008, p.66). If possible, students with FASD also benefit from smaller

classrooms because teachers, assistants, and volunteers are able to focus on all learners (Chrichton and Edmonds, 2008).

### *Teacher Tone*

Teacher tone, or the manner in which teachers think, act towards, and engage with students, also largely impacts the likelihood of school success for students with FASD. Duquette's (2006) survey inquired which teacher traits study participants most benefited from. The participants provided responses indicating their perspective regarding best and worst teacher traits. The best teachers were described as:

- Knowledgeable about FASD and the effects of alcohol-related brain damage
- Patient/Approachable
- Took time to provide clear explanations, answer questions, and provide accommodations or modifications
- Knowledgeable of students' strengths and weaknesses
- Aware of students' emotions
- Provided consistent expectations for behavior and leaning
- Willing to be flexible
- Use praise and positive reinforcement
- Helped students take responsibility for their actions

The worst teachers were described as:

- Not knowledgeable of FASD and the learning and behavioral struggles caused by the associated brain damage
- Humiliated students in private and in front of others
- Shamed students as a means of correction

- Raised their voices/were impatient
- Poorly organized
- Sarcastic or rude
- Ignored students requests for clarification or further demonstration
- Dismissed students because of their diagnosis
- Failed to provide accommodations or modifications

Participants of the survey also noted that they wished their teachers understood that most learning or behavior challenges do not stem from an attitude of “I won’t”, but rather exist as an organic product of their unique pathology (p.30)

### **Study Approach**

Jean Piaget, one of the greatest influencers of the Constructivist approach to learning, proposed that learning occurs in the form of adjustments. Two forms of adjustment, accommodation and assimilation, occur in response to experiences; new experiences add to what is already known, thus reinforcing or contradicting preexisting knowledge (Pritchard, 2009, p. 19). Piaget further concluded that by engaging in meaningful experiences, children became active participants in the construction of new knowledge. Lev Vygotsky further evolved Piaget’s ideas by suggesting children learn from a more knowledgeable other, via discussion or the provision of stimulating manipulatives. This is referred to as “scaffolding”. Vygotsky’s “Social Constructivism” also suggested the theoretical existence of the Zone of Proximal Development (ZPD), or a level of understanding just above what the individual is capable of independently (p. 25). In addition, the notion of situated learning and authentic activity highlights the importance of delivering new information within a familiar context. Pritchard states, “Children

working with new ideas in a familiar context are far more likely to engage with the ideas than if the same ideas were presented within an alien context” (p.26).

Operating from a Constructivist approach, this qualitative research study seeks to answer the research questions relating to which teaching and learning strategies best address the reading comprehension needs of students with mild/moderate FASD. This approach is fitting with Aiden individually, and current research on FASD for two reasons:

- Memory development of students with FASD parallels that of non-FASD students, therefore meaningful learning experiences that activates schema can aid in comprehension of new information
- Experiential learning and multi-sensory learning can build neural pathways within portions of the brain previously damaged by alcohol

### **Summary**

While planning for the needs of students with FASD certainly is daunting, it is paramount that teachers understand the nature of FASD and are knowledgeable of teaching and learning strategies research indicates to be most effective in meeting such needs. Supportive interactions and careful consideration when planning for physical, behavioral, and learning needs directly impacts the degree of school success experienced by students with FASD. Crichton and Edmond state, “Personal attention and creative work guided by understanding professionals seems the key to these participants to progress and grow. A holistic approach that addresses all the needs of people with FASD is the crux to a beneficial program” (p. 68). For individuals with FASD, positive

experiences with understanding, knowledgeable teachers better equips them for future success.

## **Chapter III: Methods and Procedures**

### **Introduction**

The purpose of my research is to aid teachers and school professionals in understanding why students with FASD display unique literacy learning needs (reading comprehension in particular), and which specific teaching and learning strategies address those needs. This chapter outlines research questions, the study participant, and data collection methods utilized within this research. Data analysis and research limitations are also discussed within this chapter.

