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Effective Practices and Teacher Self-efficacy in Teaching Reading Comprehension to Learners with Autism Spectrum Disorder

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Effective Practices and Teacher Self-efficacy in Teaching Reading Comprehension to Learners with Autism Spectrum Disorder

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Abstract

Learners with Autism Spectrum Disorder (ASD) often exhibit difficulty in the area of reading comprehension, yet a conducted research synthesis revealed a lack of related evidence-based practices (EBPs) specific to teaching comprehension to learners with ASD. Research connecting the learning needs of students with ASD, existing effective practices, teacher training, and teacher perceptions of their own ability to teach reading comprehension is scarce. The purpose of this study was to address this scarcity, through a focus on teacher perceived self-efficacy, teacher outcome expectancy, and teacher preparedness to use effective practices emerging from the extant research. Quantitative survey methodology and hierarchical regression analysis were utilized to investigate teacher preparedness to use effective practices, along with the job-related factors of experience, administrator support, learner verbal language, and instructional setting, as predictors of (1) teacher perceived self-efficacy, and (2) teacher perceived outcome expectancy teaching reading comprehension to learners with ASD. Study findings, based on 112 teacher participants, revealed a discrepancy between teacher reported effective practices to teach comprehension to learners with ASD, and the practices identified as effective from the research, indicating a potential research to practice gap. Results of the regression analyses identified the variables of teacher preparedness to use effective practices, teacher years of experience, and administrator support as predictors of self-efficacy; and the variables of teacher preparedness to use effective practices, administrator support, and verbal language ability of students as predictors of outcome expectancy. Findings provide a potential roadmap for helping teachers become more self-efficacious in teaching comprehension to learners with ASD through professional development in effective practices, and through provision of ongoing support from principals and administrators.

Effective Practices and Teacher Self-efficacy in Teaching Reading Comprehension to Learners with Autism Spectrum Disorder

CHAPTER I

Introduction

The incidences of children diagnosed with autism spectrum disorder (ASD) in the United States is rising steadily (Center for Disease Control and Prevention (CDC), 2014). The growing prevalence of children with ASD is significantly impacting our U.S. school system, and a need for teachers to utilize research-based instructional practices has been established. Federal mandates in the form of No Child Left Behind (NCLB, 2002) and the Individuals with Disabilities Education Act (IDEA, 2004) require teachers of learners with ASD to utilize research-based practices in making instructional decisions. A review of the literature reveals that concern exists regarding both the use of research-based practices in our classrooms, and methods of disseminating research-based information to classroom teachers (Odom et al., 2005). Furthermore, a research gap exists in the area of teacher perceptions of their own ability to teach academic content, such as reading comprehension, to learners with ASD (Ruble, Toland, Birdwhistell, McGrew & Usher, 2013; Ruble, Usher & McGrew, 2011). Understanding the influences on teacher perceptions and self-efficacy may lead to identifying factors essential to supporting teachers of learners with ASD, and to providing related targeted professional development (Ruble et al., 2011).

Background

The underrepresentation of students with complex disabilities (such as ASD) in studies investigating practices to improve academic skills is of concern (Spooner & Browder, 2015). Research related to comprehension and ASD is of specific concern, as it is well established that

individuals with ASD have difficulty with comprehension (Williamson, Carnahan, Birri & Swoboda, 2014). Evidence of learners with ASD experiencing difficulty with reading comprehension along with a related need for instruction in reading comprehension has been recognized (Whalon, Al Otaiba & Delano, 2009). In contrast to an established need in the area of reading comprehension, learners with ASD frequently demonstrate relative strength in decoding, word recognition, and rote memory (Hagiwara, 2002; Smith & Barnhill, 2001). A review of the literature identifies a need for additional research to better understand this reading disassociation, and to identify related effective practices specific to teaching reading comprehension to learners with ASD. (Huemer & Mann, 2010). The identification of research-based practices that teachers can implement to support students with ASD is necessary to improve access to core content through reading comprehension.

Furthermore, the existing research indicates a need to individualize reading instruction. In a 2013 meta-analysis of predictors of reading comprehension difficulties for learners with ASD, Brown and colleagues note autism should not be associated with one reading profile, indicating a need for teachers to have knowledge of multiple effective practices to customize selection of strategies (Brown, Oram-Cardy & Johnson, 2013). This need to individualize instructional approaches requires teachers to have knowledge of multiple effective strategies and to have skill in differentiating research-based practices to meet the needs of their students. With an increase in autism rates coinciding with an increase in mainstream placements, many teachers are not presently equipped to meet the needs of learners with ASD in the classroom (Brown et al., 2013). The finding that teachers are lacking the knowledge and/or skills to support learners with ASD in the classroom warrants further investigation and understanding in order to provide effective professional development for teachers. This study contributes to the field by identifying

factors influencing teacher self-efficacy in implementing comprehension related instructional practices including teacher preparedness to use research-based practices, and job-related factors.

Statement of the Problem

Evidence-based practices are those which have been shown by high-quality research to produce meaningful outcomes (Torres, Farley & Cook, 2012). The need to identify high quality research is not only federally mandated, it is essential to good teaching. As a result, a dialogue to define the term *evidence-based practice* (EBP), and to identify EBPs to implement in the classroom has transpired (Browder & Cooper-Duffy, 2003; Cook, Smith, & Tankersley, 2012; Odom et al., 2005; Spooner, Knight, Browder & Smith, 2011). Regardless of documented concerns, a comprehensive review of the literature to identify the existing EBPs related to reading comprehension and learners with autism spectrum disorder detailed in Chapter 2 found no EBPs specific to teaching reading comprehension to learners with ASD. Despite the established absence of practices meeting the strict criteria leading to the distinction of evidence-based; however, multiple instructional practices have been found to be effective through empirical study. Specifically, the identified comprehension related *effective practices* include: anaphoric cueing, a technique in which students are taught to look back to referents in text to identify the meaning of words such as pronouns (Solis, McCulley & El Zein, 2013), compare and contrast diagrams (Carnahan & Williamson, 2013) , cooperative learning (Kamps, Barbetta, Leonard & Delquadri, 1994; Kamps, Leonard, Potucek & Garrison-Harrell, 1995), direct/explicit instruction (Flores & Ganz, 2007; Flores & Ganz, 2009; Roux, Dion, Barrette, Dupere & Fuchs, 2014), graphic organizers (Carnahan & Williamson, 2013), question generation (Hua et al., 2012), read-alouds (Mims, Hudson & Browder, 2012), reciprocal questioning (Whalon and Hanline, 2008), story structure maps/character event maps (Stringfield, Luscre &

Gast, 2011; Williamson, Carnahan, Birri & Swoboda, 2014), systematic prompts (Mims, Hudson & Browder, 2012), and a multiple strategy approach. Details related to each identified effective instructional practice for teaching comprehension to learners with ASD are included in Chapter 2.

Based on the problem of an absence of EBPs, coupled with a lack of teacher access to effective practices in the academic content area of reading comprehension identified as an essential need for learners with ASD, research was justified related to identifying the relationship among teacher preparedness to use effective practices, teacher self-efficacy, and job-related factors surrounding teaching reading comprehension to learners with ASD. A primary goal of this study was to glean insight from teachers into their perceptions and experiences surrounding teaching comprehension. Subsequently, this study investigates understanding of teacher experiences in teaching reading comprehension to learners with ASD. This included gathering insight into what is currently happening in the classrooms of teachers of learners with ASD, including what instructional practices teachers feel confident using, and what job-related factors impact their instructional decision-making. Findings provide insight into how to meet teacher needs in practice through professional development.

Furthermore, this study advances our understanding of teacher perceived self-efficacy in teaching reading comprehension to learners with ASD in several ways. It is the first study to examine the associations among teacher use of research-based instructional practices in reading comprehension, teacher perceived self-efficacy in teaching reading comprehension, and teacher outcome expectancy teaching comprehension to learners with ASD. It is also the first study to examine self-efficacy of teachers of learners with ASD in relation to a specific content area, that of reading comprehension. The present study examined these relationships along with the job-

related factors of years of teaching experience, administrator support, learner verbal language ability, and instructional setting. In addition, the study investigated whether preparedness to use effective practices to teach reading comprehension to learners with ASD is a predictor of increased teacher perceived self-efficacy, and/or increased teacher perceived outcome expectancy. For a visual representation of study variables, see figure 1.

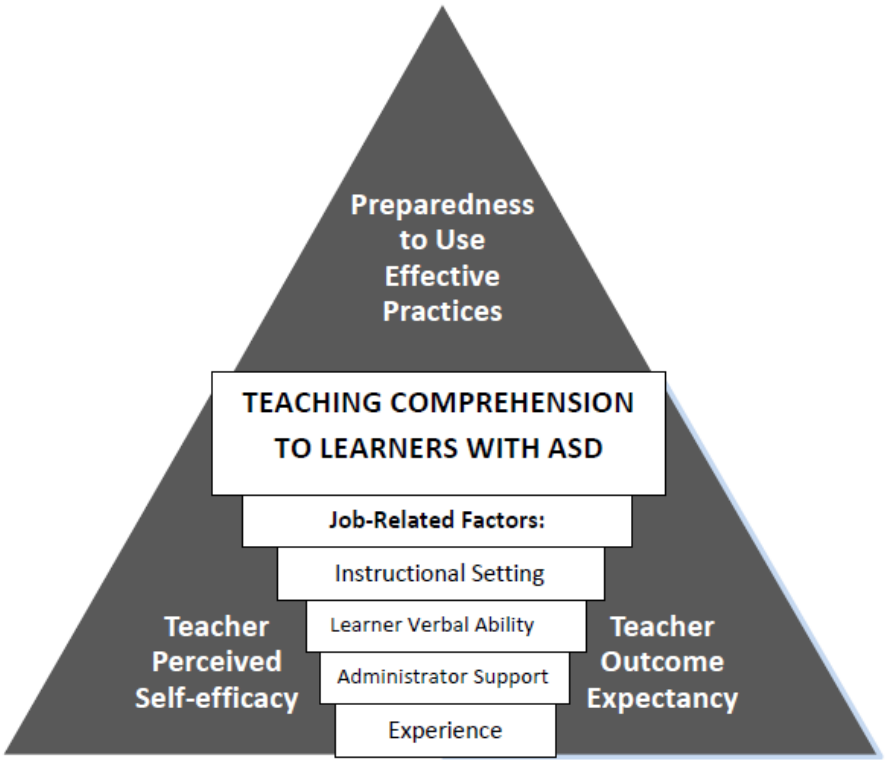


Figure 1. Relationship of variables investigated in present study.

Context of the Study

The context of this quantitative study was a survey of teachers and professionals currently working in diverse classrooms instructing learners with ASD. Participants were required to hold the primary responsibility for planning daily instruction, and to self-identify as a teacher of learners with ASD. The predictive research survey was distributed through the on-line source Survey Monkey. The use of a developed quantitative survey of teacher preparedness to

use effective practices along with a self-efficacy instrument was able to provide a direct method for gathering data relevant to teacher preparedness to use effective practices, teacher self-efficacy, teacher outcome expectancy, and job-related factors. This study aimed to identify findings relevant to future teacher professional development, potentially leading to improved teacher self-efficacy and improved instructional outcomes for learners with ASD in the classroom.

Operational Definitions

For purposes of this study, and in order to establish consistency in reporting findings related to the established research questions and hypotheses, the following operational definitions were employed. In relation to teacher perception, the term *self-efficacy* refers to teacher perceptions regarding their professional ability to effectively carry out instructional practices. The term *outcome expectancy* refers to teacher perceptions regarding their professional ability to promote positive instructional outcomes in their students. Self-efficacy is defined in Bandura's 1997 text, Self-efficacy: The Exercise of Control as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (p. 3). Studying teacher self-efficacy may uncover critical issues related to the effective use of research-based instructional practices (Ruble et al., 2011).

In relation to teacher selected instructional methods, the term *instructional practices* refers to the specific methods and strategies utilized by teachers to involve students in content learning along with related teacher actions. Providing hierarchy to the general term of instructional practices, the term *evidence-based practices* refers to those instructional practices meeting consistent, rigorous empirical demands. Cook, Smith and Tankersley (2012) define evidence-based practices as a "systematic approach to determining which research-based

practices are supported by a sufficient number of research studies that (a) are of high methodological quality, (b) use appropriate research designs that allow for assessment of effectiveness, and (c) demonstrate meaningful effect sizes such that they merit educators' trust that the practice works" (p. 497). While a universally accepted definition of EBP does not exist (Reichow, Volkmar & Cicchetti, 2008), EBPs are considered the gold standard of research-based practices. Presently, no EBPs specific to teaching reading comprehension to learners with ASD have been identified. As a result, this dissertation focused on teacher preparedness to use effective practices. For the purposes of this study, *effective practices* refers to research-based practices proven to be effective through quantitative research, but not meeting the strict criteria to be deemed evidence-based. The specific instructional practices deemed to be *effective practices* to teach reading comprehension to learners with ASD within this study (anaphoric cueing, cooperative learning, direct/explicit instruction, graphic organizers, story structure maps/character event maps, compare and contrast diagrams, question generation, read-alouds, reciprocal questioning, systematic prompts, and a multiple strategy approach) are detailed in Chapter 2, the review of the literature.

Purpose

Findings emerging from a review of the extant literature indicate reading comprehension instruction for learners with ASD is an established area of need, however, no EBPs specific to teaching reading comprehension to learners with ASD are identifiable, and effective practices have been recommended in isolation, and may not be readily accessible to teachers. Research connecting learning needs of students with ASD, effective practices, teacher training, and teacher perceptions of their own ability to teach reading comprehension to learners with ASD is scarce. This study was conducted to address this scarcity, through a focus on teacher perceived self-

efficacy, teacher outcome expectancy, and teacher preparedness to use effective practices related to teaching reading comprehension to learners with ASD.

Specifically, this study proposed to investigate teacher preparedness to use effective practices to teach reading comprehension to learners with ASD, and teacher job-related factors of experience, administrator support, learner verbal language, and instructional setting, as predictors of (1) teacher perceived self-efficacy in teaching comprehension to learners with ASD, and (2) teacher perceived outcome expectancy regarding their professional ability to improve the comprehension of learners with ASD. Detailed research questions and hypotheses aligned to study purpose follow.

Research Questions and Hypotheses

Research Question 1: What current effective practices for teaching reading comprehension do teachers report using in the classroom? For purposes of this study effective practices were identified as: anaphoric cueing, compare and contrast diagrams, cooperative learning, direct/explicit instruction, graphic organizers, question generation, read-alouds, reciprocal questioning, story structure maps/character event maps, systematic prompts, multiple strategy approach. Researchers have expressed concern regarding the quality of practices implemented in classrooms and the best method through which to disseminate research-based practices to classroom teachers (Odom et al., 2005). In a study surveying public school teachers in Georgia specific to their use of general EBPs to teach learners with ASD, the five primary utilized practices were not evidence-based reflecting a gap in teacher used practices in relation to the current research (Hess, Morrier, Heflin & Ivey 2008). As a result, it was expected that teachers lack access to the current research related to effective practices and comprehension.

Research Question 2 and Research Question 3 shared the same predictor values of

teacher use of effective practices and teacher job-related factors, yet differed in the criterion variables investigated, with Research Question 2 focusing on teacher perceived self-efficacy, and Research Question 3 focusing on teacher perceived outcome expectancy. Research Question 2: Is teacher preparedness to use effective practices along with the job-related factors of teacher experience, administrator support, learner verbal language ability, and instructional setting predictive of teacher perceived self-efficacy in teaching comprehension to learners with ASD? Research Question 3: Is teacher preparedness to use effective practices along with the job-related factors of teacher experience, administrator support, learner verbal language ability, and instructional setting predictive of teacher perceived outcome expectancy regarding their professional ability to improve the comprehension of learners with ASD?

Research warrants investigating teacher use of effective practices and job-related factors as predictors of self-efficacy and outcome expectancy. In a related study, researchers found that teachers with an understanding of effective practices and their theoretical underpinnings have a higher level of self-efficacy than teachers without this understanding (Jennet, Harris & Mesibov, 2003). Upon relating these findings to teacher use of effective practices to teach reading comprehension related to perceived efficacy and outcome expectancy, it was hypothesized that teacher use of current effective practices would be a predictor of both teacher perceived self-efficacy and outcome expectancy.

Furthermore, it was hypothesized that teacher job-related factors would be predictors of self-efficacy. Siwatu and colleagues found that teacher beliefs about their own capabilities fluctuate depending on the current context and task (Siwatu, Frazier, Osaghae & Starker, 2011). For classroom teachers, access to evidence-based research holds the potential to increase student educational outcomes (Mazzotti Rowe & Test 2012; Torres et al., 2012). As a result it was

expected that teacher perceived self-efficacy and outcome expectancy would be predicted by not only preparedness to use effective practices, but also by years of experience implementing such practices, and the context related job factors of learner ability, inclusiveness of setting, and support of administrators as indicated by the following hypotheses. Hypothesis 2: Teacher preparedness to use effective practices, along with the job-related factors of teacher years of experience, administrator support, learner verbal ability, and/or instructional setting will predict teacher perceived self-efficacy. Hypothesis 3: Teacher preparedness to use effective practices, along with the job-related factors of teacher years of experience, administrator support, learner verbal ability, and/or instructional setting will predict teacher perceived outcome expectancy.

Importance of Reading Comprehension

This study provides guidance for teacher education and implementation of effective practices leading to increased teacher self-efficacy and student outcomes in reading comprehension, an established area of need. Learners with ASD show improved outcomes when teachers use EBPs to individualize instruction to meet the unique needs of the learners, and research to identify strategies that promote teacher efficiency and student outcomes is needed. (Carnahan, Musti-Rao & Bailey, 2009). Providing instruction in reading comprehension is essential to all students regardless of perceived abilities or communication needs (Carnahan et al., 2009). Specifically, comprehension instruction promotes active thinking skills and application of thinking processes (Browder et al., 2009). Learning to comprehend text teaches thinking and includes allowing students to monitor themselves throughout daily lessons (National Institute of Child Health and Human Development (NICHD), 2000). The ability to comprehend text goes beyond academic success, further extending success needed to be a lifelong learner (NICHD, 2000).

The promotion of thinking skills related to comprehension is essential to promoting quality of life for learners with ASD. Literacy skills are critical for quality of life in areas such as living in a community, shopping in a store, and communicating with employees, friends, and family (Carnahan et al., 2009; Alberto, Fredrick, Hughes, McIntosh & Clark, 2007). Furthermore, the use of effective practices to teach comprehension to learners with ASD is crucial as instruction in comprehension may carry over to socialization (Smith & Barnhill, 2001). Effective and evidence-based practices are needed in academic core content areas, including that of reading comprehension, to best serve a growing population of learners with ASD.

Summary

In summary, given the paucity of research related to teaching reading comprehension to learners with ASD, the present study aimed to investigate if teachers are using current effective practices, if teachers are self-efficacious in implementing effective practices to teach reading comprehension, and if job-related factors influence teacher readiness to instruct individuals with ASD. The focus of this study was to address the established gap in the use of effective practices to teach reading comprehension to learners with ASD, through exploration of both teacher reported preparedness to use effective practices, and teacher confidence in their ability to promote learning in students with ASD. In addition, this study investigated teacher preparedness to use effective practices in teaching reading comprehension to learners with ASD along with job factors as predictors of increased teacher self-efficacy and outcome expectancy, with a goal of gathering information to direct both future research and future professional development for teachers. Chapter 2 provides a thorough review of the literature related to EBPs and effective practices to teach reading comprehension to learners with ASD.

CHAPTER II

Review of the Literature

This literature review explored the research related to reading comprehension and individuals with autism spectrum disorder (ASD). Rates of ASD continue to rise, yet teachers are not receiving the training needed to meet the needs of learners with ASD in the classroom (Brown et al., 2013). This identified lack in teacher knowledge of how to support learners with ASD in the classroom supports investigation to identify teacher needs, and related, effective professional development. This chapter (a) begins with a review of the characteristics of learners with ASD relevant to reading comprehension along with the importance of research-based instructional practices, (b) reviews EBPs and effective instructional practices along with a connection to learning profiles, and finally (c) concludes with consideration of teacher self-efficacy along with implications for future professional development.

Characteristics of Learners with ASD and Reading Comprehension Need

Results of a Center for Disease Control and Prevention (CDC) study, released March 28, 2014, estimate "1 in 42 boys" and "1 in 68 children" in the United States is currently identified with an autism spectrum disorder. This 29% increase from the previous 2012 report is based on evaluation of data collected in 2010 (CDC, 2014, p. 1). With incidences of ASD increasing steadily, it can be assumed the prevalence of children with autism is significantly impacting our U.S. educational system, establishing a need to identify research-based educational strategies that best meet the needs of this population.

ASD diagnosis criteria. In May of 2013, the American Psychiatric Association (APA) published the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) including an updated criteria to diagnosis ASD. This new diagnostic criteria is meant to improve

reliability and validity in diagnosis (APA, 2012) based on a need to "increase diagnostic sensitivity and specificity" (Huerta, Bishop, Duncan, Hus & Lord, 2012, p. 1056). The DSM-5 eliminated a specific Asperger Syndrome diagnosis; as a result, Asperger Syndrome will not be discussed in isolation from ASD in this report of the literature. An examination of the DSM-5 criteria reveals that the three previously separate categories of *social behaviors*, *communication behaviors*, and *repetitive behaviors* are combined into two as "deficits in communication and social behaviors are inseparable and more accurately considered as a single set of symptoms with contextual and environmental specificities" (APA, 2012, Rationale, para. 3).

Moreover, ASD criteria require symptoms in both identified main categories of "social communication and social interaction" and "restricted, repetitive patterns of behavior," but do not identify individuals with ASD in relation to cognitive ability (APA, 2012, para. 1-2.). While research often notes deficits of individuals with ASD in terms of cognition, cognition is not a component of current or past DSM criteria. Reference to cognitive deficits found in reviewed research is referred to in this literature review in terms of social thinking and executive thinking deficits.

Social thinking skills profile and ASD. According to Gutstein and Whitney (2002), individuals with ASD exhibit deficits in social thinking related to the core areas of, "social and emotional coordination," "co-regulation," "social referencing," "joint attention," and comprehending "theory of mind (ToM)," all of which relate to differences in the identified area of "experience sharing relationships" (p.164-167). It has been established and repeated throughout the research that ToM is a core deficit of ASD (Baron-Cohen, 2001; Colle, Baron-Cohen & Hill, 2007; Griswold, Barnhill, Myles, Hagiwara & Simpson, 2002). Colle and colleagues confirm that ToM is essential to comprehension of social interactions; "the ability to

understand that a person has feelings, thoughts and beliefs that may not match reality is an important aspect of social understanding referred to as possessing a theory of mind" (2007, p. 716). Gutstein and Whitney (2002) explain theory of mind as "the failure of people with autism to take the perspective of others when it is different from their own" (p. 166). While Griswold et al. (2002) note there are disagreements among researchers regarding identifying commonality in ToM among those with ASD, there is consensus that a deficit in perspective taking impacts critical comprehension of language.

Furthermore, social perspective taking difficulties may affect ability to comprehend metaphors, irony and idioms in text (Norbury, 2004). Individuals with ASD often incorrectly use pronouns, and struggle with grammatical aspects of language such as sentence semantics (O'Connor & Klein, 2004), and these difficulties may directly affect reading comprehension. Social thinking skills deficits also relate to anxiety and joint attention issues for learners with ASD, with Smith, Mirenda, and Zaidman-Zait (2007) identifying a relationship between maintaining joint attention with a partner and vocabulary development, and Trembath, Germano, Johanson, and Dissanayake (2012) reporting social interactions and concern for others can cause anxiety for learners with ASD, ranging from fearful anticipation to impaired overall functioning. In a 2013 meta-analysis of predictors of reading comprehension difficulties for learners with ASD, text that required social understanding proved difficult, while in contrast little difficulty was evident when comprehending text without required social knowledge (Brown et al., 2013).