### **Research Questions**

The methods and procedures outlined in this chapter will be utilized to answer the research questions stated below:

- What specific reading comprehension strategies best address the literacy learning needs of students diagnosed with mild-moderate FASD?
- What specific reading comprehension strategies does current research indicate may address the literacy needs of the case study participant?

### **Positionality of the Researcher**

I am a twenty-six year old teacher and sister of an individual diagnosed as having mild/moderate FASD. At the age of four, my brother Aiden was adopted by my family out of the Rochester area Foster Care System. Aiden is now fourteen years old, and recently received a mild/moderate FASD diagnosis. Having been present to witness Aiden's academic and behavioral challenges caused by FASD, I am passionate about educating others on FASD prevention and various ways to meet the diverse needs of individuals receiving an FASD diagnosis. As a student of Brockport College's Literacy

B-12 graduate program, I have the unique opportunity to utilize my academic knowledge in conjunction with my personal experiences to conduct research addressing the literacy needs of students with FASD. By completing this case study, I hope to provide sound research regarding what teaching and learning strategies best address the reading comprehension needs of students with FASD, aiding teachers as they seek to do so.

### **Participants and Context**

This research focuses on a fourteen year-old Caucasian male in the eighth grade, who for the purposes of my study shall be referred to as “Aiden”. Having received a Fetal Alcohol Spectrum Disorder diagnosis, behavior, physical, and academic markers indicate Aiden is classified within the mild to moderate FASD range. His comprehension presents the greatest area of need; therefore, this phenomenon is the literacy focus of my research. The STAR ELA assessment indicates that Aiden currently comprehends at the fifth grade reading level.

Regarding Aiden’s interests, he indicated on the Student Interest Survey (see Appendix A) greatly enjoys spending time outdoors: hiking, soccer, archery, and swimming are a few of his favorites. Aiden also greatly enjoys activities where he is able to utilize his innate creativity. Designing his own Lego structures and sketching wildlife, cars, superheroes provide Aiden creative outlets by which to control and experiment with the world around him. Aiden’s other interests include collecting diverse rocks, gemstones, and fossils. Birds and reptiles are also of great interest to Aiden.

All research conducted necessitating Aiden’s active involvement occurred within his place of residence. The reason for this is twofold: firstly, research including Aiden’s

involvement will most likely occur during a portion of his summer vacation; second, I found it beneficial to work with Aiden in an environment where he is most comfortable.

Additionally, Aiden's parents and numerous professionals that provide academic support (relating to the FASD diagnosis and literacy learning needs) were invited to complete consent forms (if applicable), and Participant Learning Needs surveys. Aiden's parents and selected professionals (will add who later) acted as consultants for the purpose of this research; any information provided on the Participant Learning Needs survey was utilized to better understand Aiden's literacy needs, and thus aided in the selection of strategies that further developed his reading comprehension abilities.

### **Procedures**

Research involving Aiden working with suggested strategies took place over the course of twelve weeks (the start and end dates will be provided once IRB approval is granted). I introduced one new comprehension strategy every three weeks, over the course of the twelve weeks. Aiden was asked to utilize the specific strategy two times over the course of a week one time in my presence, the other independently. When meeting in person, Aiden and I engaged in discussions specific to strategy significance; I also modeled correctly strategy use.

Aiden utilized the four strategies over the course of twelve weeks, engaging with a text of his choice. The "Strategy Effectiveness Form" was completed by Aiden immediately following the each half hour session. He completed this form during both the in-person and independent sessions. During the in-person session, I recorded take anecdotal notes, observing Aiden's demeanor, difficulty or ease of use with the strategy, and actual strategy use. Anecdotal records provided valuable data regarding Aiden's

understanding of each strategy. Anecdotal data indicated not only each strategy's relevance to Aiden's literacy needs, but also if more than three weeks of time was required to gain potential mastery of the strategy.

## **Data Collection Instruments and Analysis**

### *Student Surveys*

Aiden completed the Student Interest Survey preceding the twelve-week research study. The survey is composed of nine open-ended questions inquiring about his hobbies, learning interests, favorite literature genre, etc. The purpose of the student interest survey is two-fold: gaining information regarding Aiden's interests aided in selecting texts of interest, to be used in conjunction with selected strategies during the twelve-week research period. Additionally, by inquiring about the Aiden's interests, I hoped to communicate my interest in the participant himself, not just for the purposes of this capstone project.

For the duration of the twelve-week research time frame, Aiden was asked to complete the "Strategy Effectiveness Form" for each strategy used. The form is comprised of four questions providing data indicating how applicable the strategy is to Aiden's literacy needs, his level of comfort in using the strategy, and willingness to use the particular strategy in the future. A simple rubric was provided at the top of the form to help Aiden provide strategy feedback. He completed half of the Strategy Effectiveness forms provided- he refused to provide written feedback following independent use sessions.

### *Parent Survey*

Aiden's mother completed the "Participant Learning Needs - Parent Survey". This survey is comprised of eight questions; the purpose of the survey is to better understand the Aiden's learning needs, and his parents' perspectives and attitudes regarding their child's literacy learning needs in conjunction with his recent FASD diagnosis. The Parent Survey was completed prior to the start of the twelve-week research study.

### *Professional Survey*

Selected professionals involved in assessing and supporting Aiden's learning needs and/or FASD diagnosis were asked to complete the "Participant Learning Needs - Professional Survey". This survey is comprised of seven questions inquiring the professional to share their title, relationship and role in connection with Aiden, and strategy suggestions addressing Aiden's literacy needs, and the literacy needs of individuals diagnosed with FASD. In providing this form, I intend to collect information indicating what strategies may be beneficial to the Aiden's reading comprehension development. Unfortunately, I did not receive responses from the doctor and psychologist whom I sent the form to.

### *Anecdotal Data*

Anecdotal data was collected by recording observations during in-person sessions over the course of the twelve-week research study. This allowed any behaviors, attitudes, and evidence of strategy use observed to be documented for analysis.

### **Criteria for Trustworthiness**

Fortunately, the last decade has seen much research conducted and published regarding the nature of Fetal Alcohol Spectrum Disorder and its effects upon literacy

learning. The research presented in the literature review portion of this project provides reliable guidance regarding the nature of FASD and how it impacts literacy learning in particular; the same is true regarding the specific strategies that were introduced during the twelve-week research study. Only evidence-based teaching and learning practices that have proven both reliable and valid (in various research studies) were selected. Also, this research focuses solely upon Aiden; therefore all survey and feedback questions have been designed with his literacy needs in mind.

The researchers Genishi and Glupczynski (2006) discuss the relevance of personal experience to current research: when researchers investigate a topic of interest, their previous experiences shape approach to research data and analysis (p.658). Though the familial connection between Aiden and myself directly shapes my perspective and approach to the data and subsequent findings of this research, I feel the connection has afforded me the unique opportunities that few researchers have. Aiden is my brother; therefore I have been witness to the daily challenges faced by individuals with an FASD diagnosis. Intimate knowledge of Aiden's literacy needs has guided the methodology and design of this research. It is also important to note that the familial connection did not impact research objectivity: as a researcher, I was able to separate the personal connection between Aiden and myself while conducting data analysis. While recording anecdotal data, only outward behaviors were documented; Aiden's actions, body language, and remarks were recorded. Additionally, responses recorded on all feedback forms or surveys were either written by Aiden, his parents, or professional consultants; responses were scribed verbatim in instances when Aiden provided verbal feedback. Using the words of the primary participant and others involved in the recording and

reporting of information ensures the integrity and fidelity of this study. Analysis of anecdotal data was conducted after the twelve-week research study ended

Both comparative and triangulation methods of analysis were utilized. Triangulation allows for the examination of consistency of findings generated by different data collection methods used within this research. Triangulation supports the validity of research findings presented: multiple sources of data leading to the same results strengthen the reliability of findings. Comparative methods also strengthen reliability because findings are arrived at by the logical analysis of different data sets, in this case, the various surveys and data collection forms utilized within this research.