Executive thinking skills profile and ASD. In addition to social thinking difficulties, executive thinking deficits evident in learners with ASD negatively impact reading comprehension (Adams & Jarrold, 2009; Carnahan, Williamson & Christman, 2011; Klecan-Aker & Gill, 2005; Myles et al., 2002; Ricketts, 2011; Whalon & Hart, 2011b). According to

Ricketts (2011), "reading comprehension is a complex skill dependent on a number of cognitive processes. For example, to understand written text, words need to be recognized and their meanings accessed, relevant background knowledge also needs to be activated and inferences generated as information is integrated during the course of reading" (p. 1111). This process takes "executive control" defined by Adams and Jarrold (2009) as "the ability to engage in internally generated goal-directed behaviour, rather than being driven by goal-irrelevant external stimuli" (p. 1). Furthermore, reading comprehension is negatively impacted by "weak central coherence" relevant to executive thinking and defined by Carnahan et al. (2011) as "attention to details rather than the whole" (p. 57). Learners with ASD were found to "have difficulty integrating new and existing knowledge and experiences and accessing stored information when needed" as a result of weaknesses in areas related to executive functioning (Williamson, Carnahan & Jacobs, 2012, p. 451).

Challenges related to executive control influence reading comprehension in the classroom, and consequently result in a need for explicit strategy instruction such as in establishing purpose prior to reading and providing related strategies during reading (Carnahan et al., 2011). Learners with ASD were found to display comprehension levels at a lower level when left to read silently without auditory and/or visual supports, and were found to struggle when then asked to make related inferences (Myles et al., 2002; Whalon & Hart, 2011b). Myles et al. (2002) also found that learners with ASD struggle with silent readings tasks, even when they have reading levels on par with their school age peers. This finding identifies a need for changes in instruction from silent reading that is typical beyond the lower elementary level to teacher guided oral reading.

Further study of effective instructional strategies to ameliorate identified social and

executive thinking deficits and their connection to comprehension is warranted. Executive functioning, ToM, and WCC are widely considered as contributing to the cause of comprehension difficulties for learners on the autism spectrum, however there is a gap in considering these theories in relation to instructional practices (El Zein, Solis, Vaughn & McCulley, 2014).

Decoding skills and reading comprehension profile of learners with ASD. Much of the research of the last decade has been to answer the question as to whether high or average decoding skills in learners with ASD along with low comprehension skills support a universally accepted profile of the disorder; henceforth, there is a consensus in the research that individuals with ASD as a group do not exhibit generalized deficits in decoding, frequently excelling in the areas of phonics, word recognition, and fluency, and often exhibiting severe deficits in reading comprehension (Brown et al., 2013; Carnahan, Williamson & Haydon, 2009; Chiang & Lin, 2007; Gately, 2008; Griffin, Griffin, Fitch, Albera & Gingras, 2006; Griswold et al., 2002; Huemer & Mann, 2010; O'Connor & Klein, 2004; Ricketts, 2011; Whalon & Hart, 2011b).

A review of the research by Ricketts (2011) found that characteristics of ASD, including ability in relation to verbal language, oral language, and working memory appear to directly correlate with noted success in word recognition and reading comprehension. "As word recognition improves, the ability to read and understand texts is increasingly determined by oral language skill" (Ricketts, 2011, p. 1112). Furthermore, there is a correlation between strong phonemic awareness skills and becoming a successful reader; however, this correlation is not consistent in learners with ASD who often display deficits in oral language ability (Browder, et al., 2009).

Whalon, Al Otaiba and Delano reviewed the literature with a focus on the five

components of reading as identified by the National Reading Panel (NRP) (2009). The NRP Report by the National Institute of Child Health and Human Development (NICHD) established a solid guideline for the instruction of reading, breaking instruction into the five major categories of phonemic awareness, phonics instruction, fluency, vocabulary, and text comprehension (2000). Whalon and colleagues' found evidence of learners with ASD experiencing greater difficulty with reading comprehension than word reading resulting in an identified need for instruction in reading comprehension with emphasis in the early elementary grades. Specific to comprehension, Whalon and colleagues' identified cooperative learning, anaphoric cueing, and one-to-one direct instruction as promising interventions to facilitate reading comprehension improvement in students with ASD. Similarly, Chiang and Lin (2007) analyzed the literature to confirm correlations between high word recognition and low reading comprehension in a subgroup of school age learners with ASD. Additional research "examining the disassociation between decoding and comprehension in ASD is needed to understand the origin of this asymmetry and to develop more effective treatment" (Huemer & Mann, 2012, p. 491).

In contrast to established reading comprehension deficits, learners with ASD do demonstrate relative academic strength in not only decoding and word recognition, but also skills requiring recall (Hagiwara, 2002; Smith & Barnhill, 2001). Hagiwara (2002), and Smith and Barnhill (2001) conclude that rote memory is an identified strength of individuals with ASD, and as a result, learners excel in tasks related to rote knowledge and facts. Furthermore, Rumpf, Kamp-Becker, Becker and Kauschke (2012) conclude that school learners with ASD demonstrate relative academic strength in tasks such as grammar. This identified need for targeted reading comprehension remediation leads to a focus on teacher selected instructional practices.

Importance of Teacher Selected Instruction Practices

According to the National Institute of Child Health and Human Development (NICHD, 2000), teacher instruction in reading comprehension is "intimately linked to learners' achievement in this area" (p. 13). "Traditional reading instruction is not suitable for children with severe disabilities. In order to promote reading and writing in this group of children, it is necessary to explore new instructional strategies" (Basil & Reyes, 2003, p. 28). Educators must identify and incorporate "functional, meaning-based literacy activities" into reading instruction in order for learners to understand and connect to text (Lanter, Watson, Erickson, & Freeman, 2012, p. 322).

Whalon & Hart (2011b) studied reading comprehension instruction in the classroom environment. Observations and analysis of instruction in kindergarten through fifth grade classrooms found that explicit reading comprehension instruction was non-existent, equivalent to ineffective teacher-led questioning in the upper elementary grades, and a focus on phonics instruction in the lower elementary grades. Whalon and Hart (2011b) found that a focus on learning to read in the lower grades and an expectation that learners could comprehend text to learn content in the upper grades did not meet the needs of learners with ASD. Typical upper elementary teacher-lead discussions involved learner read-alouds followed by teacher questioning. When teacher questioning posed a challenge for learners with ASD, teachers provided verbal support and scaffolding by reducing questioning, providing choices, and using an emphasis on lower order thinking skills. This use of verbal teacher supports, while expected to help learners succeed, was actually harmful to learners with ASD in terms of both comprehension and singling them out socially as less than competent in the inclusive setting (Whalon & Hart, 2011b).

Teacher directed questioning also impacted regular education learners in the inclusive setting, as "the largely teacher-directed questioning…resulted in all learners generally assuming the passive role of responder as opposed to coconstructor of knowledge" (Whalon & Hart, 2011b, p. 253). Learners with ASD often do not gain from such a teacher directed "traditional format because this limits their activities through constraints imposed by the teacher and does not give them opportunities for active and self-directed" thinking (Basil & Reyes, 2003, p. 28). This research establishes a need for teachers to utilize research-based practices beyond the traditional format proven to support learners with ASD.

Furthermore, there is no one profile of learners with ASD resulting in a need to individualize instruction. In the 2013 meta-analysis of predictors of reading comprehension difficulties for learners with ASD, Brown and colleagues note autism should not be associated with one reading profile, and information about the individual learner must be considered. This need to focus on each individual learner adds complexity to the role of teacher and a need to have knowledge of multiple effective strategies to customize selection to meet the needs of each individual learner. Further research is necessary to identify the factors influencing teacher readiness to instruct individuals with ASD such as identifying the existing EBPs to teach reading comprehension, and assessing teacher knowledge and teacher self-efficacy in implementing these instructional practices.

Autism Spectrum Disorder & Evidence-Based Practices

Federal mandates in the form of No Child Left Behind (NCLB, 2002) and the Individuals with Disabilities Education Act (IDEA, 2004) require teachers of learners with disabilities to utilize research-based practices in making educational decisions. These mandates have resulted both in a research dialogue to define the term evidence-based practice (EBP), and in the

identification of EBPs to support classroom instruction (Browder & Cooper-Duffy, 2003; Cook et al., 2012; Odom et al., 2005; Spooner et al., 2011). Adherence to the use of EBPs is important to improving outcomes for special education learners who often have academic and behavioral difficulties (Kretlow & Blatz, 2011). Moreover, as a result of federal mandates requiring schools to utilize scientifically based programs, designating research as evidence-based has substantial legal ramifications for special education, including educating learners with autism (Mesibov & Shea, 2011). Concern exists regarding both (1) the quality of practices implemented in our classrooms, and (2) the best method of disseminating essential research information (Odom et al., 2005).

All learners with ASD are unique, and these differences create an explicit need for teachers to identify individualized approaches to academic goals including that of reading comprehension outcomes (Mayton, Wheeler, Menendez & Zhang, 2010). Meeting the unique needs of each individual learner through teacher knowledge of research-based practices is essential. The use of EBPs is especially applicable to the population with ASD due to (a) the continuously increasing prevalence, (b) the complex characteristics and need for individualization of practices, (c) the unique position of caregivers as vulnerable consumers of treatments, (d) an availability of "questionable treatments" and, (e) teacher requirement to comply with federal regulation and increase learner outcomes (Mayton et al., 2010).

Current state of EBP criteria and single-subject research. Special education research is particularly complex due to the variability of participants and contextual settings (Odom et al., 2005). Subsequently, special education research by nature frequently focuses on single-learner or small group, single-subject studies to establish efficacy of educational treatments and strategies (Horner et al., 2005). Single-subject research meets the needs of special education

teachers through emphasis on: learners as individuals; replicable methods of testing interventions; cost effective strategies; and a frequent focus on external and social validity providing practical, generalizable findings (Horner et al., 2005). Despite the benefits of single-subject research for classroom teachers and parents, a lack of consensus exists on defining single subject research as evidence-based (Horner et al., 2005; Spooner et al., 2011).

In order to gain understanding of the current state of research related to EBPs and learners with ASD, a further review of the research was conducted consisting of a computerized search of the ERIC, OMNI, and SAGE databases using combinations of the keywords: *EBP*, *evidence-based*, *autism*, *ASD*, *reading*, and *comprehension*. Findings remained limited, so as a result the search was expanded to address this gap and the terms *academic*, and *special education* were searched in lieu of the terms *reading* and *comprehension*. As a result, over 100 articles were acknowledged, however a review of articles found many focused on issues and treatments not relevant to this purpose (e.g. a medical emphasis). Subsequently, an ancestral hand search of articles from the reference sections of relevant studies was performed. Findings related to EBPs and EBP identification criteria follow.

The search of the literature identified three primary standards being implemented to categorize single-subject research as evidence-based (Horner et al., 2005; Reichow et al., 2008; Kratochwill et al. 2013). Acknowledging the research to practice gap, Horner and colleagues (2005) developed standards for designating single-subject research as evidence-based, characterizing single-subject research as "a rigorous scientific methodology used to define basic principles of behavior and establish evidence-based practices" (p. 165). In 2008, Reichow and colleagues built upon the foundation established by Horner et al., specifically, strengthening the focus on experimental control including fidelity of strategy implementation, inter-observer

agreement, generalizability, and maintenance standards, through development of "the Evaluative Method for Determining EBP in Autism" to enhance usability of results for learners with ASD. Most recently, in 2013, Kratochwill and a panel of researchers for the What Works Clearinghouse established single-subject design standards applicable to experimental and quasi-experimental EBP criteria. The quality standards are rigorous and require researchers to document at least three attempts to demonstrate the intervention, and the inclusion of at least 3 data points (Kratochwill et al., 2013). Due to the lack of existing research relevant to learners with ASD coupled with the rigor of EBP criteria, the current state of identified instructional EBPs remains limited.

EBP research and EBP databases. The search of the literature uncovered several comprehensive reviews specific to EBPs and autism, but not specific to reading comprehension. Chronologically, Odom and colleagues (2003) conducted a review and analysis of single subject design EBPs for young children with ASD from 1990-2002; Mayton and colleagues published a review of the literature in 2010 applying the Horner et al. 2005 criteria to ten years of research spanning from 2000-2009; and, Mesibov and Shea prepared a comprehensive report in 2011 examining clinical ASD research to strengthen recommendations for effective instruction for educators and parent practitioners. EBPs specific to reading comprehension and students with ASD were not identified in any of these comprehensive reviews.

Unfortunately, classroom teachers lack both the time to search for evidence-based treatments, and the access to information related to research-based practices (Kretlow & Blatz, 2011). In an effort to make EBPs readily available to practitioners, multiple research organizations have established free, on-line information databases including the What Works Clearinghouse (WWC), the Best Evidence Encyclopedia (BEE), and the Promising Practices

Network (Kretlow & Blatz, 2011). See on-line clearinghouses; Table 1. The various research organizations have also identified criteria for EBP designation and for identifying research quality (Odom et al., 2005). Despite the available databases, teachers report a lack of knowledge in accessing empirical research (Burns & Ysseldyke, 2009; Mazzotti, Rowe & Test, 2012). This supports a need to gather information regarding teacher knowledge in order to provide appropriate professional development to support teachers and learners through the use of training in effective instructional practices in the classroom.

Table 1

Recommended Sites for Evidence-Based Practices: Instructing Learners with ASD

	What Works Clearinghouse (WWC) Source: http://ies.ed.gov/ncee/wwc/ Single Study Reviews	**National Autism Center (NAC)** Source: http://www.nationalautismcenter.org/affiliates/reports.php Educator Manual Also called-National Standards Project	**The National Professional Development Center on ASD (PDC)** Source: http://autismpdc.fpg.unc.edu/content/evidence-based-practices Autism Internet Modules http://www.autisminternetmodules.org/user_mod.php
Site Basics	• Established by the U.S. Department of Education, Institute of Education Sciences in 2002 • Provides Single Study Reviews • Provides educator intervention reports, practice guides, and resources	• Established by the National Autism Center, primarily funded by the Autism Education Network • Provides a research summary for each identified EBP including examples and implementation methods for teachers	• Established as a multi-university professional development center in 2007; funded by the U.S. Department of Education, Office of Special Education Programs • Provides a research summary (module or brief) for each identified EBP including implementation methods for teachers, supplemental materials and generalization strategies
Site Purpose	• Purpose- to establish a trusted dissemination source of credible research identifying *what works* in education • To support educators in making informed decisions about education programs, policies, and practices	• Purpose- to identify evidence-based educational and behavioral treatments addressing the core characteristics of ASD • To help parents, educators, and practitioners integrate critical information in making treatment decisions	• Purpose- to work with state agencies to build capacity and increase the number and quality of practitioners • To promote EBPs for early intervention and for education of children and youth with ASD
Site Focus	• EBP for K-12 learners • Focus areas: early childhood ed., math, literacy, science, learners with disabilities, postsecondary ed., behavior, teacher education	• Reviewing educational and behavioral treatments (biomedical interventions are excluded) for children and young adults with ASD (under 22)	• Identifying evidence-based treatments and strategies for individuals with ASD
Resources Available	• Single study reviews • Intervention reports • Single study reviews • Quick Reviews • Reference Resources	• 11 Established Treatments • Educator manual • Parent's guide	• 24 Autism Internet Modules (AIM) • Modules provide both introductory and advanced research resources And usable forms (i.e. data collection) • Includes EBP briefs

Research Synthesis to Identify Effective Practices for Teaching Reading Comprehension

Due to the complete absence of EBPs specific to learners with ASD, a research synthesis was designed to identify *effective practices* relevant to supporting learners with ASD in the area of reading comprehension. For the purposes of this study, effective practices can be defined as research-based practices identified through high quality quantitative study, but not yet meeting the criteria needed to obtain EBP designation. While the National Reading Panel (NRP) Report (NICHD, 2000) is now over a decade old, it has remained a significant guideline for the instruction of reading since its publication. As a result, it was used as a keyword framework for identifying current research and related effective instructional practices. The NRP identifies specific instructional methods for teaching reading comprehension including methods related to both vocabulary instruction and text comprehension. A summary of the NRP Report by the International Reading Association (2002, p. 12) identifies six evidence-based strategies recommended for vocabulary instruction: "keyword method," "incidental learning," "repeated exposure," "pre-teaching of vocabulary," "restructuring reading material," and "context method," however an expanded search of the literature using the terms *autism, vocabulary* and each strategy resulted in no related findings. In terms of comprehension, eight evidence-based practices are recommended by the NRP: "comprehension monitoring," "cooperative learning," "use of graphic organizers," "question answering," "question generation," "story structure," "summarization," and a "multiple strategies" approach (International Reading Association, 2002, p. 14). When used as search terms, results were identified relevant to learners with ASD for the strategies: cooperative learning, graphic organizers, question generation, story structure, and a multiple strategies approach. In addition, further studies beyond those mentioned by NRP were identified from a continuous search of reference lists in the areas of: anaphoric cuing, direct

instruction, and systematic prompting. An inclusion criteria and coding guide was established and applied to identify only studies utilizing quantitative methodology with high quality research design.

Inclusion criteria. In order to identify *effective* research-based instructional practices from the quantitative studies garnered through the search results, the developed inclusion criteria required each included study (a) use a true or quasi-experimental group, or single-case research design; (b) include baseline and intervention data specific to learners diagnosed with ASD, and (c) include reading comprehension as a dependent variable. Inclusion criteria limited studies to the specific population of learners with ASD, encompassing learners with a diagnosis of ASD, PDD, PDD-NOS, Asperger Syndrome or a dual diagnosis including ASD. Studies focusing on groups of learners including some participants with ASD were excluded unless the study provided separate data points for the population with ASD. In terms of setting, criteria included learners with ASD in all grade levels, K-12, and all school settings, including both private and public schools, and both self-contained special education and inclusive classroom settings.

Furthermore, the dependent variables measured throughout each included study were limited to forms of reading *comprehension.* Included research explores reading interventions measuring learner understanding of text (i.e. passage comprehension, making inferences, understanding analogies). Studies measuring the effect of interventions on the ability of learners with ASD to learn to read (decoding, fluency) with and without a dual focus on comprehension were excluded, unless the studies reported the specific comprehension data points separately.

Coding procedures. A single-case design coding guide was developed for this research synthesis using the guidelines recommended by Cooper (2010). Specifically, coding began with consideration of Cooper's eight identified primary categories of reporting, independent variable,

setting, participants, dependent variable, research design, data outcomes, and coder characteristics as the starting point for guide development. As a second step to coding guide development, a small sampling of studies were read prior to drafting the guide to identify general themes related to both instruction of students with ASD, and implementation of reading comprehension strategies. Thirdly, an initial list of study characteristics was constructed. This list was then assessed relevant to reading comprehension and students with ASD and revised. For example, the coding characteristic of urban/suburban setting was eliminated and coding for specific type of reading material (novel, passage, or sentence) was added to ensure the coding guide categories directly embodied the characteristics that define reading comprehension and students with ASD. Continuing the process, adapting Cooper's recommendations to single-case design and utilizing the organizational framework of Santangelo and Graham (2012) as an exemplar, an initial coding guide was drafted to facilitate gathering the list of generated theme specific characteristics.

The coding guide was next shared with an experienced researcher and with multiple doctorate student peers and finalized based on feedback. For example, the coding of ceiling and floor effects was added to the quality indicators. As a quality check, one study was coded by a doctorate student colleague, resulting in 100% inter-rater reliability. A copy of the coding guide developed for this research synthesis can be found in Appendix A.

Findings. Thirteen studies met inclusion criteria, with 12 utilizing a single-case design. Six of the studies used a multiple baseline across participants design (Hua et al., 2012; Kamps et al., 1994; Mims et al., 2012; Stringfield et al., 2011; Whalon & Hanline, 2008; Williamson et al., 2014), three used an ABAB design (Carnahan & Williams, 2013; Kamps et al., 1995a; Kamps et al., 1995b), two used a multiple baseline across behaviors design (Flores & Ganz, 2007; Flores &

Ganz, 2009), and one used an alternating treatments design (Solis et al., 2013). The final study utilized a randomized experimental design (Roux et al., 2014).

In addition to the included research, six additional studies were identified and excluded. Exclusions were due to a lack of baseline criteria, to a group data reporting format in which specific data for students with ASD was not available, and to a format in which data specific to comprehension was not available.

Furthermore, with the goal of staying current and further strengthening data contained in this dissertation, ongoing searches of the literature for new findings are continuous by this researcher. In late 2014, the first and only published comprehensive research synthesis on reading comprehension interventions for learners with ASD emerged (El Zein et al., 2014). The research synthesis both confirms prior effective practice conclusions identified in this synthesis, and further strengthens a need to support the challenges faced by teachers related to the unique demands of teaching comprehension to learners with ASD in the classroom. El Zein and colleagues established inclusion criteria and reviewed findings of research studies to answer the question, "How effective are reading comprehension interventions in improving reading comprehension outcomes for learners identified with ASD (El Zein et al., 2014)?" The search resulted in the identification of 12 studies covering the literature from 1980 to 2012.

Specifically, El Zein and colleagues also reported the strategies resulting from four studies as effective: Flores and Ganz (2007 & 2009), Stringfield et al. (2011), and Whalon and Hanline (2008). A discrepancy emerged in the research related to a fifth study on cooperative learning; El Zein and colleagues found the cooperative learning research (Kamps et al. 1994 & 1995) to be suggestive, not effective, due to absence of fidelity measures. In addition, El Zein and colleagues also included one study in their research synthesis excluded by this researcher's

inclusion criteria.

In terms of identifying different studies, El Zein and colleagues identified five studies not included by this researcher (Asberg & Sandberg, 2010; Campbell, 2010; Kamps, 1989; Knight, 2010; Van Riper, 2010) however these studies were not deemed effective primarily due to a lack of fidelity measures. Finally, El Zein and colleagues did not include in their synthesis multiple studies included in this dissertation, likely because they were published after the initial search by the researcher group, including studies related to anaphoric cueing (Solis et al., 2013), character event maps (Williamson et al., 2014), compare and contrast strategies (Carnahan & Williamson, 2013), explicit instruction (Roux et al., 2014), question generation (Hua et al., 2012), and systematic prompting (Mims et al., 2012).

A primary focus of the literature review was to identify the existing effective and evidence-based practices related to reading comprehension and learners with autism spectrum disorder. Despite the established absence of EBPs, multiple instructional practices were found to be effective. A functional relation was established between increased reading comprehension of learners with ASD and each of the identified *effective* instructional practices of *anaphoric cueing*, *cooperative learning*, *direct/explicit instruction*, *graphic organizers* (including compare and contrast charts), *question generation*, *story structure maps/character event maps*, and a *multiple strategy approach* including reciprocal questioning, systematic prompts and read-alouds). A summary of study details related to each identified effective instructional practice for teaching comprehension to learners with ASD follows, and can be found in Table 2.

Table 2

Effective Practices to Teach Reading Comprehension to Students with ASD

a. Practices	*b. Author,*	*c. Data points*	*d. Findings*
Anaphoric Cueing	Solis et al. 2013.1	RCA- Rdg Comp Q Mean (M): B- 68.75% I- 92.5%	ᵛ**Effective**: 2/2 students increased passage comprehension using anaphoric cueing intervention, a 24% mean increase baseline to intervention. (Alt. Treatment Design/see Question Generation below)
Cooperative Learning	Kamps et al., 1994	RCA- 5 Rdg Comp Qs (5Ws) M: B-46% I1-78% B- 64% I2-89%	ᵛᵐ**Effective**: During classwide peer tutoring with a cooperative role reversal, 3/3 students increased correct responses to wh questions, a 43% increase.
	Kamps et al., 1995a	RCA- 5 Rdg Comp Qs (5Ws) M: B-27% I1-52% B- 25% I2- 58%	ᵛᵐ**Effectiv**e: One student increased correct responses to reading comprehension questions while responding to novels with peers, a 31% increase B to I
	Kamps et al., 1995b	RCA- 10-12 Rdg Comp Qs # answered correctly B-1 I1-3 B-1.25 I2-3.5	**Inconclusive**: 2/2 students using 5th grade level novels with peers displayed variability in pre/post test scores. As a result, the intervention was modified to basal readers at their level, a minimal 2% -3% increase.
Direct/Explici Instruction	Flores & Ganz, 2007	RCA- Reading Comp. Q M: Inferences Facts Analogies B-18 I-91 B-0 I-89% B-27 I-90%	ᵛ**Effective**: 2/2 students showed gains in all 3 reading comprehension skills of analogies, statement inferences and facts on researcher created probes (mean of all 3 categories) , a 75% mean increase B to I.
	Flores & Ganz, 2009	RCA- Reading Comp. Q M: Analogies Inductions Deductions B-25 I-100 B-0 I-88% B-15 I-87%	ᵛ**Effective**: 2/2 students showed gains in all 3 reading comprehension skills of analogies, deductions, and inductions on reading probes (mean of all 3 categories) , a 78% mean increase B to I.
	Roux et al., 2014	RCA- Post Test Vocabulary- effect size 1.06 Main Idea- effect size .92	ᵛ**Effective**: In a randomized experimental design of 43 students with ASD across 6 elementary schools, explicit instruction along with visual boards resulted in increased intervention group results.

Graphic Organizer (compare-contrast)	Carnahan & Williamson, 2013	RCA- Reading Comp Q M: B-66% I-96%	[v]**Effective**: 3/3 students increased passage comp. using a venn diagram to read 3 paragraph passages of science text, a 30% mean increase B to I.
Question Generation	Solis et al. 2013.2	RCA- Reading Comp Q M: B-47.5% I-82.5%	[v]**Effective**: 2/2 students increased passage comp. using QG intervention, a 35% mean increase B to I. (Alt. Treatment Design/See anaphoric cueing above)
	Hua et al., 2012	RCA- 8 Reading Comp. Q M: Facts B-31% I-40% Inferences B-25% I-35%	**Inconclusive**: 3/3 students increased the number of correctly answered factual and inferential questions; however results were modest with a mean increase of less than one question correct, a 10% increase.
Story Structure Map or Character Event Map	Stringfield et al., 2011	CBA- Qs read orally M: B- 16% Maint.- 93.3%	[m]**Effective**: During maintenance of story map instruction, 3/3 students scored a mean of 93.3% on reading quiz questions, from a baseline of 16%; a mean increase of 77.3%.
	Williamson et al., 2014	RCA- 10 Reading Comp Q M: B- 51% I.- 90%	[v]**Effective**: 3/3 students increased comprehension of narrative chapters using a character event map, along with books on tape and teacher modeling of think alouds. A 39% mean increase baseline to intervention.
Systematic Prompts w/Read-alouds	Mims et al., 2012	RCA- 11 Rdg Comp. Questions (5Ws, First, Next, Last, etc.) M: B- 23% I- 73%	[v]**Effective**: 4/4 increased comp. using systematic prompt removal with read-alouds, story structure and graphic organizers, 50% increase B to I.
Reciprocal Questioning	Whalon & Hanline, 2008	RCA- Rdg Qs asked/answered M: Unprompted Q's B- 0 I-2.8 Response to Peers B- 0 I-3.5	[vm]**Effective**: 3/3 increased asking unprompted comp. questions, responding to peer questions while reading storybooks with gen. ed. peers; using self-monitoring and graphic story maps, a 31.5% increase B to I.

Note. [v]Denotes use of visual strategies; [m]Denotes use of motivational plan; Effective- functional relation established between intervention & comprehension; Inconclusive- as reported by primary researcher(s); RCA- Researcher created assessment; CBA- Curriculum based assessment; B- Baseline; I- Intervention; 5Ws- who, what, where, when & why questions

Anaphoric cueing. O'Connor and Klein refer to anaphora as "the reference of a text back to earlier elements of itself" (2004, p. 117). Most commonly, anaphoric cueing relates to identifying the referents of pronouns in text. In a study presented by Solis, McCulley and El Zein, anaphoric cueing was included in an alternating treatments comparison of reading comprehension interventions for learners with ASD (2013). Two anaphoric cueing treatment approaches were utilized. In the first, learners were provided with text in which pronouns were underlined and choices of referent words were placed underneath each pronoun for student consideration and selection. In the alternating treatment of anaphoric cueing, the initial format was enhanced with the profiles of learners with ASD in mind. Improvements included the use of applied behavior analysis principles (EBPs for learners with ASD), the use of student interests as reinforcers during reading tasks, and the use of visual supports (Solis et al., 2013.1). In the single-case design study, two out of two students increased passage comprehension using anaphoric cueing along with ABA techniques, embedded student interests, and visual supports. Specifically, a 24% mean increase in correct response to research created questions was reported baseline to intervention. Study results suggest a mixed strategy approach including visuals, behavioral supports, and passages matched to student interests along with a more formalized reading strategy such as anaphoric cueing is effective. While deemed inconclusive, O'Connor and Klein (2004) also studied the use of anaphoric cuing instruction with learners with ASD as a means to improving text comprehension.

Cooperative learning. The NRP defines cooperative learning as instruction "where learners learn reading strategies together" (NICHD, 2000, p.15). While cooperative learning studies are found in abundance in the literature focusing on increasing social skills for learners with ASD, research remains limited in relation to cooperative learning, comprehension, and ASD

in combination, with no studies identified beyond 1995. In a single case study using multiple baseline across subject design, Kamps, Barbetta, Leonard and Delquadri assessed the use of peer tutoring in relation to reading fluency, comprehension, and social interaction of learners with ASD (1994). Three participants with ASD in an inclusive setting were paired with general education peers during reading instruction three to four days per week. The peer tutors were trained to provide "positive and corrective feedback" to their partners (1995, p. 53) through three forty-five minute sessions. The comprehension component included a completion of who what, where, when, why questions after passages were read cooperatively for eight to ten minutes. Furthermore, teachers monitored the interactions, provided motivational point sheets for all students, and posted total class points visually. For three out of three learners with ASD, class-wide peer tutoring increased correct responses by both learners with ASD and their general education peers. Specifically, learners with ASD increased comprehension question related responses from a baseline of 46% to an intervention two mean of 89%. A reversal of tutor-learner roles was then implemented and shown to increase social skills and interactions for learners with ASD.

Using a similar quantitative ABAB reversal design, Kamps, Leonard, Potucek, and Garrison-Harrell, examined the effect of cooperative learning groups, including peer tutors, small groups, and group games on the reading comprehension of learners with ASD functioning in an inclusive setting through two studies (Kamps et al., 1995.1 & 1995.2). In the first study, groups of four students, including one learner with ASD, used grade level novels to complete three structured activities including (1) peer tutoring on vocabulary terms, (2) answering of novel related "wh" questions, and (3) reading related games relevant to characters and story facts. The cooperative groups took place for thirty minutes a day as part of a longer ninety minute daily

language arts block. Students also received stickers on a social skills chart while interacting appropriately through reading activities (1995.1).

Study data points show that as a result of the cooperative learning intervention, one student with ASD increased correct response to reading comprehension questions while responding to novels with peers resulting in a 31% increase in mean score from baseline to intervention. Cooperative learning groups were effective for the one learner with ASD involved and a functional relation was established between the interventions and reading comprehension. In addition, a follow-up survey of social validity showed "improved comprehension" rated highly by teachers (1995.1, p. 96).

Despite the positive effects of the studies above, Kamps and colleagues reported variability of findings from the second study reported in the same article (1995.2). The variability of findings appeared to be a result of the 5th grade level novel being too academically challenging for the two learners with ASD. While the two girls did make progress with the cooperative learning activities, it was minimal, and the teacher social validity survey mentioned behavioral concerns with the entire large group of twenty-six students as having a potential effect on intervention (Kamps et al., 1995.2).

It is important to note again, that while this researcher deemed the two studies by Kamps and colleagues as effective, the same studies were deemed as "suggestive" by El Zein and colleagues in their recently published 2014 research synthesis. This inconsistency, coupled with a dearth in the research related to cooperative learning and learners with ASD since 1995 points to a clear need for future research to be conducted in this area.

Direct instruction. In a 2009 synthesis, Whalon and colleagues reviewed the research related to reading instruction and learners with ASD and concluded, "when considering the

instructional methods used to increase meaning-focused skills, specifically, direct comprehension instruction, the lack of such interventions targeting individuals with ASD is surprising" (p. 10). Four quantitative studies emerged in relation to direct or explicit instruction including only two published after 2009: Flores and Ganz (2007; 2009), Flores et al. (2013), and Roux et al. (2014). In the 2007 study direct instruction was used to teach the three comprehension related skills of statement inference, facts, and analogies to two learners with ASD (Flores & Ganz). Both students showed gains in all three reading comprehension skills on researcher created probes with a 75% mean increase from baseline to intervention. The 2007 study utilized a multiple-probe across baseline design and the *Corrective Reading Thinking Basics* program, beginning with a sequential presentation of comprehension tasks using direct program scripting in text inferences. Text inference instruction occurred daily until each learner reached 100% accuracy over three days. At this point, direct program scripting in text facts began. As a modification for learners with ASD, text presented facts were paired with the use of "picture cues" (2007, p. 247). Once three days of accuracy was achieved in using facts, direct program scripting in analogies began. In terms of results, both learners with ASD showed gains in all three reading comprehension skills of analogies, statement inferences, and facts on researcher created probes with an overall mean improvement of 78% baseline to intervention. A functional relation was established between direct instruction and reading comprehension, and the program was effectively modified to better support the profile of learners with ASD struggling to remember text facts through the addition of picture cues.

In a similarly designed single case study, Flores and Ganz expanded upon their 2007 findings to assess the use of direct instruction to teach the comprehension skills of analogies, inductions, and deductions to two learners with ASD in 2009. Specifically, direct instruction

was carried out using the program *Corrective Reading Thinking Basics* in the following sequence (1) verbal program scripting, (2) choral student response, (3) use of clear signals, (4) correction procedures, and (5) modeling. Overall, a functional relation was established between direct instruction and the specific reading comprehension skills of analogies, deductions, and inductions for the two learners with ASD. Direct instruction was supplemented with the use of visual supports to teach analogies, and with the use of picture sets to teach deductions (Flores & Ganz, 2009).

In 2013, Flores and colleagues assessed the use of two unmodified direct instruction programs with learners with ASD in a university sponsored summer reading program. Based on pre-testing, learners were instructed in groups of two to four using either the direct instruction program *Language for Learners*, or the program *Corrective Reading Thinking Basics*. Instruction took place as directed through program scripts with no modification taking place, and instead the teachers of the program were assessed for fidelity of program implementation. While results of this study also prove promising, it is reportedly a pilot study, and specific results of learners with ASD are not reported separately preventing it to be considered effective as currently reported.

Most recently, Roux and colleagues conducted a randomized experimental design study of the use of explicit instruction on the reading comprehension related skills of acquiring new vocabulary and identifying main idea with 43 students (2014). The study was conducted in multiple classrooms across six elementary schools. Explicit instruction was supplemented with the use of visual support boards. Significant results on a researcher created post test include an effect size of 1.06 in relation to vocabulary skills, and an effect size of .92 in relation to main idea. Of note, this was the only study identified in this synthesis using experimental design.

Question generation. Solis, McCulley, and El Zein used the same design discussed

above for anaphoric cueing to assess the use of question development as an instructional practice for learners with ASD (2013.2). As a second part of the 2013 study, question development was included in an alternating treatments comparison of reading comprehension interventions for learners with ASD. Two question development approaches were utilized. In the first, learners were directed to read text, and were then provided with question stems and asked to develop fact based questions. In the alternating treatment of question development, the same format was used along with modifications to enhance instruction for learners with ASD. Improvements included the use of applied behavior analysis principles, the use of student interests as reinforcers during reading tasks, and the use of visual supports in the form of graphic organizers (Solis et al., 2013.2).

In the single-case design study, two out of two students increased the ability to develop questions related to text along with ABA techniques, use of student interests, and visual supports, with a 35% mean increase in correct response to research created questions baseline to intervention. Again, study results suggest a mixed strategy approach including visuals, behavioral supports, and passages matched to student interests along with a more formalized reading strategy as effective (Solis et al., 2013.2).

Question Generation was utilized for learners with ASD with reported inconclusive results by Hua and colleagues (2012). Hua et al. used a questioning approach with three young adults with ASD with a dual focus on increasing fluency and comprehension of factual and inferential questions. A "Reread-Adapt and Answer-Comprehend (RAAC)" strategy was implemented, with the comprehension component requiring learners to generate and ask themselves prepared story structure questions as a preview to reading text (p. 136). While the study results demonstrated increased fluency for all young adults involved, gains in reading

comprehension were modest with "a high degree of variability of the data (warranting) further investigation" (Hua et al., 2012, p. 141).

Graphic organizers (including story structure maps, character event maps, and compare/contrast charts). Story structure can be defined as instruction in which "learners are taught to use the structure of the story as a means of helping them recall story content in order to answer questions about what they have read" (NICHD, 2000, p. 15). Stringfield et al. (2011) used a basic story map to support the comprehension of three elementary school learners with ASD after reading. Each learner read aloud a short story at their individual instructional level, and then completed the basic graphic map including "six frames (setting [characters, time, place], beginning, middle, and end)" (p. 222). All three learners made significant improvements related to post story assessment increasing scores from a 20-40% baseline accuracy range, to an 80-100% accuracy range (p. 226). In further support of the use of graphic story maps, Stringfield et al. note learner gains remained even after the use of the graphic organizer was self-faded, concluding, "the Story Map provided a framed outline of basic story elements, eliminating the requirement for participants to hold each story element in memory while considering how they related to one another to respond to story questions" (2011, p. 225).

The effectiveness of using graphic organizers to record significant character events throughout a story on comprehension of learners with ASD was investigated by Williamson and colleagues (2014). Character event map instruction was supplemented with the use of books on tape, and with explicit teacher modeling of thinking (think-alouds). As a result of the intervention three of three included participants increased correct responses to researcher created assessment questions from a baseline mean score of 51% to an intervention score of 90%.

In addition to the quantitative studies of Stringfield and colleagues (2011) and

Williamson and colleagues (2014) establishing a functional relation between the use of graphic organizers such as story structure and character event maps with reading comprehension, the use of graphic organizers to provide a focus for the information students should attend to before, during, and after learning is recommended throughout the descriptive and qualitative literature for learners with ASD. Visual story structure maps are discussed specifically below in terms of secondary practices to support effective instructional practices.

In response to the "need for ongoing research related to reading comprehension interventions, especially interventions that support access to academic content," Carnahan and Williamson studied the use of compare-contrast Venn diagrams with science texts for learners with ASD (2013, p.356). The researchers developed multiple expository passages and a series of comprehension questions based on science content for three middle school students with ASD reading below grade level. Students were instructed in the text structure of comparing and contrasting through completion of visual venn diagrams resulting in improvement from 55%-77% correct response rate at baseline to a 95% to 97% correct response at intervention. A functional relation was established between the use of compare and contrast organizers and the answering of related comprehension questions for learners with ASD (Carnahan and Williamson, 2013).

The pairing of explicit instruction with visual representation is also emerging as an effective secondary intervention feature being used in conjunction with a primary effective practice, appearing to positively influence comprehension outcomes in the majority of studies mentioned. In a descriptive journal article on comprehensive strategy instruction, Whalon and colleagues (2007) recommend teaching story structure elements to learners with ASD, and detail effective instruction using storybooks and providing visual supports for identifying story

elements including “setting,” “characters,” “events,” “problem,” “solution,” and “ending,” along with related comprehension questions (p. 17). Whalon et al. recommend first teaching specific elements of text with visual support, then asking questions specific to the story elements, for example turning the generic question, “Where does this story take place?” to a specific question, such as, “Where do the three bears live?” (2007, p. 19). The recommendations of Whalon and colleagues also include story structure instruction in the form of visual story cards and graphic maps.

In addition to the use of graphic organizers deemed effective by Carnahan and Williamson (2013) via quantitative study, and the recommendations from the descriptive literature by Whalon and colleagues. (2007), the use of graphic organizers as an effective reading comprehension strategy for learners with ASD is recommended by Gately (2008) and Stringfield, et al. (2011). Gately (2008) identified graphic maps as an effective pre-reading and during reading strategy, and Stringfield et al. (2011) identified the use of story maps as an effective post reading strategy. Gately (2008) recommends the use of a visual story structure map to focus learner thinking with key text information such as setting, characters, conflicts, and resolutions. According to Gately, this story structure map is effectively used both to introduce the text, and as a guide to keep track of the action during reading. Comparatively, Stringfield et al. (2011) used a basic story map to support the comprehension of three elementary school learners with ASD after reading.

In further consideration of why graphic organizers may support learners with ASD, O’Connor and Klein (2004) determined that when using a pre-reading question answer strategy to introduce topics related to learner interest, learners with ASD had a tendency to elicit thinking of knowledge that did not necessarily connect to text, and ultimately lead to perseveration and

continuous connection to irrelevant information. Instead of pre-reading questions, O'Connor and Klein (2004) recommend teachers use "graphic advance organizers" to provide supportive teacher selected knowledge before reading (p. 125).

Coding revealed the secondary strategy of using visual supports was effective in conjunction with a primary strategy in all of the effective instructional practices identified in this review of the literature. In addition, effective strategies were found to be used repeatedly, e.g. using a consistent who, what, where, when, why graphic organizer for multiple passage readings over an entire marking period.

Multiple strategies approach. Several studies emerged combining multiple components together as an effective instructional practice, making it difficult to categorize one component of the study as effective in isolation. For example, a 2012 study by Mims, Hudson, and Browder integrates systematic prompting, shared story reading, read-alouds, question rules, and graphic organizers to improve the comprehension of learners with ASD. Furthermore, a study by Whalon and Hanline incorporates reciprocal questioning, cooperative learning, and story structure, along with student self-monitoring and the use of visual graphics (2013). Details of studies using a multiple strategies approach follow.

Systematic prompt reduction, read-alouds, story structure and graphic organizers. Mims, Hudson and Browder used a "modified system of least intrusive prompts" on reading comprehension during read-alouds of grade-level biographies (2012, p. 69). The authors describe shared story reading as involving a partner that reads aloud along with a listener, and "the use of repeated story lines (e.g., main idea of a story or chapter), attention getters to engage the reader with the story's context (e.g., apples for a story about an orchard) and repeated opportunities to hear the story read again (i.e. rereads)" (p. 68). The use of a system of prompts to support the

learning of four learners with ASD was developed and inserted into shared story reading lessons three times per week for five weeks. The profile of included learners with ASD were considered, and the intervention was further adapted with the use of a graphic organizer visually prompting the questions, (1) What came first? (2) Next? and, (3) Last? Furthermore, the prompting took the form of errorless learning, and finally, "wh" questions were paired with visual picture symbols.

A functional relation was established between using a system of least intrusive prompts and correct response to reading questions for four learners with ASD during shared story reading. The pairing of read aloud biographies with the implementation of graphic organizers, prompting, and question rules further rounded out the effective instructional practice (Mims et al., 2012).

Reciprocal questioning, self-monitoring, and graphic story maps. In a study of the effects of reciprocal instruction on comprehension also combining multiple components, Whalon and Hanline used multiple strategies to support the needs of learners with ASD (2008). Specifically, the researchers adapted a guided questioning intervention and coupled it with student self-monitoing and the use of visual cues to teach learners with ASD to (1) ask and respond to questions, and (2) use a visual story map while taking turns reading with a general education peer. For three out of three learners with ASD, performance increased both in terms of asking unprompted comprehension related questions and responding to peer questions. Students progressed from zero percent at baseline to all three students asking and answering four to six questions at intervention while using graphic story maps. Of note, El Zein and colleagues also identify this study as effective, with reciprocal questioning emerging as an instructional practice worthy of further research and implementation.

The complexity of a multiple strategies approach. This review reveals the need for

classroom teacher support and education in implementing multi-faceted instructional practices. Even when not labeled as such within studies, a mixed strategy or multiple strategy approach seemed to be effective with all of the identified effective studies combining primary interventions with instructional practices including visual graphic organizers, behavior plans, and/or motivational materials. In an effort to further understand the subtleties of instruction within studies leading to effective instructional practices, coding guide notes of each quantitative study were examined qualitatively. Themes that further distinguish studies identified as effective and inconclusive emerge. Each study was coded with a category of "strategies co-occurring" to gather data on the use of visuals (coded 'v"), social influences ("s"), technology integration ("t"), behavioral integration ("b") and motivational plans ("m"). The use of both visual supports and motivational techniques emerges as used most frequently among the instructional practices deemed as effective, yet the same techniques are not evident in many of the studies deemed inconclusive. A mixed strategy approach to comprehension instruction appears to be essential to support learners with ASD, but is potentially more difficult to implement than strategies in isolation. As a result, ongoing professional development for special education teachers related to the teaching of reading comprehension to the population of learners with ASD using a multiple strategies approach emerges as essential.

The published research synthesis by El Zein and colleagues is the first contribution to the literature reporting that instructional practices are effective in teaching comprehension to learners with ASD. El Zein and his team recommend that teachers are supported in using the specific practices of: direct instruction, strategy instruction, graphic organizers, and peer/cooperative grouping strategies. In addition, a focus on instructional strategies promoting the "cognitive strength of visual processing" of many learners with ASD is recommended (El

Zein et al., 2014, n.p.). A focus on the need to support teachers in the classroom further supports research to identify specific teacher knowledge and beliefs related to research-based instruction. A complete integrated description of identified effective practices follows.

General Identified EBPs for Learners with ASD

Due to the absence of EBPs related to reading comprehension and ASD, a search for EBPs specific to general academics, but not specific to reading comprehension instruction was conducted as such EBPs may prove potentially relevant as secondary instructional practices to support learners with ASD in the reading classroom. In addition to searching the online databases for EBPs and ASD, the hand search of the literature focused on EBPs and ASD and uncovered several literature reviews utilizing EBP standards to designate treatments as evidence-based (Odom et al., 2003; Spooner et al., 2011). These literature reviews further identify that a need exists for EBPs that promote academic engagement specific to learners with ASD (Carnahan, Musti-Rao & Bailey, 2009; Mesibov & Shea, 2011). Findings from all sources follow, however, it is essential to recognize that each of the sources of EBPs: WWC, NAC, PDC, Odom et al. (2003), and Spooner et al. (2011) used varied and slightly different inclusion criteria and standards.

Specifically, relevant instructional practices include the use of *peer interventions*, *social interventions* and *behavioral interventions*. Instructional practices emerge across three sources as evidence-based. First, the WWC, NAC, and PDC all recommend "peer intervention" as a research-based method of academic instruction. Both NAC and PDC recommend peer intervention as evidence-based. NAC provides an educator manual on using peer training to support the communication of learners with ASD, and PDC provides an online resource module, including introductory and advanced resources and usable forms, to teach peer mediated

intervention to support the communication of learners with ASD. On a more cautious note, WWC labels class-wide peer tutoring for general reading instruction as a "potentially positive" intervention. Secondly, the WWC, NAC, and PDC also all recommend "social interventions as evidence-based for academics, and thirdly, findings included the use of behavioral techniques.