### **Limitations**

Certain limitations exist within this research. Firstly, the twelve-week research study period may not have provided enough time to assess and analyze long-term growth regarding the Aiden's reading comprehension abilities. Second, the familial relationship between Aiden and I made complete objectivity nearly impossible; the same can be said of the parent surveys. Therefore, the sibling relationship may have made Aiden feel as though he could not be completely honest. In an effort to please, Aiden may have felt he needed to answer what he perceived to be the correct or desired response, thus rendering some research data invalid. Lastly, in the past, motivation pertaining to literacy learning has proven to be a significant challenge for Aiden. If he at any point did not utilize the specified strategy with fidelity, then research data may be rendered invalid. Lastly, due to the specificity of my study, the research results may not be generalizable to other populations of students.

## **Summary**

This qualitative research study utilizes both methodological triangulation and comparative analysis to answer the research questions of this study. The Student Interest Survey, parent survey, and professional survey provide information that is triangulated, whereas Aiden's responses provided on the Strategy Feedback forms were compared weekly (even though strategies will be introduced every three weeks) to further answer the stated research questions.

## Chapter IV: Analysis

### Introduction

Before analyzing the various data sources discussed in this research, a system of organization was first devised. The coding processes utilized to analyze and interpret data encompassed color-coding, category development, and emerging findings. My research involved methodological triangulation and comparative analysis because surveys, feedback forms, and anecdotal notes comprised collected data. The organization process allowed for easier ascertaining of research themes and subsequent analysis, with greater accuracy.

The data found within surveys, feedback forms, and anecdotal notes lead to the emergence of three findings: 1. The participant benefitted most from highly structured strategies 2. Memory deficits directly impacted strategy effectiveness 3. Participant's attitude directly impacted strategy frequency of use. The three findings directly connect with the research questions:

- What specific reading comprehension strategies best address the literacy learning needs of students diagnosed with mild-moderate FASD?
- What specific reading comprehension strategies does current research indicate may address the literacy needs of the case study participant?

### *Collection tools and organization of findings*

I categorized findings across the surveys, feedback forms, and anecdotal notes by reading through each and searching for similarities and differences. Information supporting the first finding (mentioned above) was highlighted blue; similarly, information pertaining to the second finding was highlighted yellow; the third finding,

green. The Student Interest Survey and Participant Learning Needs Survey provided Aiden, his parents, and the multiple professionals involved in teaching or providing the mild/moderate FASD diagnosis the opportunity to share information regarding Aiden’s interests and particular learning needs, better equipping me to select valid reading comprehension strategies. The Strategy Effectiveness Form, provided Aiden a venue to share feedback about the four reading comprehension strategies taught to him: a simple rubric (shown below) was provided to Aiden to aid me in understanding which strategies were most beneficial.

1.	2.	3.
This strategy is not helpful to me; it did not help me understand what I read.	This strategy was somewhat helpful to me as I read; it I might use it again.	This strategy is very helpful to me as I read; I plan to use it again.

**Figure 4.1**

Anecdotal notes were used to record Aiden’s demeanor, difficulty or ease of use with the strategy, and actual strategy use. Anecdotal records provided valuable data regarding Aiden’s understanding of each strategy. This data indicated not only each strategy’s relevance to Aiden’s literacy needs, but also if more than three weeks of time was required to gain potential mastery of the strategy.

The Student Interest Survey, Participant Learning Needs Surveys (for both parents and professionals) were triangulated to aid in the selection of reading comprehension strategies that best meet Aiden’s literacy needs. Aiden’s feedback on The Strategy Effectiveness forms (collected over the course of twelve weeks) and my anecdotal notes were compared to determine which of the four selected strategies best addressed his reading comprehension needs, and why. The remainder of this chapter will discuss in detail the findings determined in conducting my research and how the finding directly connect with the purposes of my research.