The limited findings of general EBPs not specific to comprehension, was further expanded by a review of the literature conducted by Odom et al. (2003). Odom and colleagues assessed the quality of 37 single-subject studies published from 1990-2002 related to educational practices for children with autism. Odom and colleagues completed the review prior to the EBP standard recommendations of Horner et al. (2005) and instead designated their highest quality practices as "well-established." The two strategies of *adult-directed teaching* and *differential reinforcement* were characterized as well-established. *Adult-directed teaching* refers to antecedent strategies in which an adult provides a model or scaffold to support a child's behavior, such as using "a set of scaffolding techniques (e.g. questions, expansions, elaborations) and storybook reading to promote spontaneous language use" (Odom et al., 2011). *Differential reinforcement* was defined by Odom and colleagues as "rewards to be provided when children use a skill being taught and not provided when the skill is not used" (2003).

Furthermore, Spooner and colleagues completed a literature review on single-subject studies from 2003-2010 to identify EBPs for teaching general academic skills to learners with disabilities (not limited to ASD) (2011). An application of the Horner et al. 2005 criteria was utilized and resulted in two strategies, *task analytic instruction*, and *discrete response instruction*, emerging as evidence based. *Task analytic instruction* is defined as, "step-by-step teaching for a chain of responses to complete an activity (e.g. to solve an algebraic equation to make a purchase" and was shown as evidence-based when used in combination with systematic

prompting and feedback (Spooner et al., 2011, p. 382). *Discrete response instruction,* or instruction to elicit single-step responses (e.g. "sight words or simple facts like state capitals") emerged as evidence-based across varied implementation approaches from massed trials, to embedded trials to a naturalistic teaching approach (Spooner et al., 2011, p. 383).

Linking Reading Practices with Profiles of learners with ASD

In addition to identifying effective and EBPs, practices can be linked to the social thinking and executive functioning profiles of learners with ASD in order to establish practical professional development guidelines for classroom teachers to individualize instruction. Addressing the identified needs related to both text comprehension and socialization prevalent in learners with ASD is critical to guiding this instructional planning (Smith & Barnhill, 2001). Moreover, Griswold et al. (2002) discussed the need for the establishment of a guide to instruction based on identification of individualized learner skills and deficits through relevant assessment and analysis of learner work samples, enabling teachers to have a framework for connecting specific learner needs and effective instruction.

Alignment of instructional practices and identified needs of learners with ASD are summarized in Table 3. While not deemed evidence-based, the following recommendations emerge from a review of research encompassing quantitative, descriptive and qualitative research. Instructional practices deemed to address comprehension needs related to ToM include the use of explicit support for considering character perspectives and motives, and understanding figurative language (Gately, 2008; Norbury, 2004). Gately (2008) recommends strategy instruction to support comprehension of character thinking and intent through the use of visual "Who? Did What?" charts and goal charts, the use of character "emotional thermometers," and the use of character "cartoon bubbles" to distinguish character thoughts from statements (p. 43).

According to Norbury (2004) direct instruction in identifying key words and specific context clues that make meaning of text supports comprehension, including understanding of complex or figurative language and character intention. Gately (2008) also suggests the development of social stories related to text to further support understanding of character perspectives and actions. Social stories form links between learner feelings and experiences, and character experiences and can "help learners understand language which may seem contradictory to a character's actions" through text-to-self connections (Gately, 2008, p. 44).

Further related to ToM, O'Connor and Klein (2004) and Williamson, Carnahan, and Jacobs (2012) found that learners with ASD infrequently self-correct, and benefit when explicitly taught to use reading comprehension strategies related to anaphora. O'Connor and Klein (2004) define anaphora as "reference of a text back to earlier elements of itself" (p. 117). Anaphoric cueing requires learners to self-monitor and to actively engage with text, for example, to "relate pronouns to antecedent nouns" (O'Connor and Klein, 2004, p. 118), or to recognize "an author's use of the word *because* alerts readers that the text pattern will be cause and effect" (Williamson et al., 2012, p. 453). Furthermore, O'Connor and Klein (2004) identify potential benefits of technology programs which direct learners to use anaphoric cueing strategies through supportive scaffolding to increase text comprehension. Uncertainty in how to self-correct, or how to make decisions, can become a source of anxiety for learners with ASD, and technology programs may also provide an effective emotional support (Basil & Reyes, 2003; Trembath et al., 2012).

According to Trembath et al. (2012), interactions with teachers in the form of teachers providing auditory instruction can result in learners with ASD feeling highly anxious. Learner anxiety directly impacts classroom performance, including participation, socialization and comprehension and can be reduced by pairing auditory instruction with visual representation and

a positive learning environment (Basil & Reyes, 2003; Carnahan et al., 2009; Trembath et al., 2012). Visual instruction recommended to support comprehension includes graphic technology, pictures, social picture stories, color strips for text emphasis and focus of instruction, and the NRP recommended use of graphic organizers, and story maps (Alberto, et al., 2007; Carnahan et al., 2009; Gately, 2008; Mesibov & Shea, 2010; Whalon et al., 2007). Additionally, according to Basil & Reyes (2003) effective comprehension activities allow for learners to "follow their own course" free from teacher correction and predetermined right or wrong answers, as teacher establishment of a thinking environment is essential to not only lowering anxiety, but to increasing learner confidence and promoting successful learning behaviors (p. 41).

Learners with ASD often exhibit socially inappropriate behavior, however, individuals can "be better served by teachers who design multiple ways of participating in classroom structures than by teachers who expend similar time and energy on developing strategies to manage learner behavior within rigidly conceived routines" (Chandler-Olcott & Kluth, 2009, p. 552). In terms of social behavior, communication, and comprehension, changing instruction from silent reading to oral reading (Myles et al., 2002) and incorporating the use of active strategies including roleplaying or video creation (Griswold et al., 2002), further supports text comprehension, focus, and on task behavior.

Table 3

Instructional Practices for Reading Comprehension Aligned to Learner Needs

a. Social and executive thinking skills deficits	***b. Academic need related to reading comprehension***	***c. Instructional Practices for reading comprehension***
Theory of mind (ToM)	Perspective taking, metaphors, irony, idioms	Explicit instruction in figurative language, identifying context clues and key words
	Pronoun usage, self-correction, grammar/semantics	Anaphora instruction
	Character perspectives	Graphic organizers (who did what charts), emotional thermometers, cartoon bubbles, social stories, Venn diagrams
Social & emotional communication	Initiating, comprehension requiring social understanding	Question answer relationships (QAR), graphic organizers, story maps, pictures, color strips
	Oral language, auditory comprehension	Role play, video creation, technology based reading instruction
	Anxiety, willingness to take risks in classroom	Supportive classroom environment, technology, pair visuals with auditory instruction
Executive control & goal directed action	Establishing purpose for reading	Modeling, direct instruction, QAR, question generation, systematic prompts
	Inferencing	Priming, QAR, use of short text length
	Integrating prior knowledge and new experiences/text	Priming, graphic story structure maps
Co-regulation & regulated behavior	Regulation with teacher, lesson pacing	Pre-reading support, priming graphic organizers, technology based reading instruction, read-alouds
Weak central coherence	Attention and focus, attention to detail rather than whole	Story structure instruction, graphic organizers, systematic prompts, cooperative learning
	Focus and comprehension when left to read silently	Priming to anchor direction of text, technology based reading instruction

Furthermore, in relation to executive thinking skills, priming is an "important strategy to focus reading as a thinking activity" (Gately, 2008, p. 41). Priming includes previewing background knowledge and building familiarity with text to allow learners to connect with content prior to comprehension instruction (Carnahan et al., 2009; Gately, 2008; Griffin et al., 2006; Westby, 2012). "Given challenges with activating relevant background knowledge, priming may be an especially beneficial strategy for supporting comprehension for learners with ASD" (Carnahan et al., 2009, p. 13). Studies reveal positive results using instructional strategies relating text content to learner prior knowledge including making connections (Gately, 2008) and priming (Carnahan et al., 2009; Gately, 2008; Griffin et al., 2006, Westby, 2012); however, it is essential that prereading information provided through priming, "helps anchor thinking in the correct direction of the text" (Gately, 2008, p. 41). For example, priming via providing titles, pictures and topics is effective in teaching learners to identify main idea. In addition, learners are better able to make inferences and answer questions when priming is paired with the use of text of one paragraph or less (Carnahan et al., 2009; Myles et al., 2002), therefore, teachers may need to rethink using novels or long stories, or select stories that can be appropriately chunked and taught in sequence with comprehension strategies incorporated throughout.

Finally, rich curriculum can be planned around topics of interest using theme-based instruction to best support comprehension and engagement in learning (Carnahan et al., 2009). "Gaining skills such as listening comprehension, tracking key phrases in texts, and using picture cues may be critical skills for learners with severe developmental disabilities to engage with literature across their life span" (Browder et al., 2009, p. 272).

Implications for Teacher Education and Professional Development

When teachers have to support learners with ASD, it often reveals gaps in quality

instruction, and addressing these gaps, such as in the area of reading comprehension, benefits all learners in an inclusive setting (Chandler-Olcott & Kluth, 2009; Simonsen et al., 2010). While there are consistencies in learning among students with ASD, each student learns individually and a focus on specific reading profiles may support instruction of comprehension (Carnahan et al., 2009, p. 10). An expansion of curriculum with universal design including strategies that support reading comprehension will aid readers in both inclusive and self-contained settings (Gately, 2008).

The NICHD reported in 2000 that research is needed to assess how to best instruct teachers in identifying effective comprehension strategies. In addition, NICHD reported, "teachers must be skillful in their instruction and be able to respond flexibly and opportunistically to learner's needs for instructive feedback as they read" (2000, p. 16). Furthermore, "in order for teachers to have the skills needed to meet varied learner needs, extensive formal instruction in reading comprehension is necessary, preferably beginning as early as pre-service" (NICHD, 2000, p.16). Clearly these needs still exist more than a decade after this NICHD report. This necessity for teachers to be skilled in teaching reading is further exacerbated in those instructing learners with ASD, as teachers have reported that the label of the disability itself in no way supports a specific understanding of strengths and needs relevant to planning academic instruction or related programming (Griswold et al., 2002).

Focused teacher education and professional development relevant to both effective instructional practices and meeting the needs of individual learners with ASD is needed. LaBarbera and Soto-Hinman reviewed the literature in 2009 and found a current need to "systematically change the methods and structures that pre-service and in-service teachers are trained in order to ensure that *all* learners are included in today's classrooms" (p. 7). Simonsen

and colleagues have similarly addressed the need for special education teachers to be highly skilled through a focus on "redefining special educators as interventionists" (Simonsen et al., 2010, p. 20). LaBarbera and Hinman (2009) report, learners with ASD are excluded from peer related strategies and cooperative learning scenarios that have been proven to increase reading comprehension because of inaccurate teacher perception. An emphasis on the mindset that learners with ASD can learn and do benefit from reading comprehension strategies including structured peer discussion in the inclusive setting is an essential component of new teacher education (LaBarbera & Soto-Hinman, 2009). Research to obtain a better understanding of this teacher "mindset" is warranted. According to Carnahan et al. (2009), "it is important to realize that the principles of balanced literacy instruction are applicable to all learners, regardless of perceived level of cognitive or communication functioning" (p. 13). This raises the question; does the communication level of learners with ASD impact teacher perception of their ability to improve the students' reading outcomes? Specifically this dissertation study aims to uncover teacher perception related to instructing learners with ASD through a focus on teacher perceived self-efficacy and teacher perceived student outcome efficacy in the area of reading comprehension.

Teacher Self-efficacy

While not numerous, effective instructional practices do exist for instructing learners with ASD in reading comprehension. The question remains, which effective practices do teachers use with self-perceived efficacy? How do job factors such as (1) functional communication level of learners, (2) restriction of instructional setting, (3) teacher education and experience, and (4) administrator support impact teacher perception related to teaching reading comprehension to learners with ASD?

Teacher self-efficacy research. Teacher self-efficacy refers to teacher perceptions regarding their professional ability to promote positive instructional outcomes in their students, and studying teacher self-efficacy may uncover critical issues related to the effective use of research-based instructional practices (Ruble et al., 2011). Self-efficacy research stems from social cognitive theory and can be traced back to the work of Bandura. Widely cited, self-efficacy is defined in Bandura's 1997 text, Self-efficacy: The Exercise of Control as "beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments". Self-efficacy regulates self-motivation and decision-making processes (Bandura, 1997; Bandura & Locke, 2003).

Despite a plethora of research studying the self-efficacy of general education teachers, only three prior studies of self-efficacy of teachers of learners with ASD were found in the literature (Jennett et al., 2003; Ruble et al. 2011; Ruble et al., 2013). In 2003, Jennett and colleagues studied professional self-efficacy and teacher burnout in relation to use of Applied Behavior Analysis (ABA) or Treatment and Education of Autistic and Related Communication Handicapped Children (TEACCH) as the primary instructional paradigm. In terms of self-efficacy the Teacher Efficacy Scale (TES) for special educators (Coladarci & Breton, 1997) was administered. The wording of TES statements was adapted to better match participants working with learners with autism including 34 teachers utilizing an ABA approach to instruction, and 30 teachers using a TEACCH approach. In terms of study results, Jennett and colleagues found a correlation between increased teacher commitment to an instructional paradigm and increased teacher efficacy. Study findings support the conclusion that "teachers with a stronger commitment to or understanding of the underlying theoretical orientation of their teaching approach have a greater sense of efficacy, particularly with respect to their own effect on

students" (Jennet et al., 2003, p. 590).

In 2011, the second study of underlying sources of self-efficacy for teachers of learners with ASD was conducted by Ruble and colleagues through comparison of teacher self-efficacy, teacher burn-out, and teacher perceived support from school leaders. To assess self-efficacy the Teacher Interpersonal Self-efficacy Scale (TISES) was administered to 35 special education teacher participants. Ruble and colleagues explored the relationship of teacher self-efficacy and the three factors of (1) number of years teaching, (2) perceived support from school administrators, and (3) teacher burnout. The TISES was adapted to best match study purposes through the removal of one assessment item. In terms of results, classroom management and teacher burnout were associated with teacher self-efficacy. A correlation was not found specific to teacher self-efficacy in relation to numbers of years teaching experience and perceived support from leadership.

The purpose of the third study of self-efficacy was to evaluate a new self-efficacy instrument developed specifically for use with teachers of learners with ASD, the Autism Self-Efficacy Scale for Teachers (ASSET) (Ruble et al., 2013). The ASSET was developed to overcome limitations of previous instruments not sensitive to the specific role of teacher of learners with ASD (Ruble et al., 2013). Forty-four special education teachers participated in the 30-item ASSET survey instrument, developed to "assess the beliefs of special education teachers about their ability to carry out their professional tasks associated with teaching students with autism" (Ruble et al., 2013, p. 1153). Results provided confirmation of ASSET reliability; however it was recommended future users consider changing the response scale from the initial 100 point system. Moreover, Ruble and colleagues recommend further researchers place emphasis on assessing teacher efficacy in relation to "specific instances of teaching children with

ASD" (Ruble et al., 2013, p. 1157). This recommendation supports a specific focus on teacher efficacy related to reading comprehension.

Teachers of learners with ASD who understand the theory behind instructional paradigms have higher levels of teaching efficacy, however those with inadequate knowledge and understanding of such instructional paradigms may be unable to analyze problems and determine solutions needed to achieve instructional success (Jennet et al., 2003). "Understanding the potential sources of self-efficacy for teachers of students with disabilities, such as autism, can help identify factors to target in professional development activities and ongoing teacher support initiatives" (Ruble et al., 2011, p. 68). The research of Jennet and colleagues, and Ruble and colleagues leads to the question of whether increased knowledge of research-based instruction in the core academic content area of reading comprehension will also correlate with increased teacher perceived efficacy and perceived ability to improve student outcomes. Preparing teachers to be self-efficacious "entails fostering the developing of competence and confidence" (Siwatu et al., 2011, p. 210). Furthermore, Siwatu and collagues, in their study of self-efficacy and pre-service teachers of African American students, note that teacher beliefs about their own capabilities fluctuate depending on the academic task and current context (2011). For example teacher self-efficacy may fluctuate when teaching the academic task of reading comprehension, to a group of students with ASD with varied individualized learning profiles. Furthermore, high efficacy in knowledge of ASD may not be associated with teaching reading comprehension, or vice-versa.

Understanding the influences on teacher self-efficacy may lead to identifying factors essential to supporting teachers of learners with ASD, and to providing related targeted professional development (Ruble et al., 2011). Professional development and training in

underlying instructional practices may be the key to improving self-efficacy of special education teachers (Jennet et al., 2003). Conversely, "a negative sense of self-efficacy has (a negative) impact on the 'desired results' of good reading instruction, being: student achievement," (Hastings, 2012, p. 61).

Self-efficacy reading inventory. In order to assess self-efficacy of instruction in reading teachers, the Reading Teaching Efficacy Instrument (RTEI) was developed in 2004 (Szabo & Mokhtari). The RTEI measures (a) teacher self-efficacy, the perceptions and attitudes toward their ability to teach reading, and (b) outcome expectancy, perceptions and attitudes toward their ability to influence student reading development (Szabo & Mokhtari, 2004). However, no published studies have assessed the self-efficacy of teachers of learners with ASD in relation to specific academic content, such as reading comprehension. Hess and colleagues recommend further assessing teacher perceived efficacy of specific interventions as a guide for future research (2008). Finally, per the recommendation of Hendricks (2011) further research into the perceived effectiveness of treatments may provide a first step in eliminating barriers to successful programming for learners with autism spectrum disorder.

Summary

In the last decade, the population with ASD has increased rapidly establishing a great need for effective and available research-based instructional practices. It has been established that educators need to consider the individual needs of learners with ASD, and use this understanding to guide instruction in the area of reading comprehension. Results of this review establish that despite 50% of the included studies identifying effective practices taking place since 2009, there remains a surprising dearth of studies focusing on reading comprehension and ASD. A research to practice gap exists in which teaching based on research findings is not occurring in the

classrooms of learners with ASD (Mayton and colleagues, 2010). In addition, the existing discrepancy in criteria used to classify practices as evidence-based has understandably led to lack of clarity for teachers as to what an EBP is (McDuffie & Scruggs, 2008). An understanding of why this gap exists through a focus on (1) teacher preparedness to use effective practices, and (2) teacher perceptions of their experiences in the classroom, may help bridge this research to practice gap for learners with ASD.

In summary, two issues related to supporting learners with ASD in the area of reading comprehension emerged. First, no EBPs specific to learners with ASD were found, and despite the fact that effective instructional practices do exist, the current research questions teacher access to these research-based practices. Secondly, the impact of job-related factors specific to teachers working with learners with ASD, and the impact on teacher perceptions of their own ability to use effective practices to teach reading comprehension remain unclear. The present study addresses these gaps by investigating teacher preparedness to use effective practices to teach reading comprehension to learners with ASD, along with the teacher job related factors of experience, administrator support, learner verbal language, and instructional setting, as predictors of (1) teacher perceived self-efficacy in teaching comprehension to learners with ASD, and (2) teacher perceived outcome expectancy regarding their professional ability to improve the comprehension of learners with ASD.

CHAPTER III

Method

A review of the literature reveals gaps in both research and practice related to academic instruction of learners with ASD in the area of reading comprehension. A gap in research identifying instructional practices as evidence-based to teach comprehension to learners with ASD exists, along with a gap in teacher access to current effective instructional practices. As aforementioned, this study addresses these gaps, exploring teacher preparedness to use effective practices, and teacher confidence in their ability to teach reading comprehension and promote increased instructional outcomes in the area of comprehension in learners with ASD.

Research Questions

In terms of identifying teacher use of effective practices and predictors of teacher perceived self-efficacy and outcome expectancy surrounding teaching reading comprehension to learners with ASD, this study investigated the following three research questions:

1. What current effective practices for teaching reading comprehension do teachers report using in the classroom? For purposes of this study effective practices were: anaphoric cueing, compare and contrast diagrams, cooperative learning, direct/explicit instruction, graphic organizers, question generation, read-alouds, reciprocal questioning, story structure/character event maps, systematic prompts, and multiple strategy approach.
2. Is teacher preparedness to use effective practices along with the job related factors of experience, administrator support, learner verbal language, and setting predictive of teacher perceived self-efficacy in teaching comprehension to learners with ASD?
3. Is teacher preparedness to use effective practices along with the job related factors of experience, administrator support, learner verbal language, and setting predictive of

teacher perceived outcome expectancy regarding their professional ability to improve the comprehension of learners with ASD?

Prediction Research

Survey methodology was used to gather both descriptive data and predictive data to support understanding the use of effective practices to teach comprehension by classroom teachers. Prediction studies are "associated with advancing knowledge" (Teddlie & Tashakkori, 2009, p. 113). Furthermore, nonexperimental surveys play an important role as precursors to identifying EBPs (Cook & Cook, 2008). This prediction study aimed to consider the predictor variables of teacher preparedness to use effective practices along with job-related factors in relation to the two criterion variables of teacher perceived self-efficacy and outcome expectancy. Additionally, methodological triangulation in the form of gathering data from several instruments, and starting the survey with one simultaneous open-ended question was used intentionally to corroborate data and strengthen findings. This initial open-ended question was included in order to capture the practices teachers deem effective and are actually using in their classrooms, and to serve as a check for consistency via comparison of participant open-ended responses to the effective practices identified through the conducted research synthesis.

Survey methodology was used as a means for gathering information regarding teacher experiences and beliefs with a goal of obtaining a solid representation of what is happening in the classroom, why teachers are making instructional decisions, and how we can help teachers via professional development. Survey methodology was selected to provide participant representation beyond data that could be obtained via smaller representation in qualitative case study or interviews. Furthermore, the majority of existing quantitative research includes small single-subject design studies of individual student response to intervention. This study aimed to

gather the larger perspective of teachers of learners with ASD.

Context of the Study

The prediction study was conducted via a non-experimental quantitative survey distributed through the on-line source Survey Monkey to the target group of professionals teaching learners with ASD. Quantitative survey and the use of survey questions in a pre-established order is a systematic method for obtaining data from a targeted group (Teddlie & Tashakkori, 2009). The use of quantitative survey questions was used as a direct method for gathering data related to the dependent variables of self-efficacy and outcome expectancy, and the independent variables of teacher preparedness to use effective practices and teacher job-related factors. Descriptive statistics were used to report teacher preparedness to use effective practices found in the current research. Hierarchical regression analysis was conducted to determine relationships among teacher preparedness to use effective practices, teacher job-related factors, and teacher perceived self-efficacy and outcome expectancy.

Procedures

Research procedures involved the stages of survey development, participant recruitment, pilot survey completion, related recommended revisions, implementation of the final survey, and data analysis. Specific steps included (1) completion of a pilot survey for content and clarity with professionals that have experience teaching learners with exceptional needs; (2) Arcadia University Institutional Review Board (IRB) submission and related committee recommended revisions; (3) development of the complete survey via the Arcadia University Survey Monkey account inclusive of the informed consent document; (4) initiation of the study via e-mail to teachers and professionals of learners with ASD with instructional decision making, along with a posted invitation to participate in the study on the Council for Exceptional Children (CEC)

Members Forum, and on the National Association of Special Education Teachers (NASET) Teacher to Teacher Forum; (5) closure of the Survey Monkey survey; and (6) analysis of data using IBM SPSS Statistics 21.