## *Findings*

### **Aiden Benefited Most From Highly Structured Strategies**

The strategy feedback and anecdotal notes I recorded indicate that highly structured comprehension strategies benefitted Aiden the most. Highly structured strategies are those that provide specific, step-by-step directions that detail exactly what the learner should thinking and doing as he engages with a text. Two of the four strategies introduced to Aiden over the twelve-week research time fit these criteria: the SQ3R and R.A.P strategies proved most beneficial. The SQ3R comprehension strategy proceeds as follows: survey, question, read, recall, and review. First, the student surveys the text (title, cover, table of contents, synopsis on back, etc.), and then asks questions such as “What is this text about?” or “What can I learn from this text?”; he or she then reads the text, making note of anything that does not make sense or any questions that arise. The student can then recall (in his or her mind, or on paper) the important points within the text, or review any questions posed while reading; lastly, the student rereads the text (or any portion of the text) that he or she does not understand. The R.A.P paraphrasing strategy promotes meta-cognitive exercise to overcome reading comprehension challenges. This task-structure strategy is carried out as such: First, the student reads the paragraph, then asks and answers, “What’s the main idea?” (including two supporting details); lastly, the student states them main idea in his or her own words.

Aiden’s feedback on the Strategy Effectiveness Form supports the conclusion that highly structured strategies are most beneficial to him. Aiden completed the form once a week, immediately following sessions where I was present (he did not complete the forms following independent sessions), resulting in the completion of twelve feedback

forms. Aiden's rubric feedback and responses to the questions provided me data by which to gauge Aiden's perception regarding the level of strategy helpfulness. For each in-person session, I recorded my observations of Aiden's body language and verbal responses/feedback, and fluency of strategy use. While I expected Aiden's feedback to change as he became more comfortable with each strategy, I noticed that his feedback on the SQ3R and R.A.P strategies became more positive over time. His responses indicated that he not only understood and saw that value in each strategy, but planned to utilize either one in the future. For example, when responding to the question "Would you use this strategy to help you better understand what you read? Why?" Aiden replied, "I would say yes. I like this one because I know the steps and because the steps don't change. I know what to do now."

Conversely, when asked the same question regarding the Leaving Tracks and identifying story elements strategies, Aiden provided feedback such as "I was confused" or "I might use this strategy in the future" consistently.

During the in-person sessions, I observed Aiden as he practiced using each strategy, documenting his behaviors, body language, statements, and questions. I then analyzed my observations to determine Aiden's willingness, engagement, comfort, and fluency with each strategy. While practicing the SQ3R and R.A.P strategies, I noticed Aiden engaged with the text with more eagerness and less visible stress than when utilizing the other comprehension strategies. He also provided additional feedback on the Strategy Effectiveness form such as "I like this one because it tells me exactly what to do" and "This strategy is not confusing", indicating he preferred the SQ3R and R.A.P strategies.

## **Memory Deficits Directly Impacted Strategy Effectiveness**

Based upon Aiden's feedback, anecdotal data, and current knowledge regarding the nature of FASD, my analysis revealed that memory deficits directly impacted the effectiveness of the introduced strategies. For Aiden in particular, deficits pertaining to recall of stored information and the process of converting new knowledge from short-term memory to long-term, are significant. Research reveals these phenomena occur in direct result of organic brain damage caused by prenatal exposure to alcohol. Although challenges regarding recalling previously learned information and converting new information to long-term memory could be detrimental, research also indicates that teaching and learning strategies exist to accommodate and remediate such memory deficits. Discussed within the second chapter of this research study, repetition of new information and skill practice, and the provision of visuals are of great help to students receiving an FASD diagnosis.

An analysis of the anecdotal data found within my documented observations reveals that even after three weeks of practice with each of the four selected reading comprehension strategies, Aiden continued to struggle to recall a strategy of his choice. On more than one occasion, Aiden would make comments such as "I kind of remember the strategy, but not great" or "I want to use it (the strategy) to understand, but I can't remember how". Having extensive background knowledge of Aiden's academic challenges, I was not surprised by his struggle to recall the strategies I had introduced to him. Fortunately, having visual aids (outlining step-by-step strategy use) readily available within a binder help Aiden greatly.