Participants

The present study recruited participants in a sample with representation of professionals instructing learners with ASD typically referred to as teachers, including general education teachers, special education teachers, reading specialists, and autism consultants with primary responsibility for daily instruction. This study aimed to capture the diversity in teacher experiences by including special education and general education teachers in public and private schools, teachers of learners with high verbal language ability and/or teaching in inclusive settings; and teachers of learners with limited verbal ability and/or teaching in self-contained setting; however, a convenience sampling was accepted with representation from willing participating professionals. Professionals not in a primary instructional decision making role were excluded.

As mentioned in Chapter 2, only three prior studies of self-efficacy of teachers of learners with ASD were found in the literature (Jennett et al., 2003; Ruble et al. 2011; Ruble et al., 2013). The sample size in each of these studies was considered in developing a goal for the sample size of this study. The prior studies of special education teachers of learners with ASD included a mean of only 47 teachers (range of 35-64). Specifically, in a study to assess teacher self-efficacy in working with learners with ASD using a self-efficacy instrument, the Autism Self-Efficacy Scale for Teachers (ASSET,) 44 special education teachers participated in the 30-item ASSET survey instrument, (Ruble et al., 2013). In a study to assess self-efficacy of teachers, the Teacher Interpersonal Self-efficacy Scale (TISES) was administered to 35 special education teacher

participants by Ruble and colleagues in 2011. Finally, Jennett and colleagues assessed teacher self-efficacy using the Teacher Efficacy Scale (TES) for special educators (2003). Participants included 34 teachers utilizing an ABA approach to instruction, and 30 teachers using a TEACCH approach, for a total sample size of 64 teachers.

Reasons for small sample sizes were not explicitly discussed by the authors of prior studies, however it can be assumed the recruitment of a specialized teaching position can be limiting. The recruitment of teacher participants is estimated to be a potential hurdle as (1) there are typically a limited number of teachers of learners with ASD within each school or district, (2) some of these teachers may not teach reading comprehension, and (3) due to the sensitive nature of special education, some teachers may be hesitant to participate, or unable to participate in research. In addition to consideration of prior research, a sample size goal was established by using the formula for calculating sample size recommended by Tabachnik and Fidell (2007):

N (# of participants) > 50 + 8m (# of independent variables)

Considering that there are five independent variables in the present study (preparedness to use effective practices, years of experience, administrator support, learner verbal ability, and instructional setting) a minimal sample size of 90 participants was targeted to establish validity. Despite the mean of 47 participants identified in prior research studies, a participant sample size goal of 90 - 100 teachers was proposed for the present study.

Participants were recruited via the internet. E-mail invitations to participate in the study were sent to teachers and professionals with primary instructional responsibility for learners with ASD beginning with Pennsylvania and New Jersey state education websites. A related hand search of school and district websites to obtain specific teacher contacts was conducted, and invitations were expanded to additional states based on available teacher contact information.

Moreover, invitations were spread colleague to colleague through the use of snowballing and the included statement, "feel free to forward this invitation to colleagues who are also teachers of students with autism spectrum disorder." Furthermore, an invitation to participate in the study along with a link was posted on the online CEC Member Forum, and on the NASET Teacher to Teacher Forum. One follow up e-mail was sent to each potential respondent two weeks after the initial invitation. As per Institutional Review Board recommendations, no follow up notification or contact was used to increase response rates, other than the reminder email. A paper copy of the complete survey was also readily available. This survey was to be used upon request as appropriate to capture responses of teachers in a school setting.

The survey remained open for a period of one month and gathered an initial sample size of 134 participants. Upon analysis, 22 of these responses were eliminated due to participants not completing required sections of the survey including the RTEI adapted instrument, the Effective Practices Survey, and the Job-factors Survey (n = 21) or not meeting the inclusion criteria as a teacher/professional teaching learners with ASD (n = 1). A final sample size of 112 participants was obtained for the present study, exceeding the established goal. See Appendix E for the teacher invitation to participate e-mail, Appendix F for the CEC and NASET professional forum invitations, and Appendix G for a list of initial school sources.

Participant Demographics

The 112 participants span 23 states, ranging from teaching within Pre-K through age 18-21 school-based programs, and encompassing public, private, and charter school staff. It is important to note that throughout the demographic questions participants were able to select multiple response categories as appropriate, and were able to skip questions and/or write a response in a category labeled *other*. Percentages are not reported in relation to multiple

response categories. See Tables 4 - 6.

The majority of teachers reported certification in special education (*n* = 88), followed by elementary education (*n* = 67), academic content area certification (e.g. English teacher) (*n* = 26), autism consultant or BCBA certification (*n* = 16), reading specialist (*n* = 7), and finally speech language pathologist (*n* =7). Teachers were able to select more than one certification area as applicable. The majority of participants have earned a master's degree plus additional credits (*n* = 53; 47%), followed by a master's degree (*n* = 28; 25%), bachelor's degree (*n* = 15; 14%), bachelor's degree plus graduate credits (*n* = 12; 11%), and a doctorate degree (*n* = 3; 3%). In the area of teaching grade level, participants were able to select multiple categories to reflect their current teaching schedule. In order of majority of responses, teachers reported teaching students in the following grade levels: K - 2nd grade (*n* = 42); 3rd - 5th grade (*n* = 41); 6th - 8th grade (*n* = 30); 9th - 12th grade (*n* = 27); all grade levels (*n* = 11); Pre-K (*n* = 3), and ages 18 - 21 in a high school setting (*n* = 3).

Demographic information was also gathered regarding participant education and professional development specific to teaching reading comprehension to learners with ASD. Thirty-eight percent of teachers reported taking 1 - 3 college courses specific to teaching reading, and 36% reported receiving professional development. Moreover 92% reported a desire to receive professional development specific to comprehension and learners with ASD.

In terms of participant setting and location of employment, demographic data was gathered related to type of school, type of classroom, and state of employment. See Table 5.

Table 4

Participant Demographics

	N (%)		*N* (%)
Area of Certification			
Special Education	88	Autism Consult. & BCBA	16
Elementary Education	67	Reading Specialist	7
Academic Content	26	Speech Language Path.	7
Highest Degree			
Bachelor's Degree	15 (14%)	Master's Degree Plus	53 (47%)
Bachelor's Plus	12 (11%)	Doctorate Degree	3 (3%)
Master's Degree	28 (25%)	(No Response)	2
Grade Level Teaching			
Pre-K	3	9^{th} - 12^{th} Grade	27
K – 2^{nd} Grade	42	Ages 18 – 21	3
3^{rd} - 5^{th} Grade	41	All grade levels	11
6^{th} - 8^{th} Grade	30	(No Response)	2
Education specific to Reading Comprehension & ASD:			
Have taken 1-3 college courses in teaching reading comp. to students with ASD			42 (38%)
Have taken no college courses in teaching reading comp. to students with ASD			68 (62%)
(No Response)			2
Professional Development (PD) specific to Reading Comprehension & ASD:			
PD in teaching reading comprehension to students with ASD received			40 (36%)
No PD in teaching reading comp. to students with ASD received			70 (64%)
(No Response)			2
Interest in PD in teaching reading comprehension to students with ASD			100 (92%)
Not interested in PD in teaching reading comprehension to students with ASD			9 (8%)
(No Response)			3

Note. $N = 112$

Table 5

Setting Demographics

Category	*N* (%)	Category	*N* (%)
Type of School			
Public School	77	Home School	4
Private or Non-Public	28	Charter	1
Both Public & Private	3	(No Response)	1
Classroom Type			
General Academic	56	Non-classroom	7
Content Specific	23	TEACCH	5
ABA	27	(No Response)	7
Eclectic	7		
State of Employment (*N* = 112)			
California	11 (10%)	New Jersey	20 (19%)
Colorado	4 (4%)	New York	1 (1%)
Delaware	3 (3%)	Ohio	1 (1%)
Florida	3 (3%)	Pennsylvania	33 (31%)
Georgia	2 (2%)	South Carolina	1 (1%)
Hawaii	1 (1%)	Tennessee	2 (2%)
Illinois	2 (2%)	Texas	4 (4%)
Indiana	3 (3%)	Utah	2 (2%)
Louisiana	1 (1%)	Virginia	5 (5%)
Maryland	5 (5%)	West Virginia	1 (1%)
Montana	1 (1%)	Wyoming	1 (1%)
New Hampshire	1 (1%)	(No Response)	4 (4%)

Note. $N = 112$

The majority of participants reported teaching within a public school (77%), and teaching within a general academic classroom (56%). In addition, the majority of participants reported employment in the states of Pennsylvania (*n* = 33; 31%), New Jersey (*n* = 20, 19%), and California (*n* = 11; 10%). Data pertaining to least restrictive environment and inclusivity of setting was also gathered as independent variables related to job-factors and will be presented in Chapter 4.

In order to gather an understanding of the learners being supported in the area of reading comprehension, participants were asked to provide demographic data regarding the student population they teach within their current or most recent caseload. Specifically, they were asked whether the students participate in statewide assessment, and whether they have a secondary diagnosis of intellectual disability. Moreover, participants were asked about the verbal language ability of their students, an independent variable that will be reported in Chapter 4.

The responses related to statewide assessment were similar, with 56 participants reporting that students on their current caseload do participate in statewide testing, and 55 participants reporting their students do not. Responses to the dual diagnosis question were more variable, with 56 participants reporting primarily teaching students diagnosed with ASD and intellectual disability; and 47 participants reporting teaching students with ASD without intellectual disability. See Table 6 for complete demographic data pertinent to population taught.

Table 6

Population Taught by Participants

Category	N
Statewide Assessment	
Primarily teach students participating in statewide assessment testing	56
Primarily teach students participating in alternate statewide assessment	55
Teach a mix of students that do and do not participate in assessment	5
N/A due to setting or age of students	9
(No response)	4
Diagnosis	
Primarily teach students Diagnosed with ASD without Intellectual Disability	47
Primarily teach students Diagnosed with ASD and Intellectual Disability	56
Teach a mix of student populations	17
(No response)	3

Note. $N = 112$

Instruments

Teacher participants completed a quantitative survey aligned to research questions and purpose. The three-part survey was comprised of (1) the Reading Teaching Efficacy Instrument (RTEI), (2) the Effective Practices Survey, and (3) the Job-related Factors Survey. The RTEI is an instrument with established construct validity developed by Szabo and Mokhtari (2004) and adapted for this study (RTEI-a). The Effective Practices Survey, and the Job-related Factors Survey are questionnaires developed for this study. See Appendices B – D for complete surveys.

Reading Teacher Efficacy Instrument. The Reading Teaching Efficacy Instrument (RTEI) was developed by Szabo and Mokhtari (2004) to assess pre-service teacher self-efficacy

in teaching reading. The two-part RTEI measures (a) *teacher self-efficacy*: the perceptions and attitudes toward the ability to teach reading, and (b) *outcome expectancy*: perceptions and attitudes toward the ability to influence student reading development (Szabo & Mokhtari, 2004). No known studies have assessed the self-efficacy of teachers of learners with ASD in relation to teaching the specific academic content area of reading comprehension.

The RTEI was developed as the first measure of self-efficacy in teaching reading, and measures two related constructs independently through statements that are integrated throughout one questionnaire: (1) The teacher *self-efficacy* component measures teachers perceptions and attitudes toward their ability to teach reading, as assessed through responses toward nine statements; (2) The teacher *outcome expectancy* component measures teacher perceptions and attitudes toward their ability to influence the reading development of their students through response to six statements (Szabo & Mokhtari, 2004). The 15 total questions are presented in a Likert scale format with participant response choices ranging from "1 = strongly disagree" to "5 = strongly agree" (Szabo & Mokhtari, 2004).

Although this instrument can be measured in two ways, as one complete instrument, or as two separate instruments, conclusions from instrument developers recommend using the instrument to determine results in the two distinct subscales of self-efficacy and outcome expectancy, as utilized in this present study. The instrument developers assessed internal consistency through reliability analysis and found the final *self-efficacy* component of the RTEI to have a reliability alpha coefficient of .83, and the final *outcome expectancy* component of the RTEI to have a reliability alpha coefficient of .70 (Szabo & Mokhtari, 2004). Responses for the two distinct subscales are scored using the categories of low, average, and high (Szabo & Mokhtari, 2004). The RTEI self-efficacy component has a possible score of 10-50: Low = 10-

35; Average = 36-46, and High = 47-50. The RTEI outcome expectancy component has a possible score of 6-30: Low = 6-17; Average = 18-24, and High = 25-30. This scoring system is proposed for the adapted RTEI participant responses.

Furthermore, the RTEI was developed as a tool to assess and provide support for new teachers and teacher candidates, and no studies are available in which the RTEI was given to teachers of learners with ASD. As a result, several adaptations were made to the original instrument. A sample statement prompting teacher reflection in the self-efficacy component includes, "I understand the process of reading well enough to be effective in teaching reading." Additionally, a sample prompt for the outcome expectancy measure includes, "When the reading performance of students improves, it is often because their teacher has found a more effective way to support reading" (Szabo & Mokhtari, 2004, p. 63-64). For purposes of this study, RTEI statements were minimally adapted (RTEI-a) to consistently keep teacher participants focused on the teaching of comprehension (e.g. not decoding) and on teaching learners with ASD (e.g. not the general student population). For example, the RTEI statement, "I will continually look for better ways to teach reading" was adapted to, the RTEI-a statement "I continually look for better ways to teach reading comprehension to students with ASD." The RTEI five point Likert scale remained unchanged.

Effective Practices Survey. The Effective Practices Survey was developed based on results of the conducted research synthesis of the extant literature to identify effective practices specific to teaching reading comprehension to learners with ASD. This research emphasis served as a means to establish survey content validity. A primary purpose of this study was to narrow the research to practice gap in the area of comprehension and to assess teacher preparedness to use the effective practices explicitly recommended by the current research. The Effective

Practices Survey was developed with an emphasis on this research-based content; the survey focuses on teacher preparedness to use each of the identified effective practices of: anaphoric cueing (Solis et al., 2013), compare and contrast diagrams (Carnahan & Williamson, 2013), cooperative learning (Kamps et al., 1994; Kamps et al., 1995), direct/explicit instruction (Flores & Ganz, 2007; Flores & Ganz, 2009; Roux et al., 2014), graphic organizers (Carnahan & Williamson, 2013), question generation (Hua et al., 2012), read-alouds (Mims et al., 2012), reciprocal questioning (Whalon and Hanline, 2013), story structure or character event maps (Stringfield et al., 2011; Williamson et al., 2014), systematic prompts (Mims et al., 2012), and a multiple strategy approach, or a combination approach using the foregoing effective practices. As discussed in Chapter 2, these effective practices were also deemed the current standard for teaching comprehension to learners with ASD from a second source beyond this researcher's synthesis, the recently published synthesis of El Zein and colleagues (2014).

The Effective Practices Survey was used to capture teacher perceptions toward their preparedness to use the 11 effective practices through their response to 11 statements, one for each practice identified through the research synthesis. Statement wording was modeled and adapted from the format of statements used in an inventory of teacher perceived self-efficacy in mathematics, the Mathematics Teaching Efficacy Beliefs Instrument (MTEBI); specifically from the format of the statement, "I understand mathematics concepts well enough to be effective in teaching elementary mathematics" (Enochs, Smith & Huinker, 2000). For example, to assess use of the effective practice *anaphoric cueing* teachers were presented with the following statement, "I understand *anaphoric cueing* well enough to use it as an effective strategy to teach reading comprehension to students with ASD."

Well-designed surveys maintain consistency in participant response categories (Fanning,

2005). Remaining consistent with established RTEI instrument scoring, participants were instructed to respond to each statement on the Effective Practices Survey using the same five point Likert rating scale ranging from strongly agree to strongly disagree. Participant total scores range from 11-55 and were used in the hierarchical regression model to associate the variables of teacher use of effective practices and job factors with teacher self-efficacy and outcome expectancy scales obtained from the RTEI-a instrument.

Open-ended question. Prior to presentation of the 11 quantitative statements, the Effective Practices Survey began with one initial open-ended question, "In your experience what research-based instructional strategies stand out as those you use effectively to teach reading comprehension to students with ASD?" Use of this initial survey question pertinent to the purpose was designed to establish participant trust and increase participant decision to continue on to survey completion (Fanning, 2005). This initial open-ended question was analyzed and quantified to serve as a check for consistency when compared to participant responses to the subsequent quantitative teacher preparedness to use effective practices questions. Quantifying open-ended data is an effective technique in data analysis (Teddlie & Tashakkori, 2009). Specifically, participant responses were coded 1-11 through comparison to the actual effective practices emerging from the literature, as assessed by the Effective Practices Survey. For example, if a participant gave a response of "direct instruction," this was given a score of 1 as it represented one of the effective practices. If a participant gave a response that was not one of the effective practices, for example "re-teaching," it was given a score of 0. The number of participants reporting each effective practice on the open-ended survey was summed, and mean reporting of each effective practice was calculated. This descriptive data is reported in Chapter 4 (See Table 10). Overall, the survey was able to elicit an understanding of teacher use of effective

instructional practices, and to understand whether or not teachers feel efficacious about using these practices in their classrooms to increase student outcomes.

Job-related Factors Survey. The third survey component, the Job-related Factors Survey provided data pertinent to the remaining predictor variables (a) teacher years of experience; (b) administrator support; (c) learner verbal language ability; and, (d) instructional setting. Participant data provided in response to these four predictor variables was included in the hierarchical regression analysis developed to investigate Research Question 2 and Research Question 3. Participants provided a response to one statement for each variable in a categorical format, selecting the category that best indicated their current employment and experiences with learners on their current caseload. Following the four statements providing data related to predictor variables, the Job-related Factors Survey transitioned into the gathering of pertinent demographic data including teacher certification, grade level teaching, education and professional development, administration factors, type of classroom, and learner functioning as reported.

Finally, the Job-related Factors Survey was used to gather data pertinent to participant inclusion or exclusion. The survey invitation included the criteria that participants must self-identify as a teacher of students with ASD to participate in the study. Data analysis began with verifying the appropriate response to the inclusion criterion of "certification" embedded in the Job-related Factors Survey demographic section. Participants were provided with options meeting inclusionary criteria, specifically the certifications of: special education; reading specialist; elementary education; autism consultant; and content specific certification. Furthermore, the survey provided respondents the ability to write an open-ended comment in the category of *other*. Of note, multiple participants wrote "speech and language pathologist" into

this other category (n = 7). Surveys of participants indicating certifications that were unclear as to whether they held the instructional decision-making for learners with ASD, and/or response of teacher assistant or administrator, were excluded from further data analysis (n = 1).

Variables

This study aimed to investigate the relationship of multiple variables on teacher perceptions related to teaching reading comprehension to learners with ASD with the purpose of gaining insight to guide future research and related professional development. The dependent variables considered through this proposed study included two variables related to teacher perception measured through the RTEI-a instrument: (1) teacher self-efficacy, and (2) teacher outcome expectancy. Five independent variables were considered throughout the study as potential predictors of self-efficacy and outcome expectancy. These potential predictors included (1) teacher preparedness to use effective practices, (2) teacher experience, (3) support from administration, (4) learner verbal language ability, and (5) instructional setting. Dependent variable data obtained from the RTEI took the form of a separate numerical scale for self-efficacy, and for outcome expectancy. Independent variable data including teacher use of effective practices data was obtained from results of the Effective Practices Survey. The remaining independent variable data related to teacher experience, administrator support, learner verbal language, and instructional setting was obtained from questions on the Job-related Factors Survey. For purposes of data analysis using predictive modeling, dependent variables are referred to as criterion variables, and independent variables are referred to as predictor variables. See Figure 2 for a representation of criterion variables to be analyzed in relation to predictor variables and hypotheses.

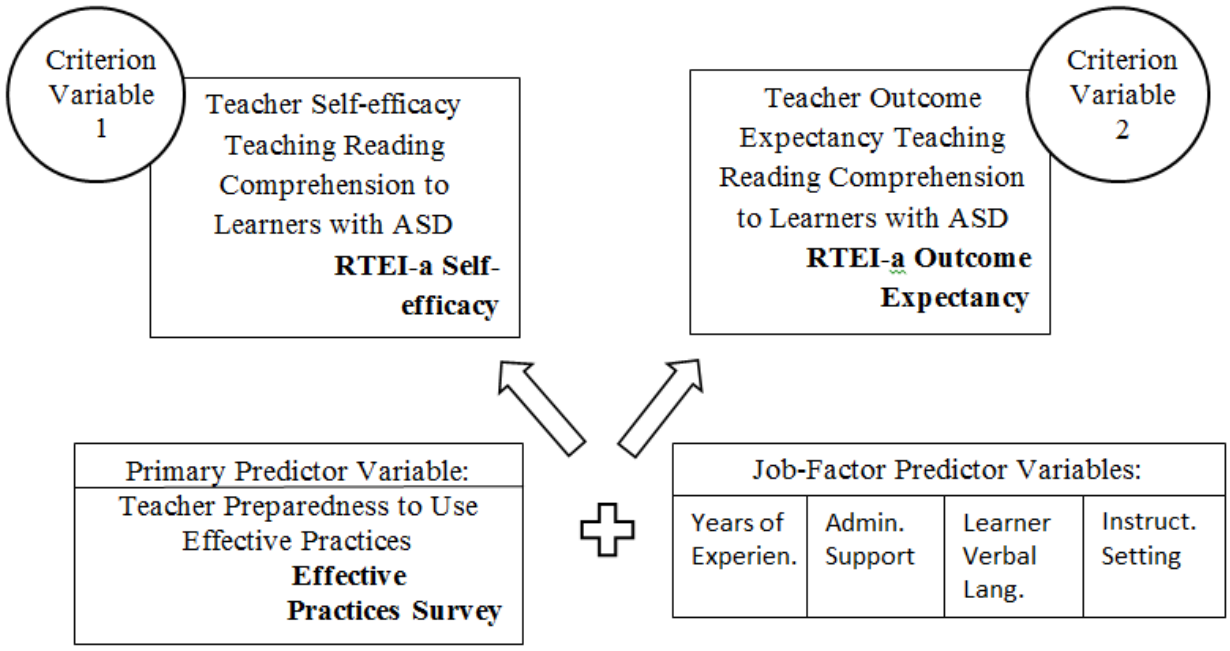


Figure 2. Criterion and predictor variables investigated. Teacher preparedness to use effective practices, along with the four job-factors, are the predictor variables for both self-efficacy and outcome expectancy.

Data Collection and Analysis

This study included both descriptive and predictive research questions, and data analysis varied based on the type of research question. Research Question 1 was descriptive in nature and asked, what current effective practices for teaching reading comprehension do teachers report using in the classroom? Data for this question was addressed by (1) scoring responses to the Effective Practices Survey, and (2) quantifying the descriptive open-ended responses from participant responses to the initial open-ended question responses with the same 11 effective practices.

A total score for each participant was calculated from the Effective Practices Survey. Participant responses to the 11 quantitative questions were summed resulting in a total score ranging from 11-55. Because data related to the Effective Practices Survey is limited to this

study, it is important to note that reported data is based on sample characteristics only, and not based on reliable normative data.

In addition, participant responses to the initial Effective Practices Survey open-ended question were coded 1-11, corresponding with the 11 actual effective practices emerging from the literature. Following this coding, percentage data, and data indicating the total number of teachers writing in each instructional practice as one they have personally found effective were compared with the quantitative results. The five quantitative categories (strongly agree – strongly disagree) were collapsed to dichotomous categories, with one category indicating preparedness to use the effective strategy (encompassing strongly agree, and agree responses), and one category indicating lack of preparedness to use the effective strategy (encompassing undecided, disagree, and strongly disagree responses).