### **Aiden's Attitude Directly Impacted Strategy Frequency of Use**

Aiden's attitude towards reading practice directly impacted his willingness to utilize the introduced comprehension strategies. Fortunately, Aiden did not display a lack of resiliency (as I had initially expected), but rather at times, general disinterest and unwillingness to engage in strategy practice. I observed Aiden demonstrating avoidance behaviors such as focusing on anything other than the text, putting his head in his arms, frequent bathroom breaks, attempting conversation about topics unrelated to the text or strategies when I attempted to refocus him, etc. Aiden also made statements such as "I don't care about this anymore" and "Reading is stupid and I don't care if I understand what I am reading" Often times, Aiden would also comment "I had a bad day today", "It's summer; I shouldn't have to do school during my summer break", and "I am so angry because I wanted to see my friend today, but I got in trouble, so I can't". Such statements also provided evidence that much of Aiden's resistance to practicing the comprehension strategies stemmed from challenging feelings and situations unrelated to literacy learning. Thankfully, Aiden demonstrated a willing attitude and engaging behaviors approximately 75% of the in-person sessions.

Additionally, my analysis further revealed that Aiden's comorbid ADHD diagnosis also impacted his ability to utilize comprehension strategies. Though willing the majority of the time, inattentiveness and frequent distractibility often posed significant challenges to Aiden's utilization of the introduced comprehension strategies. Behaviors such as attempting conversation about topics unrelated to the text or strategies, tapping his pencils or bouncing his leg, playing with his clothing, checking his watch often, calling out to pets, stretching and yawning characterize many distracting factors.

## Summary

Although four reading comprehension strategies were introduced to Aiden over the course of twelve weeks, two in particular were of most benefit: the SQ3R and R.A.P strategies proved most helpful to Aiden. Aiden’s responses on the Strategy Effectiveness Form (see table below) and my recorded anecdotal data support this finding. As I completed an analysis of the remaining data, two other findings emerged: 1. Memory deficits directly impacted strategy effectiveness 3. Participant’s attitude directly impacted strategy frequency of use. The implications of these findings in connection with the research questions are discussed within the next chapter.

Week	Leaving Tracks	R.A.P	Story Elements I.D.	SQ3R
1	Rubric score:2			
2	Rubric score:2			
3	Rubric score:2			
4		Rubric score: 3		
5		Rubric score:3		
6		Rubric score:3		
7			Rubric score:2	
8			Rubric score:1	
9			Rubric score:2	
10				Rubric score:2
11				Rubric score:3
12				Rubric score:3

**Figure 4.2 Strategy Effectiveness Form Feedback**

\*Blank cells indicate that the strategy was not focused upon that specific week

\* See Figure 4.1 on page 27for rubric criteria

## **Chapter V: Conclusions and Implications**

### **Introduction**

The purpose of my research is to aid teachers and school professionals in understanding why students with Fetal Alcohol Spectrum Disorder diagnoses display

unique literacy learning needs (focusing specifically on reading comprehension development), the nature of FASD, and which teaching and learning strategies best address those needs. In Aiden's case, the impact of teaching and learning literacy strategies in connection with reading comprehension is explored: task structure and memory strategies were selected. The research questions listed below provided my research guidance:

- What specific reading comprehension strategies best address the literacy learning needs of students diagnosed with mild-moderate FASD?
- What specific reading comprehension strategies does current research indicate may address the literacy needs of the case study participant?

The conclusion section will not only answer the research questions mentioned above, but also examine why the SQ3R and R.A.P strategies most benefitted Aiden, while the Leaving Tracks and Story Element strategies did not. The nature of FASD, in combination with Aiden's unique reading comprehension needs, is also discussed in relation to the research questions. In addition, not only will specific reading comprehension strategies that best addressed Aiden's literacy needs be outlined, but also strategies for teaching and learning, in addition to environmental and interpersonal factors that have proven critical to school success for students receiving an FASD diagnosis.

A brief section discussing recommendations for future research is included.

This chapter concludes with a brief discussion of why my research with Aiden is of both professional and personal importance to me as researcher. As a sister of a sibling with an FASD diagnosis and teacher, I truly believe that literacy is freedom: the ability to

ascertain, comprehend, and synthesize language in all its forms is critical to not only academic success, but also successful communication with the world and the diverse individuals that populate it.

## **Conclusion**

The purpose for conducting this research with Aiden was to not only expand my personal knowledge of Fetal Alcohol Spectrum Disorder, but also to aid teachers and school professionals in understanding why students with FASD diagnoses display unique literacy learning needs. The research questions provided guidance as I focused specifically upon reading comprehension development with Aiden; in particular, which teaching and learning strategies best addressed not only Aiden's unique literacy needs, but also those typical of individuals receiving an FASD diagnosis.

Current literature focusing upon FASD in conjunction with successful learning and literacy skill development suggests that particular teaching and learning strategies relating to learning environment, teacher tone, and targeted planning directly increase the likelihood of academic success for student receiving an FASD diagnosis. In conducting research with Aiden, I worked towards answering the research questions "What specific reading comprehension strategies does current research indicate may address the literacy needs of the case study participant?" and "What specific reading comprehension strategies best address the literacy learning needs of students diagnosed with mild-moderate FASD?" The subsequent findings of my research indicate that for Aiden, structured comprehension strategies with clear steps, that can be utilized frequently and flexibly were most beneficial. Of the four strategies I selected to teach Aiden, the SQ3R and R.A.P strategies fit the parameters mentioned above, therefore proved most helpful

for Aiden when he struggled to comprehend text. Explicit instruction that included modeling of strategy use (I verbalized my thinking as I worked through the steps of the strategy to ascertain the intended idea of the text), scaffolding, and ample time to practice the utilization of the strategies were also critical. In addition, current research indicates that students receiving an FASD diagnosis benefit from deliberate planning of the classroom environment. Room layout, visuals of classroom expectations, the composition of learning groups, clutter, etc. can aid or detract from student learning. Intentional planning of the learning environment directly increases the likelihood of academic success and high school graduation. In addition, particular teacher attributes and dispositions have been found to directly impact the likelihood of successful school completion for students receiving an FASD diagnosis. Teachers who demonstrated patience and were approachable, knowledgeable about FASD, set consistent expectations, were knowledgeable about FASD and the effects of alcohol-related brain damage, took time to provide clear explanations, answer questions, and provide accommodations or modifications, were aware of students' emotions, and utilized praise and positive reinforcement, were indicated to be most effective.

## **Implications for Teaching and Learning**

### *Implications for Aiden*

When working with Aiden to determine which learning strategies best address his literacy needs-reading comprehension in particular- the research question “What specific reading comprehension strategies does current research indicate may address the literacy

needs of the case study participant?” provided guidance. In working with Aiden, three findings emerged: 1. Aiden benefitted most from highly structured activities

2. Memory deficits directly impacted strategy effectiveness

3. Aiden’s attitude directly impacted strategy frequency of use

Based upon these findings, I would recommend that Aiden continue to select texts of great interest to him; if he feels he has not understood what he has read, he now has at minimum two effective strategies to aid in his comprehension of the text. The SQ3R and the R.A.P strategies proved most effective in that they are highly structured and are comprised of a clear sequence of steps. I would also encourage Aiden to revisit his reading comprehension binder that contains step-by-step directions regarding how to utilize each strategy introduced during our research time together. I have informed Aiden that I am available to provide clarification and additional help as he feels necessary. Additionally, if Aiden experiences frustration or demonstrates oppositional behaviors towards reading and strategy use, I would recommend that he take a break to calm. Once calm and interested in continuing reading, Aiden can then utilize a strategy of his choice, at his discretion.

### *Implications for My Teaching*

While conducting research independently and with Aiden, I learned a great deal regarding the nature of FASD, its impact of literacy learning, and various teaching and learning strategies that address the unique literacy needs of individuals receiving an FASD diagnosis. In particular, the necessity of targeted, intentional planning of not only teaching and learning strategies, but also learning environment, was impressed upon me. The teaching commandment *Know thy student* is key: I feel that during my time with

Aiden, I not only expanded my knowledge of him as a learner, but also as an individual. As I conversed with Aiden and documented his behaviors and feedback, I was struck most by his resiliency. Living with FASD is not a light burden, yet Aiden largely carried himself with optimism and an endearing shy candor.