Research Questions 2 and 3 were predictive in nature and were investigated using multiple regression analysis. Research Question 2: Is teacher preparedness to use effective practices along with the job-related factors of experience, administrator support, learner verbal language ability, and setting predictive of teacher perceived self-efficacy in teaching comprehension to learners with ASD? Teacher preparedness to use effective practices, and teacher job-related factors as predictors of self-efficacy, were examined using hierarchical regression. Hierarchical regression is used to consider the relationship among two or more predictor variables and their related changes to the criterion variable. In terms of Research Question 2, the relationship considered was that of teacher preparedness to use effective practices identified through the Effective Practices Survey, along with data obtained from the Job-related Factors Survey, on the criterion variable of teacher perceived self-efficacy identified through the RTEI-a. The multiple regression prediction model was represented by a combination

of predictor variables in the following equation, assuming Y'_1 is a linear function:

$$\boldsymbol{Y'_1 = a + b_1x_1 + b_2x_{2+} b_3x_{3+} b_4x_{4+} b_5x_5}$$

In this study the following functions were defined as:

Y'_1 = teacher perceived self-efficacy
x_1 = preparedness to use effective practices
x_2 = teacher experience
x_3 = administrator support
x_4 = learner verbal language ability
x_5 = instructional setting

Research Question 3: Is teacher preparedness to use effective practices along with the job-related factors of experience, administrator support, learner verbal language, and setting predictive of teacher perceived outcome expectancy regarding their professional ability to improve the comprehension of learners with ASD? Research Question 3 mirrored Research Question 2 in terms of the predictor variables, with a change in the criterion variable being investigated to teacher perceived outcome expectancy. The related expectation that teacher preparedness to use effective practices and teacher job-related factors were predictors of teacher perceived outcome expectancy were investigated using multiple regression to consider the relationship among the same predictor variables and the criterion variable of teacher outcome expectancy identified through the RTEI-a. The multiple regression prediction model was represented by a combination of predictor variables in the following equation, assuming Y'_2 is a linear function:

$$\boldsymbol{Y'_2 = a + b_1x_1 + b_2x_{2+} b_3x_{3+} b_4x_{4+} b_5x_5}$$

In this study the following functions were defined as:

Y'_2 = teacher outcome expectancy
x_1 = preparedness to use effective practices
x_2 = teacher experience
x_3 = administrator support
x_4 = learner verbal language ability
x_5 = instructional setting

IBM SPSS Statistics 21 was used to analyze the effectiveness of each equation, and to determine the relationship among variables. Hierarchical regression analysis was considered the most effective means to identify the strength of the variables as predictors of both teacher perceived self-efficacy and teacher perceived outcome expectancy related to teaching comprehension to learners with ASD based on current research and experience.

Hierarchical Regression Analysis

In hierarchical analysis, independent variables are ordered in terms of causal priority (Cohen, Cohen, West & Aiken, 2003). Hierarchical analysis was selected as the method for this study as it is preferable to use hierarchical analysis based on available research and theory, over computer generated stepwise analysis, when the research is exploring how the prediction of certain variables (the job-factors) improve upon the prediction of others (preparedness to use effective practices) (Leech, Barrett & Morgan, 2011). Subsequently, the five predictor variables were considered and ordered based on research and experience in the causal priority of (1) preparedness to use effective practices, (2) teacher years of experience, (3) administrator support, (4) learner verbal ability, and (5) instructional setting. Research warrants investigating teacher use of effective practices and job-related factors as predictors of self-efficacy and outcome expectancy. In a research study, Jennett and colleagues found that "teachers with a stronger commitment to or understanding of the underlying theoretical orientation of their teaching approach have a greater sense of efficacy particularly with respect to their own effect on students" (Jennet et al., 2003, p. 590). Upon relating this quote to teacher use of effective practices related to perceived efficacy and outcome expectancy, it was hypothesized that teacher use of current effective practices would be the primary predictor of both teacher perceived self-efficacy and student outcome expectancy. As a result, participant total scores on the Effective

Practices Survey were entered as the first block, or primary predictor variable, in the hierarchical regression model.

Siwatu and colleagues found that teacher beliefs about their own capabilities fluctuate depending on the current context and task (Siwatu, Frazier, Osaghae & Starker, 2011). In line with this research, it was hypothesized that a combination of teacher job-related factors would add to the strength of the self-efficacy and outcome expectancy prediction models. For classroom teachers, access to evidence-based research holds the potential to increase student educational outcomes (Mazzotti, Rowe & Test 2012; Torres et al., 2012). Subsequently, it was expected that teacher perceived self-efficacy and outcome expectancy would be predicted by not only use of effective practices but also years of experience implementing such practices as the second strongest predictor of self-efficacy and outcome expectancy. Teacher reported years of experience was therefore entered as the second block in the hierarchical regression model, with the categories of 0-2 years, 3-9 years, and 10+ years coded and entered in a forward manner.

Following the variables of preparedness to use effective practices and teacher experience, the job-related factor of administrator support was considered. Supportive school administrators are responsible for taking a leadership role in supporting teachers with access to research-based practices to teach individuals with special needs, and for providing professional development (Simonsen et al., 2010). Simonsen and colleagues recommend a model in which administrators and teacher preparation programs support teachers in becoming trained as "interventionists with a flexible and comprehensive skill set to work across many settings through a system of education and support" (2010, p. 21). In addition, this researcher's self-efficacy and outcome expectancy as a former teacher was shaped by strong administrator support, and by the awareness that teacher ability to gain education and professional development may be reliant on

professional and financial support from school administrators. As a result, support received by school administration was the next expected predictor of teacher perceived self-efficacy and outcome expectancy. The variable of administrator support was analyzed as the third block in the hierarchical regression model, via the categories of high level of support, some support, and lack of support.

Moreover, the specific characteristic of learner verbal language ability was investigated. One of the factors influencing the development of comprehension in learners with ASD is oral language (Ricketts, 2011). Communication impairments in learners with ASD may limit comprehension (Ricketts, Jones, Happé & Charman, 2013). The variability in verbal language ability in learners with ASD can make planning high quality instruction challenging (Carnahan, Williamson, Haydon, 2009). Unfortunately, due to limitations in verbal language and perceived cognition, some learners with ASD may not be provided with quality instruction in literacy as teachers prioritize other tasks (Mirenda, 2003). As a result it was hypothesized that the learner characteristic of verbal ability would be a predictor of teacher self-efficacy and outcome expectancy. The variable was analyzed as the fourth block in the hierarchical regression model, with the variables of typical to high functioning in terms of verbal language ability, moderately to mildly impaired in terms of verbal language ability, severely limited in verbal ability and/or non-verbal learners, and a caseload of learners of mixed verbal abilities, entered via forward analysis.

Finally, the instructional setting teachers find themselves in daily, whether inclusive, self-contained, or a combination of both, was hypothesized to be a predictor of self-efficacy and outcome expectancy, yet had the most limited research base. All students benefit from quality reading instruction geared toward students with ASD in an inclusive classroom (Chandler-Olcott

& Kluth, 2009). Whalon and Hart observed the actual literacy instruction in inclusive classrooms in order to gain a better understanding of the instruction for learners with ASD in this setting. They found that teaching reading was limited to phonics in the early grades, and teacher questioning about text in the upper elementary grades with teachers in the inclusive setting moving from a pattern of teaching students to read, to expecting students to comprehend to learn content (2011). No studies were identified investigating the teaching of reading comprehension in self-contained classrooms. As a result of a lack of research related to instructional setting, this variable was explored as the final predictor of teacher perceived self-efficacy and outcome expectancy and became the last and fifth block in the model. Variables related to the categories: full time inclusive setting, a partially inclusive and partially self-contained setting, a self-contained setting, and a 1:1 setting, were entered in a forward manner.

Each of the four job-factor variables was analyzed through a coding system in which participant categorical responses were numbered as 0 = evident, and 1 = not evident, referred to as dummy variables (Kachigan, 1986). The research goal was to explore the causal relationship of the primary predictor variables (i.e. administrator support) yet there was no basis or reason for prioritizing the related categorical responses (i.e. high level of support; moderate support, and lack of support). As a result, the block of dummy variables related to each job-factor was entered in SPSS using forward analysis. This regression analysis technique is "primarily hierarchical" and "incidentally stepwise" resulting in an a priori hierarchical analysis of the five researched predictor variables, along with purposeful results related to the participant response categories (Cohen et al., 2003, p. 161). See the five predictor variables displayed by hierarchical analysis blocks, along with related ordinal categories, in Table 7.

Table 7

Hierarchical Regression Predictor Variables

Block 1	Block 2	Block 3	Block 4	Block 5
Effective Practices: (reported as total score of 11-55)	**Years of Experience:** • 0-2 years • 3-9 years • 10+ years	**Admin. Support:** • High • Some • Low	**Learner Verbal Ability:** • High • Moderate • Low or NV • Mixed	**Instructional Setting:** • Inclusive • Partially Incl. • Self-contained • 1:1 instruction

An analysis of participant responses to the ordinal categories in relation to the predictor variable of learner verbal ability revealed a number of participants selected multiple categories and used the open-ended *other* category to note that they are responsible for teaching learners with an overall mix of verbal abilities. In response to this data, a fourth category of mixed verbal ability was established (n = 22). Similarly, in relation to the predictor variable of setting, multiple participants wrote in the open-ended *other* category that they worked with students in a one on one setting, for example as speech and language pathologists responsible for supporting students in the area of comprehension and communication. In response, a 1:1 instruction category was established (n = 8).

Data Analysis Steps

Prior to the hierarchical analysis, regression coefficients were analyzed to indicate the contribution of each predictor variable to the change of the criterion variable (McMillan & Schumacher, 2006). Next, tolerance levels were analyzed to ensure there were not multicollinearity issues. Assessment of collinearity was conducted to ensure that high intercorrelations among predictor variables were not evident, and did not lead to unreliable

results. There is disagreement in the field regarding methods which indicate freedom from multicollinearity using the statistics of tolerance and variance inflation factor (VIF). As a result, several tests of multicollinearity were considered, including the suggestion that tolerance values below .10 along with a VIF exceeding 10 indicate a serious problem with collinearity (Cohen et al., 2003), and the recommendation that tolerance exceed 1 - R^2 (Leech et al., 2011).

Hierarchical analysis was then used to gain understanding into the extent to which teacher preparedness to use effective practices and teacher job-related factors are predictors of teacher perceived self-efficacy and outcome expectancy, with the goal of gaining insight to guide future research and professional development. A *p* value, of .05 or below was considered to be a reliable indicator of significance for variables in the prediction models (Cohen et al., 2003). The models for both teacher perceived self-efficacy and outcome expectancy, displaying normally distributed residuals, intercorrelations, and regression coefficients, are presented in Chapter 4.

Missing Data

In consideration of participant's ability to voluntarily participate and withdrawal from the survey with minimal risks of participation, it was decided that participants would not be required to respond to every question on the research survey. Twenty-one respondents either skipped large sections of the survey, such as the entire RTEI instrument section, or skipped required responses related to the independent job-factors questions. These respondents were therefore eliminated as participants. In other instances, participants left an individual response throughout the RTEIa survey and/or the Effective Practices Survey blank. Both of these surveys requested participants choose an ordinal response from 5 = strongly agree, to 1 = strongly disagree. In the study analysis, this missing data was handled by replacing each nonresponse with the mean response of all participants to the question. Substituting missing responses with the mean

variable reflecting group responses is an appropriate method for coding missing data in quantitative scales (Cohen et al., 2003).

Reliability and Validity

This prediction study utilized an on-line self-report survey believed to be a means for collecting data from a large sample of teachers of learners with ASD. Capturing a wide representation of teachers of students with ASD, a limited population, is essential to increasing reliability of findings. In terms of surveys, the researcher developed Effective Practices Survey was potentially validated via the three psychometric measures of (1) content validity, (2) inter-item correlation, and (3) internal consistency. The survey was founded in research-based content, with the effective practices being assessed for use identified through a thorough synthesis of the research. Adding to this content validity is the recently published synthesis conducted by El Zein and colleagues (2014) that corroborates and strengthens synthesis findings. During data analysis, measures of inter-item correlation were conducted, along with a test of internal consistency using Cronbach's alpha to establish reliability, as reported in Chapter 4. Furthermore, the two-part RTEI inventory was selected in part for its established reliability (alpha coefficient of .83 and .70) (Szabo & Mokhtari, 2004).

Moreover, in an effort to diminish the limitations inherent in self-report, methodological data triangulation in the form of an open-ended question included in the teacher Effective Practices Survey, served as a means for corroborating data obtained from the quantitative survey responses. Methodological triangulation was used purposefully to investigate corroboration and/or convergence of findings, and to increase study validity (Greene, 2007).

Consent and Confidentiality Procedures

Due to the nature of online survey methodology, contact with participants as a researcher

was limited to the initial e-mail invitations to participate in the study. Participants were not asked to provide their names or contact information. Survey data was kept confidential, and direct contact with participants did not occur. The survey itself began with a document of informed consent detailing a description of the research, data confidentiality, voluntary participation and withdrawal, expected time involvement, and risks and benefits of participation. The data collected in this research project will remain confidential, and participant e-mails were not linked to survey responses. This survey was conducted through the third party server, Survey Monkey.

Additionally, participation in this study was completely voluntary and participants were able to end the survey at any time. In terms of risks and benefits, the risks associated with the study to participants were minimal and commensurate with those encountered in the course of a typical day. Participants did not receive compensation for participating in this study. As recommended by the Arcadia University IRB, the document of informed consent included the statement, "I understand the nature and purpose of this project and filling out this survey provides consent for the information to be used anonymously and confidentially in the study. I understand that I can choose to leave a question blank if I would rather not answer it. Clicking 'next' or turning this page constitutes my informed consent to participate in this research." See Appendix H for the complete informed consent document.

Timeline

The timeline for this research study included: dissertation proposal defense and revisions completed in February 2015; Institutional Review Board submission and revisions completed in March 2015; research data collection via the final survey posted on Survey Monkey conducted March/April 2015; and finally, data analysis, findings and recommendations completed

May/June of 2015.

Summary

In summary, this study utilized quantitative methods to investigate teacher preparedness to use effective practices to teach reading comprehension to learners with ASD, along with teacher job-related factors as predictors of how teachers perceive their ability to teach comprehension to learners with ASD, and how teachers perceive their professional ability to improve the comprehension of learners with ASD. Overall it remains the hope of this researcher that data obtained through this quantitative study will help guide future research and professional development leading to increased teacher knowledge in teaching comprehension, and improved reading outcomes for learners with ASD.

CHAPTER IV

Results

The purpose of this study was to investigate teacher preparedness to use effective practices to teach reading comprehension to learners with ASD, along with teacher job-related factors of experience, administrator support, learner verbal language, and instructional setting, as predictors of (1) teacher perceived self-efficacy in teaching comprehension to learners with ASD, and (2) teacher perceived outcome expectancy regarding their professional ability to improve the comprehension of learners with ASD. The study used descriptive and predictive analysis to answer three research questions. Results related to the investigated research questions follow, beginning with participant responses to the Effective Practices Survey, followed by the results of the Job-related Factors Survey, and culminating with results pertinent to the two criterion variables of self-efficacy and outcome expectancy.

Effective Practices Survey

The anticipated primary predictor variable in this study was teacher preparedness to use effective practices. To assess the reliability of the researcher developed Effective Practices Survey, Cronbach's alpha was applied to the 11 items summed to establish the survey total score. The resulting reliability coefficient indicates strong internal consistency among the 11 survey questions ($\alpha = .885$, $M = 43.52$, $SD = 7.27$). In addition, *Cronbach's alpha if deleted* statistics were analyzed, and indicated that if the question asking participants to indicate their preparedness to use anaphoric cueing were removed, alpha would increase to .887. As this increase of .002 was minimal and as it was expected that some teachers might not have heard of the instructional practice, anaphoric cueing, a decision was made not to remove the item. Deletion of the other 10 items was not recommended, and would result in a lowering of the

Cronbach's alpha coefficient.

Responses to the 11 quantitative questions on the Effective Practices Survey were summed for each effective practice using SPSS (see Table 8). For each effective practice, teacher *strong agreement to preparedness to use it*, and teacher *agreement to preparedness to use it* were summed to indicate an overall level of preparedness. Beginning with majority response, 80% or more teachers reported preparedness to use the instructional practices of graphic organizers (93%), read-alouds (91%), direct instruction, (89%), and compare and contrast charts (88%). Teachers reported a lower level of agreement with their own preparedness to use the instructional practices of a multiple strategies approach (79%), cooperative learning (75%), story structure (71%), systematic prompts (69%), question generation (65%), reciprocal questioning (61%), and anaphoric cueing (24%).

Furthermore, a descriptive analysis of the Effective Practices Survey results was conducted to assess which groups of teachers indicated the overall lowest and highest preparedness to use research-based effective practices. Mean responses and standard deviations are provided in Table 9. The overall mean, based on a possible score of 11-55, was 43.52. The category of teachers reporting the lowest mean preparedness to use effective practices, along with the lowest range of scores (Range = 22-51), was the group teaching in a 1:1 or therapeutic setting (M = 38.14). This was followed by those teaching non-verbal learners or learners with low verbal language ability (M = 39.00), those with 0-2 years of teaching experience (M = 40.69), and those with a reported lack of administrator support (M = 40.86). In contrast, the category of teachers reporting the highest mean preparedness to use effective practices emerged as those with a high level of administrator support (M = 46.33), followed by those teaching in a mixed partially inclusive/partially self-contained setting (M = 46.25).

Table 8

Quantitative Reporting of Preparedness to Use Effective Practices

Effective Practices	Strongly Agree		Agree		Undecided		Disagree		Strongly Disagree	
	n	%	*n*	%	*n*	%	*n*	%	*N*	%
Anaphoric cueing	9	8	18	16	23	21	40	36	22	20
Compare & contrast	55	49	44	39	6	5	4	4	2	2
Cooperative learning	38	34	46	41	16	14	11	10	1	1
Direct Instruction	55	49	45	40	5	5	5	5	1	1
Graphic organizers	65	58	39	35	5	4	3	3	0	0
Multiple strategies	44	39	45	40	15	14	6	5	1	1
Question generation	37	33	36	32	21	19	16	14	1	1
Read-alouds	62	55	40	36	6	5	4	4	0	0
Reciprocal questioning	33	29	35	31	26	23	17	15	1	1
Story Structure	34	30	46	41	17	15	13	12	2	2
Systematic prompts	39	35	38	34	15	13	18	16	1	1

Note. $N = 112$

Table 9

Preparedness to Use Effective Practices Descriptive Statistics

Variable	*N*	%	Range	Frequency	
				Mean	*SD*
Effective Practices TOTAL			11 – 55	43.52	7.27
Years of experience					
10 + years	66	59	20 - 55 (35)	43.98	8.01
3 – 9 years	33	29	33 - 54 (21)	43.71	5.55
0 – 2 years	13	12	29 - 52 (23)	40.69	6.60
Administrator Support					
High Level Support	30	27	20 - 55 (35)	46.33	8.01
Some Support	61	54	22 - 55 (33)	42.94	7.02
Lack of Support	21	19	27 - 55 (28)	40.86	5.70
Learner Verbal Ability Taught					
High Verbal Ability	28	25	35 - 55 (20)	45.26	6.02
Moderate Verbal Ability	34	30	35 - 55 (20)	45.47	6.12
Low or Non-verbal	28	25	20 - 55 (35)	39.00	7.99
Teaching Mixed Levels	22	20	26 - 54 (28)	44.05	7.28
Instructional Setting					
Inclusive	22	19	20 - 55 (35)	41.36	8.53
Partially Incl. Part Self-cont.	41	37	36 - 55 (19)	46.25	5.76
Self-contained	41	37	27 - 55 (28)	42.95	6.59
1:1 Setting	8	7	22 - 51 (29)	38.14	10.34

Note. Total scores obtained from the Effective Practices Survey

Descriptive Results: Research Question 1

Research Question 1 asked, what current effective practices for teaching reading comprehension do teachers report using in the classroom? For purposes of this study effective practices were identified as: anaphoric cueing, compare and contrast diagrams, cooperative

learning, direct/explicit instruction, graphic organizers, question generation, read-alouds, reciprocal questioning, story structure maps/character event maps, systematic prompts, and a multiple strategy approach.

This research study was designed with an initial open-ended question asking participants to list all the strategies they have found to be effective in teaching reading comprehension to students with ASD. One hundred and one participants responded to this question, and 11 participants left the question blank. Participant responses were analyzed and coded 1 -11 in alignment with the 11 effective practices identified through the synthesis of the research. Table 10 displays the number and percentage of teachers actually reporting each of the research synthesis identified practices as effective in the classroom. Teacher reporting of the research-based *effective* practices was limited. Of all the effective practices to teach reading comprehension to learners with ASD, direct instruction and graphic organizers were the most highly reported, however the percentage of teachers listing each practice was low, 15% for graphic organizers (n = 17), and 14% for direct instruction (n = 16).

Additional participant responses from highest to lowest percentage reported include: reciprocal questioning (6%, n = 7), story structure (5%, n = 4), read-alouds (4%, n = 4), question generation (3%, n = 3), systematic prompts, (3%, n = 3), anaphoric cueing (1%, n = 1), compare and contrast charts (1%, n = 1), and cooperative learning (0%). This range of 0 – 15% is lower than the teacher reported preparedness to use each effective practice range of 24 – 91% on the quantitative component of the survey, indicating a discrepancy between teacher reported effective practices to teach reading comprehension to learners with ASD on the initial open-ended question, and teacher reported preparedness to use effective practices identified via the research synthesis on the quantitative component of the survey.

Table 10

Comparison of Quantitative Reporting and Open-ended Responses

	Teachers Reporting Preparedness to Use Effective Practices (Agree & strongly agree on Effective Practices Survey)		Practices Reported by Teachers as Effective in the Classroom (From the initial open-ended question)	
Effective Practices	*n*	%	*n*	%
Anaphoric cueing	27	24	1	1
Compare & contrast	99	88	1	1
Cooperative learning	84	75	0	0
Direct instruction	100	89	16	14
Graphic organizers	104	93	17	15
Multiple strategies	89	79	*	*
Question generation	73	65	3	3
Read-alouds	102	91	4	4
Reciprocal Questioning	68	61	7	6
Story structure	80	71	6	5
Systematic prompts	77	69	3	3

Note. N = 112; Multiple Strategy Approach is not reported as all participants listed more than one strategy; however, no participants specifically noted using strategies simultaneously

The practices for teaching reading comprehension reported as effective by the majority of teachers did not match the effective practices found in the literature. Findings reveal a discrepancy between teacher reported effective practices and those recommended by researchers.

Prediction Model Variables

The remaining research questions were investigated using hierarchical regression analysis, with a prediction model analyzed for each criterion variable of self-efficacy and outcome expectancy. It was anticipated that teacher preparedness to use effective practices as detailed in relation to Research Question 1 would be the primary predictor variable of self-efficacy and outcome expectancy, and that a combination of job-related factors would add to each prediction model. Self-efficacy and outcome expectancy data, along with job-related factor data follow.

Self-efficacy and outcome expectancy. As a precursor to the regression analysis, the overall levels of teacher reported self-efficacy and outcome expectancy were analyzed (see Table 11). In terms of self-efficacy, only 5% of teachers felt a high sense of self-efficacy teaching comprehension to learners with ASD, 64% indicated an average level of self-efficacy, and 31% indicated a low level of self-efficacy. In terms of outcome expectancy, indicating teacher beliefs about their own ability to increase student outcomes in the area of comprehension, 16% of teachers reported high outcome expectancy, 69% reported average outcome expectancy, and 15% reported low outcome expectancy.

Table 11

Reported Teacher Perceived Self-efficacy and Outcome Expectancy

Teacher Reported Levels from RTEIa	Self-efficacy (Hypothesis 2)		Outcome Expectancy (Hypothesis 3)	
	n	%	*N*	%
High Level	6	5	18	16
Average Level	71	64	77	69
Low Level	35	31	17	15

Note. $N = 112$

Job-related factors. Job factor data related to the four remaining predictor variables of teacher years of experience, administrator support, learner verbal ability, and instructional setting germane to this prediction study were collected via the Job-related Factors Survey. Results, reported by survey response categories, follow.

Teacher years of experience. When asked to provide total years of teaching experience, the largest group of teachers (59%, $n = 66$) reported 10 plus years of teaching, followed by 29% ($n = 33$) reporting 3 – 9 years of experience, and 12% ($n = 13$) reporting 0 – 2 years of experience as teachers. This data aligns with national statistics as discussed in Chapter 5.

Support from administrators. In terms of the level of support received by principals and administrators, teachers were asked to select among the categories of: high level of support including consistent encouragement, financial reimbursement for professional development, and provided classroom materials (high level); some support including encouragement, or classroom materials, or financial reimbursement for professional development (some level of support); or, lack of support including no financial reimbursement for professional development, limited classroom materials, and no encouragement. The largest group of teachers reported some level of

support (54%, *n* = 61), followed by 27% of teachers reporting a high level of administrator support (*n* = 30), and 19% reporting a lack of support from school administrators (*n* = 21).

Learner verbal language ability. For the predictor variable related to verbal language ability, teachers were asked to consider students on their current or most recent caseload, and to indicate if they primarily teach students with ASD that they consider typical to high functioning in terms of verbal language ability (high); moderately to mildly impaired in terms of verbal language ability (moderate); severely limited in verbal language ability and/or non-verbal learners (low); or, if they teach learners of mixed verbal abilities (mixed). Responses to this question were varied with 25% teaching learners with high verbal ability (*n* = 28), 30% teaching learners with moderate verbal ability (*n* = 34), 25% reporting low or non-verbal learners (*n* = 28), and 20% reporting mixed level learners (*n* = 22).

Instructional setting. Moreover, for the predictor variables of instructional setting, teachers were asked to consider their current or most recent caseload of learners and their instructional settings, and to then report the setting in which they primarily teach. Nineteen percent of teachers reported teaching in the least restrictive inclusive environment (*n* = 22), 37% reported teaching in a partially inclusive and partially self-contained setting (*n* = 41), and similarly 37% reported teaching in a full-time self-contained setting (*n* = 41). Seven percent reported teaching in a 1:1 or therapeutic setting.

Research Question 2 Results: Self-efficacy

Utilizing hierarchical regression, predictors of teacher perceived self-efficacy were investigated in the order hypothesized as most to least impactful based on research and experience as detailed in Chapter 3. The use of forward analysis, a method of stepwise regression where one independent variable is added at a time to determine whether each variable increases

the R^2 value, was used in a limited manner within each variable block to order the related sets of participant response categories.

Statistical analysis was conducted using SPSS. Descriptive statistics were analyzed, the scatterplot and histogram were examined for normal distribution, and distribution of errors (residuals) were checked and found to be normally distributed. Pearson correlations were examined, revealing that predictor variables were not highly correlated. See Appendix J for self-efficacy histogram and scatterplots, and Appendix L for the complete Pearson correlation matrix. Research Question 2 asked, is teacher preparedness to use effective practices along with the job-related factors of teacher experience, administrator support, learner verbal language ability, and instructional setting predictive of teacher perceived self-efficacy in teaching comprehension to learners with ASD? Findings beginning with descriptive statistics, followed by the results of each block of the model, and concluding with the most significant predictors of teacher self-efficacy follow.

Descriptive statistics related to teacher perceived self-efficacy and job-related factors are provided in Table 12. The overall instrument mean was 37.69 with a possible score of 10 – 50. Responses to three categories were below the mean, with all three groups falling in the low self-efficacy range. Teachers with 0 – 2 years of teaching experience had the lowest reported self-efficacy (M = 34.85), followed by teachers reporting a lack of administrator support (M = 35.04), and teachers supporting students in a 1:1 setting (M = 35.43). Moreover, ranges in scores for the category of lack of administrator support emerged as having both the lowest bottom range score of 26, and the lowest top score of 40. All remaining categories fell in the low average range. The group of teachers with a reported high level of administrator support emerged as the group with the highest level of self-efficacy (M = 39.85).

Table 12

Self-efficacy Descriptive Statistics

Variable	*N*	%	Range	Frequency	
				Mean	*SD*
Self-efficacy TOTAL			10 – 50	37.69	4.97
Years of experience					
10 + years	66	59	26 - 49 (23)	38.63	5.03
3 – 9 years	33	29	29 - 48 (19)	36.91	4.72
0 – 2 years	13	12	29 - 42 (13)	34.85	4.11
Administrator Support					
High Level Support	30	27	26 - 49 (23)	39.85	5.23
Some Support	61	54	28 - 49 (21)	37.44	4.67
Lack of Support	21	19	26 - 40 (14)	35.04	4.24
Learner Verbal Ability Taught					
High Verbal Ability	28	25	31 - 48 (17)	38.24	4.41
Moderate Verbal Ability	34	30	29 - 48 (19)	37.92	4.21
Low or Non-verbal	28	25	26 - 49 (23)	35.79	5.50
Teaching Mixed Levels	22	20	26 - 49 (23)	39.04	5.64
Instructional Setting					
Inclusive	22	19	26 - 43 (17)	36.27	.4.50
Partially Incl. Part Self-cont.	41	37	29 - 49 (20)	38.59	5.03
Self-contained	41	37	26 - 48 (22)	38.02	5.02
1:1 Setting	8	7	28 - 43 (15)	35.43	5.31

Note. RTEI-a Self-efficacy Scoring: Low = 10 - 35; Average = 36 - 46; High = 47 - 50

Prior to the hierarchical regression analysis, a test for multicollinearity was conducted to ensure high intercorrelations among predictor variables did not exist or lead to inaccurate results. All Tolerance levels exceeded the cutoff using the formula of 1 - .428 (the R^2 value) = .572 as follows, .962 (effective practices), .962 (10 years of experience plus), and .967 (lack of

administrator support). Moreover, the VIFs (the inverse of Tolerance) were below 10: 1.039 (effective practices), 1.008 (10 years of experience plus), and 1.034 (lack of administrator support).

A hierarchical regression analysis was conducted to identify the potential predictors of teacher perceived self-efficacy. The predictor variables were analyzed in blocks prioritized by research and experience as follows: (1) preparedness to use effective practices, (2) teacher years of experience, (3) administrator support, (4) learner verbal ability, and (5) instructional setting. Teacher preparedness to use effective practices data was entered as the first block of the regression analysis. Results indicated teacher preparedness to use effective practices significantly predicted self-efficacy with an R^2 value of .37, F (1, 110) = 64.15, $p < .001$.

Teacher years of experience data was entered as the second block in the regression analysis. Results indicated teacher years of experience added to the significance of the model. Together, teacher preparedness to use effective practices, along with teacher years of experience emerged as predictors of self-efficacy, with a model R^2 value of .40, F (2, 109) = 36.63, $p < .001$.

Data related to administrator support was entered as the third block in the analysis. Results indicated teacher preparedness to use effective practices, along with years of experience, and administrator support significantly predicted self-efficacy with the highest R^2 value of .43, F (3, 108) = 26.89, $p < .001$. The entering of block 4, and block 5 did not add to the prediction model indicating that learner verbal ability and instructional setting are not predictors of teacher perceived self-efficacy.

Results of the final model revealed the combination of three variables: teacher preparedness to use effective practices, teacher years of experience, and administrator support, explain 43% of the variance in teacher perceived self-efficacy. See Table 13.

Table 13

Self-efficacy Prediction Models

	R	R^2	ΔR^2	*F*	*df*	*P*
1. Effective Practices Total	.607	.368	.368	64.153	1, 110	<.001
2. Effective Practices Total 10+ Years of Experience	.634	.402	.034	36.637	2, 109	<.001
3. Effective Practices Total 10+ Years of Experience Lack of Admin. Support	.654	.428	.026	26.886	3, 108	<.001

Two predictor variables positively impacted self-efficacy: teacher preparedness to use effective practices, along with the job-related factor of teacher years of experience of ten plus years. In addition, the job-related factor of lack of administrator support negatively impacted teacher self-efficacy. Table 14 displays the unstandardized regression coefficients (*B*), standardized regression coefficients (β), significance, and change in R^2 for each variable in the model.

Table 14

Predictors of Teacher Perceived Self-efficacy

Predictor Variables	*B*	*SE*	β	*t*	*p*	ΔR^2
Teacher Preparedness to use Effective Practices:						
EP Survey Total	.385	.05	.56***	7.59	<.001***	.368
Teacher Years of Experience						
10+ Years Experience	1.92	.74	.19*	2.61	.010*	.034
Support from Administrators						
Lack of Support	-2.06	.94	-.16	-2.20	.030*	.026

Note. Statistical significance *p<.05; **p<.01; ***p<.001

Hierarchical regression analysis was conducted to investigate whether teacher perceived self-efficacy in teaching reading comprehension to learners with ASD could be accurately predicted by the variable of teacher preparedness to use effective practices to teach reading comprehension to learners with ASD, along with job-related factors. The regression model indicates that 43% of the variance in teacher perceived self-efficacy is predicted from the inclusion of the variables. Thirty seven percent (ΔR^2 = .37) of the model is attributed to the primary variable of preparedness to use effective practices, with an additional 6%, 3% from 10 plus years of teaching experience (ΔR^2 = .03), and 3% from lack of administrator support (ΔR^2 = .03), attributed to job-related factors. Therefore, the predicted pattern is confirmed.

Research Question 3: Outcome Expectancy

Following the analysis of self-efficacy, descriptive statistics, scatterplots, and histograms for the second criterion variable, outcome expectancy, were also examined; see Appendix K.

Distribution of errors were checked and found to be normally distributed. Pearson correlations were examined, and revealed that predictor variables were not highly correlated. See Appendix M for the complete outcome expectancy correlation matrix.

Descriptive statistics related to teacher outcome expectancy and job-related factors are provided in Table 15. The overall instrument mean was 21.10 with a possible score of 6-30. Responses to all categories were close to the mean and fell within the average outcome expectancy level. The lowest outcome expectancy was reported by the group of teachers reporting a lack of support from principals and administrators (M = 19.33), and this group also reported the lowest range of scores (12-25). Furthermore, the group of teachers working within an inclusive setting reported a similarly low level of outcome expectancy (M = 19.38). In contrast, the highest outcome expectancy was reported by teachers instructing non-verbal learners and/or learners with low verbal ability (M = 22.17), and the highest outcome expectancy range of scores (15-30) was provided by teachers working within a self-contained setting.

The second hierarchical regression analysis was conducted to investigate whether teacher perceived outcome expectancy could be accurately predicted by the variables of teacher preparedness to use effective practices to teach reading comprehension to learners with ASD, along with a combination of the four job-related factors. Consistent with the analysis of self-efficacy, variables were entered in blocks prioritized by research and experience as follows: (1) preparedness to use effective practices, (2) years of experience, (3) administrator support, (4) learner verbal ability, and (5) instructional setting. See the prediction models in Table 16.

Table 15

Outcome Expectancy Descriptive Statistics

Variable	*N*	%	Range	Frequency	
				Mean	*SD*
Outcome Expectancy TOTAL			6 – 30	21.10	3.52
Years of experience					
10 + years	66	59	12 - 29 (17)	21.05	3.60
3 – 9 years	33	29	14 - 30 (16)	21.48	3.68
0 – 2 years	13	12	16 - 26 (10)	20.38	2.66
Administrator Support					
High Level Support	30	27	17 - 30 (13)	21.43	3.12
Some Support	61	54	12 - 29 (17)	21.59	3.44
Lack of Support	21	19	12 - 25 (13)	19.33	3.83
Learner Verbal Ability Taught					
High Verbal Ability	28	25	12 - 24 (12)	20.28	2.90
Moderate Verbal Ability	34	30	16 - 28 (12)	21.59	2.92
Low or Non-verbal	28	25	12 - 30 (18)	22.17	4.23
Teaching Mixed Levels	22	20	14 - 26 (12)	20.05	3.67
Instructional Setting					
Inclusive	22	19	14 - 25 (11)	19.38	3.13
Partially Incl. Part Self-cont.	41	37	12 - 28 (16)	21.37	3.23
Self-contained	41	37	15 - 30 (15)	21.85	3.39
1:1 Setting	8	7	12 - 29 (17)	20.57	5.74

Note. RTEI-a Outcome Expectancy Scoring: Low = 6-17; Average = 18-24; High = 25-30

Table 16

Outcome Expectancy Prediction Models

	R	R^2	ΔR^2	*F*	*df*	*p*
1. Effective Practices Total	.153	.023	.023	2.632	1, 110	.108
2. Effective Practices Total Lack of Admin. Support	.268	.072	.048	4.203	2, 109	.017
3. Effective Practices Total Lack of Admin. Support Low or Non-verbal learners	.346	.120	.048	4.886	3, 108	.003
4. Effective Practices Total Lack of Admin. Support Low or Non-verbal Learners Moderately Verbal Learners	.393	.154	.035	4.873	4, 107	.001

Analysis revealed that the strongest model, model 4 in Table 16, predicted teacher perceived outcome expectancy with an R^2 value of .154 suggesting that 15.4% of teacher outcome expectancy can be predicted by a combination of teacher preparedness to use effective practices, lack of administrator support, and learner verbal ability, however, as shown in Table 17, an examination of the regression coefficients revealed that the *p* value of the primary variable of teacher preparedness to use effective practices (.056) is slightly above the predetermined significance cut-off of .05.

Table 17

Hierarchical Regression Predicting Teacher Outcome Expectancy: Model 4

Predictor Variables	*B*	*SE*	*β*	*t*	*P*	ΔR^2
Teacher Preparedness to use Effective Practices:						
EP Survey Total	.09	.05	.19	1.94	.056	.023
Support from Administrators						
Lack of Admin. Support	-1.94	.83	-.21	-2.35	.021*	.048
Verbal Ability of Learners						
Low or Non-verbal Learners	2.49	.83	.31	3.01	.003**	.048
Moderate Learners	1.55	.739	.20	2.09	.039*	.035

Note. Model $R = .39$; $R^2 = .15$; Adjusted $R^2 = .12$; F (4,107) = 4.87;
Statistical significance *p<.05; **p<.01; ***p<.001

As a result, the preceding, or third generated model, was also analyzed, see Table 18. While the R^2 value of this model is reduced from 15% ($R^2 = .154$), to 12% ($R^2 = .120$), all variables within the model are significant. This model also indicates that variance in the criterion variable outcome expectancy is predicted from a combination of the three variables of administrator support, verbal language ability of learners, and preparedness to use effective practices. The variable of lack of administrator support negatively impacted teacher outcome expectancy and indicates 5% of the outcome expectancy variance ($\Delta R^2 = .048$).The remaining two predictors positively impacted teacher outcome expectancy, with teaching learners with low or non-verbal language ability predicting 5% of outcome expectancy ($\Delta R^2 = .048$), and with preparedness to use effective practices predicting 2% of outcome expectancy ($\Delta R^2 = .023$). The variables of years of experience, and instructional setting were not found to be predictors of outcome expectancy.

Table 18

Hierarchical Regression Predicting Teacher Outcome Expectancy: Model 3

Predictor Variables	*B*	*SE*	*β*	*t*	*P*	ΔR^2
Teacher Preparedness to use Effective Practices:						
EP Survey Total	.10	.05	.20	2.06	.042*	.023
Support from Administrators						
Lack of Support	-1.72	.83	-.19	-2.07	.041*	.048
Verbal Ability of Learners						
Low or Non-verbal Learners	1.92	.79	.24	2.42	.017*	.048

Note. Model $R = .35$; $R^2 = .12$; Adjusted $R^2 = .10$; F (3,108) = 4.89;
Statistical significance *p<.05; **p<.01; ***p<.001

In considering the models together, it can be concluded that 12% to 15% of the variance in the criterion variable outcome expectancy is predicted from the variables of (1) teacher preparedness to use effective practices, (2) support provided to teachers from school administrators, and (3) the verbal language ability of learners in the classroom. Therefore, the predicted pattern is confirmed.

It was anticipated that teacher preparedness to use effective practices would be the primary predictor of teacher outcome expectancy, and that a combination of job-factors would add to the prediction model. In both outcome expectancy models explored, preparedness to use effective practices actually indicated the smallest percentage of the model (2.3%; $\Delta R^2 = .023$), with each job-related factor emerging as stronger predictors of outcome expectancy. As a result,

Hypothesis 3 is partially supported.

Summary

Three research questions and related hypotheses exploring the relationships among teacher preparedness to use effective practices, teacher job-related factors, and teacher self-efficacy and outcome expectancy teaching reading comprehension to learners with ASD were investigated.

Relevant to the first research question investigating teacher preparedness to use the current research-based practices to teach learners with ASD, a discrepancy between teacher reported effective practices to teach reading comprehension to learners with ASD, and the practices deemed effective from a synthesis of the research emerged, indicating a research to practice gap.

Furthermore, relevant to the two predictive research questions, hierarchical regression analyses were conducted to investigate both teacher perceived self-efficacy, and teacher outcome expectancy. A combination of independent variables emerged as predictors of both criterion variables. The variables of teacher preparedness to use effective practices, teacher years of experience, and administrator support emerged as predictors of self-efficacy ($R^2 = .428$; $p < .001$). The variables of teacher preparedness to use effective practices, administrator support, and verbal language ability of students emerged as predictors of outcome expectancy ($R^2 = .120$; $p < .05$). Interpretation of findings, along with potential implications for teacher professional development, and future research recommendations will be detailed in Chapter 5.

CHAPTER V

Discussion

A research synthesis on reading comprehension and ASD was conducted at the onset of this study, revealing a lack of EBP's specific to teaching comprehension to learners with autism, a research to practice gap related to the dissemination of research-based practices to teachers (Odom et al., 2005), and a lack of research exploring teacher perceptions related to teaching academic skills (Ruble et al., 2011). This study aimed to contribute to the field by identifying factors influencing teacher self-efficacy and outcome expectancy when using the identified effective practices to teach comprehension to learners with ASD, through an analysis of teacher preparedness to use these effective practices, along with consideration of the impact of job-related factors.

Review of Methods

Teachers of learners with ASD (N = 112) took part in a quantitative survey-based prediction study. Data were gathered related to the dependent variables of self-efficacy and outcome expectancy, and the independent variables of teacher preparedness to use effective practices and job-related factors. The three-part survey was comprised of (1) the Reading Teaching Efficacy Instrument (Szabo & Mokhtari, 2004) adapted, (2) the Effective Practices Survey, and (3) a demographic job factors survey. The Effective Practices Survey stemmed from the conducted research synthesis and assessed teacher preparedness to use each of the identified effective practices of: anaphoric cueing (Solis et al., 2013), compare and contrast diagrams (Carnahan & Williamson, 2013) , cooperative learning (Kamps et al., 1994; Kamps et al., 1995), direct/explicit instruction (Flores & Ganz, 2007; Flores & Ganz, 2009; Roux et al., 2014), graphic organizers (Carnahan & Williamson, 2013), question generation (Hua et al., 2012), read-

alouds (Mims et al., 2012), reciprocal questioning (Whalon & Hanline, 2013), story structure and/or character event maps (Stringfield et al., 2011; Williamson et al., 2014), systematic prompts (Mims et al., 2012), and a multiple strategy approach using a combination of effective practices.

Hierarchical regression analysis was conducted to examine each of the independent variables as predictors of both teacher perceived self-efficacy, teacher perceptions regarding their professional ability to effectively carry out instructional practices, and teacher outcome expectancy, teacher perceptions regarding their professional ability to promote positive instructional outcomes in their students in the area of comprehension. The predictor variables were analyzed in blocks prioritized by research and experience and included teacher preparedness to use effective practices, teacher years of experience, administrator support, learner verbal ability, and instructional setting.

Summary of Findings

Research Question 1 investigated whether teachers would report the current effective practices found in the literature as those they deem effective for teaching comprehension to learners with ASD in the classroom. While teachers reported preparedness to use many effective practices when prompted to consider each one in isolation, they did not generate a list of instructional practices that matched the current research when responding to the initial open-ended question. Consequently, a discrepancy between teacher reported effective practices to teach reading comprehension to learners with ASD, and the practices identified as effective from the synthesis of the research emerged, indicating a potential research to practice gap. This finding suggests that while teachers may feel confident in their ability to use effective practices in the classroom, they are either not, as a collective group, actually using them in the classroom;

or, they do not as a collective group perceive the investigated instructional practices as effective.

Research Questions 2 and 3 investigated whether teacher preparedness to use effective practices along with the job-related factors of teacher experience, administrator support, learner verbal language ability, and instructional setting are predictive of teacher perceived self-efficacy in teaching comprehension to learners with ASD, and teacher outcome expectancy for their students in the area of comprehension. Results of the regression analyses identified a combination of independent variables as predictors of each criterion variable. The variables of teacher preparedness to use effective practices, teacher years of experience, and administrator support emerged as predictors of self-efficacy (R^2 = .43). The variables of teacher preparedness to use effective practices, administrator support, and verbal language ability of students emerged as predictors of outcome expectancy (R^2 = .15). Findings provide a potential roadmap for helping teachers become more self-efficacious, and for increasing their student outcome expectancy through a focus on these emerging variables, mainly, through training in effective practices, and through provision of ongoing support from principals and administrators. A detailed analysis of study findings follows, along with an interpretation of findings, a consideration of study limitations, and implications for practice and research.

Discussion

Participant demographics. An aim of this study was to gather the perspectives and experiences of teachers of learners with ASD as a collective group. As detailed in Chapter 3, a large and diverse group of participants was obtained for this study encompassing special education teachers, general education teachers, ABA therapists, speech language pathologists, and professionals self-identifying as teachers of learners with ASD across all grade levels (Pre-

K- age 21). Considering the potential impact of participant demographics on results, it is important to note the majority of participants were special education certified teachers (n = 88) with a high level of education. Forty seven percent indicated holding a master's degree, and an additional 25% indicated holding a master's degree plus additional credits. Overall, this is slightly higher than national averages reported by the U.S. Department of Education National Center for Education Statistics (NCES) in which 56 % of teachers were identified as having a master's degree or higher in 2011-12 (U.S. Department of Education, 2015).

Similarly, in regards to teacher years of experience, a majority of participants (59%) indicated 10 plus years of teaching experience. This statistic is comparative to national averages reported by NCES in which 59 % of teachers in the last measured year, 2011-2012, had over 10 years of experience, and 11% had less than three years of experience (U.S. Department of Education, 2015). This majority profile may impact study findings. For example, despite an overall experienced and highly-educated group, only 38% of participants reported ever taking a college/university course with content related to teaching reading to students with ASD. It can be assumed this percent would be even lower for a less experienced participant population. It is also possible that teachers may have reported courses with limited content related to teaching reading and/or to teaching students with ASD in this category, such as courses in general reading instruction, or courses in using applied behavior analysis, further inflating reported teacher educational experiences. In addition, while a national profile of highly experienced teachers may inflate reported knowledge of effective practices, self-efficacy, and outcome expectancy assessed by this study, it can also be assumed to provide a solid representation of the field, revealing the perspectives of experienced professionals, and the factors influencing reading comprehension instruction of students with ASD consistent with national norms.