### **Recommendations for Future Research**

Regarding my own research, I am interested in the continuation of working with Aiden, introducing reading comprehension strategies that fit the criteria of being structured, composed of step-by-step process, and can be utilized repetitively, regardless of the text type. I would continue to utilize the Strategy Effectiveness Form to get valuable feedback from Aiden regarding his comfort and understanding of the strategy. My recommendation for other researchers interested in expanding their knowledge of literacy strategies for students with FASD diagnoses, would be to utilize the research questions “What specific reading comprehension strategies best address the literacy learning needs of students diagnosed with mild-moderate FASD?” This question will provide specific guidance pertaining to the research topic, yet is broad enough that any research finding have the potential to be globalized to many individuals with FASD.

### **In Closing**

As a researcher and educator, conducting this research was of great benefit for myriad reasons: firstly, the incidence of individuals receiving Fetal Alcohol Spectrum diagnoses continues to rise; whether the increase is due to more accurate diagnosing of FASD, or an increase in prenatal alcohol exposure, is currently unknown. Second, as an educator, it is my duty to do all I can do to best plan for the needs of all students; given my first point, expanding my personal knowledge regarding the nature of FASD and particular teaching

and learning strategies that may be of benefit to students with an FASD diagnosis, is critical. Lastly, I feel it is important to share my research findings, and the recommendations of other current sources of research, with other educators.

As Aiden's sister, conducting research that focused upon meeting his unique literacy needs has been of great personal importance. Having witnessed the academic challenges Aiden has faced due to his teachers' naivety regarding the nature of FASD and its impact on reading comprehension in particular, I felt it necessary to focus my research on teaching and learning strategies that would be of benefit to Aiden's literacy needs. It is my hope that the research findings presented here will be of benefit to teachers, parents, school staff, or anyone desiring to not only deepen their knowledge of FASD, but also teaching and learning strategies that can positively impact the likelihood of academic success for students diagnosed with FASD. While the academic, social-emotional, and behavioral challenges associated with FASD are vast, teachers and educators alike can positively impact the learning of students diagnosed with FASD by utilizing targeted teaching and learning strategies.

Appendix A

**Student Interest Survey**

1. Do you have any hobbies? If so, what are they?
2. What is your favorite way to spend your free time?
3. What is your favorite book genre(s)? (Example: Fantasy)
4. What is your favorite book(s)?
5. What is your favorite movie(s)?
6. What is your favorite game(s) to play?

7. Is there anything you would like to learn about?
  
8. Is there a particular book or book series that you are interested in reading?
  
9. Is there anything you are interested in having me teach you regarding reading comprehension (understanding what you are reading, while you read)?





7. Do you have any goals for your child as a unique learner and reader? If so, please share:

8. Please share any additional information (including relevant experiences) you feel would be of benefit with the researcher:

## Appendix C

### Participant Learning Needs Survey

**Please note:** Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with The College at Brockport, or the researcher. If you decide to participate, you are free to skip any survey questions or tasks related to the research of this study. You may also withdraw from this study at any time without penalty.

Please answer the survey questions below to the best of your ability. If you are unwilling or unable to answer any of the questions below, simply respond “N/A” or leave the provided space blank.

1. What is your professional title?
2. What agency or office are you employed by/affiliated with?
3. Do you give the researcher consent to include the agency or office name within the research project and correlated campus presentation? (If you are unable to provide consent, please indicate in the provided space)
4. In what capacity do you work/provide services to/interact with the study participant?
5. If any, what tools (formal and informal) have you utilized in assessing the study participant?

6. A.) In your professional opinion, what teaching and/or learning strategies are of benefit to reading comprehension development, in regards to individuals diagnosed with Fetal Alcohol Spectrum Disorder?

B.) To the study participant in particular?

C.) Other special learning needs?

7. Please share any additional information you feel would be of benefit to this study:

Appendix D

## Strategy Effectiveness Form

Date: \_\_\_\_\_

1.	2.	3.
This strategy is not helpful to me; it did not help me understand what I read.	This strategy was somewhat helpful to me as I read; it I might use it again.	This strategy is very helpful to me as I read; I plan to use it again.

1. Strategy name:
2. Using the ranking scale above, how affective was this strategy to your reading comprehension (did it help you understand what you read)?
3. Would you use this strategy to help you better understand what you read? Why?
4. Are you comfortable using this strategy independently, or would you like more practice using it?

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