In the area of support received from principals and administrators, when asked to select whether they receive a high level of administrator support, some level of administrator support, or a lack of administrator support, a majority of participants also indicated one sub-category, with 54% reporting some level of administrator support. This majority is not assumed to alter study results and is assumed to be representative of the field as the high and low support subcategories were also normally distributed (high level of support from administrators = 27%, lack of administrator support = 19%).

In contrast to the alignment with national averages, results of the demographic question asking teachers to indicate whether the majority of students on their current or most recent caseload take alternative state assessments does not appear to be representative of the field of special education. A Review of the 2009 statistics from the National Center for Special Education Research (NCSER) indicates the use of alternative assessments varies by state (Cameto, et al., 2009), with reports for example, of 7% of students in New Jersey, and 41% of students in Texas, taking alternative assessments common. In the present study, 55% of teachers reported that their students participate in alternate assessment, a mean percentage significantly higher than common state averages. It may be possible that teachers responding to this question indicated student participation in alternate assessment if their students were taking state assessments with accommodations. In addition, this reporting may actually reflect national demographics specific to learners with ASD. According to Witmer and Ferreri (2014), a large number of students participating in alternate assessment are learners with ASD. In their recent study of U.S. teachers, findings revealed that 44% of students with ASD participated in alternate assessment in some form (Witmer & Ferreri, 2014).

Furthermore teacher reporting in the present study may reflect differences in language

used to indicate alternate assessments across states, as well as differences in assessments across states. This demographic data was not of primary importance to the present study, yet it is important to note that in future research it will be essential to clarify this figure and to add an additional response category of *participates in statewide assessments with accommodations* to future related surveys.

Effective practices. Many teachers do not have the time or training to identify research-based practices for use in the classroom (Santangelo, Novosel, Cook, & Gapsis, 2015). In line with this prior research, results of the Effective Practices Survey found that a majority of teachers did not strongly agree that they are prepared to use the identified effective practices to teach reading comprehension to students with ASD. Collectively, participants responded to only four of the 11 presented effective practices with a common response of *strongly agree to preparedness to use* the practice: graphic organizers (58%), read-alouds (55%), direct instruction (49%), and compare and contrast charts (49%). Widening this analysis by summing participant responses of *strongly agree* together with *agree to preparedness to use* each practice, considerably increased overall percentages, bringing the range of agreement to preparedness to use all 11 effective practices to 24 – 93%.

This data was corroborated by the open-ended question asking teachers to report instructional practices they have found to be effective in the classroom. The use of graphic organizers and direct instruction emerged as the most reported effective practice (graphic organizers 15%; direct instruction 14%), and identification of the two instructional practices by teachers in both the open-ended question and the survey indicates some agreement that these practices are effective by both teachers and researchers. Unfortunately, identification of each of the remaining effective practices via the open-ended question was further limited, ranging from a

high of only 6% of teachers reporting reciprocal questioning as effective in the classroom (*n* = 7), to a low of 0% reporting cooperative learning as effective to teach reading comprehension. This overall low reporting of the effective practices on the open-ended question (ranging from 0% - 15%) appears to contradict the higher levels of teacher reported preparedness to use the same effective practices in the quantitative survey (ranging from 24 – 93%). With a mean discrepancy of 67%, findings imply that the large majority of teachers do not turn to the effective practices emerging from the literature as their primary methods for teaching comprehension to learners with ASD in the classroom.

It remains unclear from the present study why teachers do not consider the effective practices emerging from the literature as the most effective practices for classroom use, however several plausible explanations emerge. First, teachers may be relying on EBPs that exist but are not specific to comprehension to teach reading to learners with ASD (such as ABA and TEACCH). Secondly, teachers may be overwhelmed by the large number of instructional practices available leading to a lack of clarity in prioritizing their effectiveness. Thirdly, teachers may feel confident in their ability to use the practices found by researchers to be effective in the classroom, yet unfortunately they may not perceive them to be the most effective instructional practices available. And finally, teachers may be actually choosing not to use the identified practices as the believe them to be ineffective in the classroom. In addition to a research to practice gap, this may indicate a practice to research gap in which researchers are not investigating those practices prioritized by teachers. The finding of a potential practice to research gap indicates the need for communication and collaboration among teachers and researchers to ensure researchers are investigating the practices that teachers deem to be most effective in the field. Moreover, findings suggests a need for teachers to remain current in how

to implement effective practices identified by researchers, with fidelity, to improve student comprehension outcomes, along with consideration of how to ameliorate the existing research to practice gap in the area of comprehension and ASD.

The Effective Practices Survey results were further analyzed by total score and participant demographic data. The overall mean was 43.52, with 11 - 55 points possible. Participants reporting the lowest mean preparedness to use effective practices, along with the lowest range of scores (Range = 22 - 51), was the group teaching in a 1:1/therapy setting (M = 38.14). This was followed by participants instructing non-verbal learners or learners with low verbal language ability (M = 39.00), those with 0 - 2 years of teaching experience (M = 40.69), and those with a reported lack of administrator support (M = 40.86). Conversely, participants reporting the highest mean preparedness to use effective practices emerged as those with a high level of administrator support (M = 46.33), followed by those teaching in a mixed partially inclusive/partially self-contained setting (M = 46.25). These findings suggest teachers and professionals working with students in a 1:1 capacity, and working with students with limited verbal language ability may be the subgroup with the greatest need for both professional development/education in comprehension, and ongoing administrator support.

Although research in relation to instructional setting is limited, verbal ability has recently been considered in relation to self-efficacy. In a prior investigation of the self-efficacy of teachers of learners with ASD, Ruble and colleagues consider their results along with learner verbal ability, stating "within the communication domain, some children may be completely nonverbal, while others may be able to speak spontaneously in full sentences…and determining how to best address the full range of needs within the wide spectrum represented by autism is a formidable challenge teachers face" (2011, p. 71). This aligns with findings of the present study

and points to a potential need to consider effective practices based on individual learner need. Furthermore, regardless of specific learner characteristics, findings of the present study suggest that as a whole, teaching experience is needed to develop preparedness to use effective practices to teach comprehension to learners with ASD.

Self-efficacy in teaching comprehension. Self-efficacy in teaching can be defined as teacher perceptions regarding their professional ability to effectively carry out instructional practices. The present study found that only five percent of teachers emerged as reporting a high level of self-efficacy in teaching reading comprehension to learners with ASD. This low finding, while of concern, was not surprising as it aligns with the identification of comprehension instruction as a major need for learners with ASD (Williamson et al., 2014) and with the existing lack of research studies specific to teaching reading comprehension to learners with ASD meeting EBP criteria (Mayton et al., 2010). Additionally with teachers experiencing a lack of available time and training to search for research-based practices (Santangelo, et al., 2015), it can be assumed that instructing learners with ASD in the area of comprehension may be perceived as a struggle for classroom teachers.

A search of the literature was conducted to compare teacher self-efficacy in teaching reading comprehension to learners with ASD, to those teaching general education students, or students with learning disabilities, to better understand if lack of high self-efficacy in teaching reading comprehension is specific to teachers working with learners with ASD, or actually indicative of teaching reading comprehension overall. In a qualitative study looking at early career teacher self-efficacy in teaching reading (not focusing on teacher of learners with ASD) it was found that one of four teachers did not report high self-efficacy in teaching reading comprehension (Hastings, 2012). This implies that teaching reading comprehension, regardless

of the student population, may be a difficult skill for teachers to master. It can be assumed that working with a complex and diverse population of learners with ASD may exacerbate the challenge of gaining self-efficacy in teaching reading comprehension for teachers.

Predictors of self-efficacy and outcome expectancy. Research Questions 2 and 3 investigated predictors of teacher perceived self-efficacy and outcome expectancy. Most germane to study results, four of the five investigated variables emerged as predictors of self-efficacy and/or outcome expectancy, with instructional setting emerging as the only variable not significant in a prediction model. As indicated, the variables of teacher preparedness to use effective practices, teacher years of experience, and administrator support emerged as significant predictors of self-efficacy ($R^2 = .43$), and the variables of teacher preparedness to use effective practices, administrator support, and verbal language ability of students emerged as significant predictors of outcome expectancy ($R^2 = .15$).

It was hypothesized that teacher preparedness to use effective practices would be the primary predictor of both self-efficacy and outcome expectancy, and that a combination of job-related factors would add to each prediction model. Teacher preparedness to use effective practices did emerge as the primary predictor of self-efficacy ($\Delta R^2 = .37$), however it emerged as the third of three variables predicting outcome expectancy ($\Delta R^2 = .02$). This indicates 37% of the variance in teacher reported self-efficacy, yet only 2% of the variance in teacher outcome expectancy can be attributed to teacher preparedness to use current research-based strategies to teach reading comprehension to learners with ASD. This result was unexpected and questions the link between self-efficacy in using effective practices, and the expectation that learner comprehension outcomes will be increased. It may be possible that teacher outcome expectancy is further strengthened by teacher preparedness to use instructional practices beyond those

included in the limited list of 11 effective practices. Regardless, teacher preparedness to use effective practices did emerge as significant in both models, suggesting access to effective practices and professional development to establish teacher preparedness to use each instructional practice, with confidence and fidelity, may improve teacher perceptions and expectations about not only their own ability to teach, but about their own impact on the learning outcomes of their students.

As discussed in Chapter 2, there are a limited number of prior studies investigating the self-efficacy of teachers of learners with ASD. In a study by Jennett and colleagues, teachers of learners with ASD with a strong background in ABA or TEACCH were, in contrast to the findings of this study, identified as highly efficacious in teaching learners with ASD (2003). The researchers concluded that while it was difficult to understand whether or not the teachers were first highly efficacious, and then sought out the strong background, or whether the strong background led to the self-efficacy, "the implications of these results provide a method of accomplishing this task- adequate training may be the key" (Jennett et al., 2003, p. 591). The present study, in which preparedness to use effective practices was a predictor of both self-efficacy and outcome expectancy, aligns with this research finding and further supports a need for systematic teacher training and support in teaching comprehension.

Support from principals and administrators emerged as the second most significant predictor variable, also contributing to both the self-efficacy model and the outcome expectancy model. The prediction models indicate that a lack of administrator support negatively impacted self-efficacy by 3% ($\Delta R^2 = .03$), and that low administrator support accounted for 5% of the variance in outcome expectancy ($\Delta R^2 = .05$). This indicates that self-efficacy and outcome expectancy are reduced by low levels of administrator support including lack of financial

reimbursement for professional development and education, lack of instruction related materials, and lack of perceived professional support. This finding aligns with a 2012 study in which Calek and colleagues found a relationship between teacher self-efficacy using instructional practices and administrator evaluation of teaching processes. Furthermore, the same study found a correlation between administrator actions supporting teachers and collective self-efficacy, or teacher beliefs they can make a difference as a collective group (Calek, Sezgin, Kavgaci, & Kilinc, 2012). In another related study, Shyman found that both self-efficacy and administrator support together were predictors of emotional exhaustion among special education paraeducators (2010). Findings of the present study, coupled with the findings in the recent literature, suggest that ongoing support by school administrators in the core area of reading comprehension is essential to maintaining efficacious professionals with high expectations for their students with ASD.

Furthermore, an analysis of descriptive group means in relation to self-efficacy and outcome expectancy shows that the subgroup of teachers reporting low administrator support had the lowest overall outcome expectancy mean, and the second lowest overall self-efficacy mean. Moreover, the group of teachers with the highest level of administrator support emerged as the subgroup with the highest mean self-efficacy. In considering the prediction data combined with the demographic group data, findings indicate that teachers of learners with ASD with a high level of administrator support have both a higher level of confidence in their own ability to teach comprehension (self-efficacy), and a higher level of confidence in their own professional ability to promote positive instructional outcomes in their students (outcome expectancy).

It also appears that administrator support both negatively and positively impacted teacher self-efficacy and outcome expectancy in direct relation to the lack of support or the high level of

support provided. This finding suggests that principals and administrators have the ability to increase or decrease teacher perceptions regarding their ability to effectively carry out instructional practices, and teacher perceptions regarding their professional ability to promote positive instructional outcomes in their students, through their actions. This study adds to the findings of Calik and colleagues, that instructional leadership provided by principals or school administrators along with communication of a clear vision, and establishment of high expectations for teachers, increases teacher self-efficacy (2012). Principals need to be aware of the links between their behaviors and teacher self-efficacy, and may want to consider increasing financial support for professional development and coursework, and increasing instructional expectations related to the use of effective practices to teach comprehension, as possible.

With regard to the job-related factor of teacher experience, having 10 or more years of experience emerged as a significant predictor of teacher self-efficacy teaching comprehension to learners with ASD, indicating 3% of the variance in teacher responses ($\Delta R^2 = .034$). An analysis of the demographic data related to teacher years of experience and self-efficacy, shows an increase in self-efficacy coinciding with years of teaching. More specifically, teachers with 0-2 years of experience reported a mean self-efficacy score of 34.85, teachers with 3-9 years of experience reported a mean self-efficacy score of 36.91, and teachers with 10 or more years of experience reported a mean self-efficacy score of 38.63. This analysis of group means aligns with the prediction model implication that teacher self-efficacy increases as years of teaching experience increases.

The finding that teacher self-efficacy increases as years of teaching experience increases is significant as it builds on results obtained in prior research. In a 2011 study, Ruble and colleagues noted a surprising lack of research associating teacher years of experience and teacher

self-efficacy. Converse to the present study, the researchers investigated the relationship, and did not find an association among years of experience and the general self-efficacy of teachers instructing learners with ASD (Ruble, et al, 2011). In response, the researchers theorized that the lack of connection between experience and self-efficacy may be explained by the widening research to practice gap in teaching students with ASD, with teacher instruction lagging behind current research (2011). Perhaps the model of the present study, with its focus on the specific content area of reading comprehension was not as strongly impacted by this research to practice gap, believed to still be in existence.

Lastly, the job-related factor of learner verbal ability emerged as a significant predictor of teacher outcome expectancy for student increased achievement. Specifically, teachers instructing students with limited verbal language ability or non-verbal language ability showed an increased outcome expectancy, with the variable attributing to 5% of the model variance ($\Delta R^2 = .048$). The positive impact of limited student verbal language ability on teacher outcome expectancy was unexpected and warrants further investigation. It was expected, due to limitations and the related need for alternative communication when responding during comprehension instruction, that limited verbal ability would reduce, not increase, teacher outcome expectancy. This unexpected result may be explained by teachers being in an instructional setting in which they are able to work more closely with these students, resulting in more of a perceived impact on student outcomes. Moreover, while predictive of outcome expectancy, student verbal language ability was not predictive of teacher self-efficacy. On the contrary, limited verbal ability appeared to decrease self-efficacy. Further analysis of demographic data related to student verbal ability and self-efficacy shows the subgroup of teachers reporting working with students of low verbal ability reported a lower overall mean self-

efficacy than those working with learners with each increased level of verbal ability. It appears the emergent relationship among learner verbal ability, teacher self-efficacy in providing comprehension instruction, and teacher outcome expectancy warrants deeper investigation.

Finally, the job-related factor of instructional setting emerged as the only investigated variable not significant in a prediction model. In a descriptive analysis relating job-factors to teacher preparedness to use effective practices, however, the variable emerged of practical importance. The group of teachers reporting working with students in a 1:1 capacity reported the lowest overall mean preparedness and the lowest range of scores when completing the Effective Practices Survey, followed by the next lowest subgroups, participants working with learners with limited verbal ability, and participants with 0-2 years of teaching experience. Furthermore, the subgroup of teachers instructing students in a varied setting, partially working in a general education classroom, and partially working in a self-contained setting indicated a high overall mean preparedness to use effective practices, second only to the subgroup receiving strong administrator support. While the results are not statistically significant, it appears that instructional setting may have an impact on teacher access to, experience with, and/or use of effective practices.

In order to further understand the impact of setting, the demographic data related to the category of 1:1 instructional setting was analyzed and found to have the highest level of standard deviation of all categories in relation to outcome expectancy and preparedness to use effective practices. It is important to note that this category had the lowest number of participant (n = 8) and appeared to be comprised of primarily two specific groups, speech and language pathologists, and home based therapists. It can be assumed that the increased deviation in responses is a result of these two groups having different perspectives in teaching comprehension

to learners with ASD, and furthermore findings may suggest that effective practices such as graphic organizers and story structure maps, are not instructional practices frequently used by these professionals. In contrast, findings also may suggest that results may be more diverse due to the category of 1:1 setting not representing a collective group. As speech language pathologists often work on IEP goals related to language comprehension for learners with ASD, and home-based therapists often work with early intervention age children in need of literacy instruction, it is recommended that these two groups continue to receive training and support in comprehension along with classroom teachers.

Limitations

The findings of this research synthesis may be limited by several factors. The foundation of this study was quantitative survey methodology, with participants recruited through e-mail invitation and subsequent colleague to colleague snowballing of the final survey. All participant responses were self-reported and confidential, resulting in a lack of ability to validate participant responses. As a result, there is the possibility of a positive self-report bias that may have overinflated results.

Moreover, while the participants spanned 23 states, representing a national perspective of teachers of learners with ASD, the majority of participants were from the three states of Pennsylvania (n =33; 31%), New Jersey (n =20; 19%), and California (n =11; 10%) . State-specific factors such as incidences of autism, adherence to least restrictive environment, how school systems are structured, and how state and local spending budgets are allocated, may have influenced participant responses and skewed the responses into alignment with the experiences of participants predominantly represented by these three states. The present study did not attempt to analyze responses state by state.

Furthermore, this study investigated five predictors of teacher self-efficacy and outcome expectancy. The primary predictor of preparedness to use effective practices, defined from an initial conducted research synthesis, was assessed, along with the added impact of four job-related factors selected from research and experience. It is possible that uninvestigated predictor(s) may have also impacted teacher self-efficacy and outcome expectancy in this study, effecting the significance of each model. In addition, this study considered teacher self-efficacy and outcome expectancy as criterion variables using regression analysis. Results of regression analysis are most reliable when the variable categories analyzed are equally distributed. Overall, only 5% of teacher participants scored in the highly self-efficacious level. While this result, that a limited number of teachers are highly self-efficacious in teaching reading comprehension to learners with ASD, is an informative outcome of the study, the low number of teachers in the high self-efficacy category may have skewed the resulting prediction models.

In addition, this study measured teacher preparedness to use 11 specific effective practices identified through a current research synthesis. The inquiry of teacher preparedness to use effective practices is not the same as teacher actual use of effective practices, or teacher knowledge of how to use each practice with fidelity as recommended by researchers. Further research in the classroom to identify actual use of effective practices was not conducted.

Finally, while the research synthesis coding was reviewed by a graduate student, both the coding of the open-ended question asking teachers to identify reading comprehension practices they deem as effective, and the analysis of data were completed by one doctoral student researcher, resulting in limited inter-rater reliability and potential limitations to coding quality. The interpretation of results was also completed by only one researcher, leaving a potential for unintentional researcher bias.

Significance

The most significant outcome of this study is potentially the relationship between teacher preparedness to use a variety of effective practices and teacher perceived self-efficacy. In 2003, Jennett and colleagues identified a relationship between the self-efficacy of teachers of students with ASD and their commitment to a theoretical teaching method such as ABA or TEACCH. Commitment included having a strong knowledge and understanding of the method. The present study adds to the prior research findings, by suggesting that self-efficacy goes beyond general teaching models, to the knowledge and understanding of specific instructional practices used within each model to teach reading comprehension to learners with ASD.

In addition, this study extends the research of Ruble and colleagues (2011, 2013). As a conclusion to their 2013 study, Ruble and colleagues recommended future researchers investigate teacher self-efficacy in relation to specific instruction of learners with ASD. The current study followed this recommendation with a specific focus on the essential skill of reading comprehension. In contrast to the results of Ruble and colleagues' 2011 study in which administrator support and teacher years of experience were not found to correlate with the general self-efficacy of teachers of students with ASD, results of the present study revealed that the same two variables did emerge as predictors of teacher self-efficacy related specifically to teaching reading comprehension. This is likely due to the more specific focus of the present study on self-efficacy related to teaching comprehension to learners with ASD, as opposed to the investigation of general self-efficacy in the prior research. Furthermore, the variance in results may be due to the difference in sample size. For example, while the present study encompassed 112 participants, the 2011 study considered a smaller sample size of only 24 participants in relation to investigating the relationship between self-efficacy and administrative support due to

missing data (Ruble et al., 2011).

Also contributing to the research is the finding that a discrepancy emerged between teacher reported effective practices to teach comprehension to learners with ASD, and the practices identified as effective from the research synthesis indicating, once again, a possible research to practice gap. IDEA (2004) mandates the use of research-based practices when teaching learners with disabilities. As recommended by Simonsen and colleagues (2010) teachers of special education students should optimally be qualified as interventionists, able to differentiate instruction using multiple research-based strategies to address individual student needs. The lack of indication that teachers are using effective practices with a strong degree of self-efficacy from this study implies that teachers may not yet be able to serve in this interventionist role in the area of reading comprehension. Perhaps teachers are using packaged reading programs systematically with all learners, or perhaps teachers are not explicitly teaching comprehension skills to learners with ASD at all. Regardless, results indicate a change is needed and teachers must be supported with options to the current lack of available EBPs, and supported in focusing on improving the comprehension of all learners, based on individual need, within their classrooms.

Finally, the relationship between teacher outcome expectancy and teacher self-efficacy emerged as an important area of study with limited prior research. Results of the present study were initially surprising as teachers reported an overall higher level of outcome expectancy than self-efficacy teaching comprehension. It was expected that a positive belief in one's own ability to teach comprehension to learners with ASD would be a precursor to one's belief that their teaching would increase student learning in the classroom. However, this divergent finding may indicate that teachers are self-efficacious in the use of instructional practices, albeit practices that

do not mirror those found in the current literature. For example, teachers may be self-efficacious and confident that they can increase student outcomes using instructional practices they reported as effective that did not match the literature, such as annotating text, or re-teaching. In addition to a research to practice gap, this may indicate a practice to research gap. Of related significance, results of the prediction models did indicate a strong relationship between both self-efficacy and outcome expectancy and teacher preparedness to use effective practices, as expected, and it appears that teacher preparedness to use the effective practices emerging from the literature is a good indicator of both teacher self-efficacy and outcome expectancy in the area of reading comprehension.

Implications

Implications for practice. Comprehending text is an essential skill, providing a foundation for accessing academic content that extends into post-school life. There is a consensus in the current literature that learners with ASD exhibit a profile of relative strength in decoding and learning to read, yet subsequent weakness in the area of text comprehension (Williamson et al., 2014). The primary implication of this study is the related need for teachers to be efficacious in using effective practices to teach comprehension. Subsequently, a necessity for teachers of learners with ASD to participate in ongoing professional development and/or education related to teaching reading comprehension emerges. This emerging need for ongoing teacher professional development in the area of teaching reading comprehension is further supported by 92% of teachers indicating a desire to participate in professional development related to teaching comprehension to learners with ASD.

In a related study by Hastings exploring teacher self-efficacy related to reading instruction, early career teachers reported that professional development opportunities in the

form of colleague observations, participating in reading demonstrations, and participating in learning workshops led by "external experts" were most impactful in increasing their self-efficacy in teaching reading (2012, p. 66). Overall, it appears hands-on training demonstrating how to teach current effective practices may be a means for increasing teacher self-efficacy in the area of comprehension. This professional development should include tools for self-identifying effective practices and for staying current with research initiatives related to using practices with fidelity. As indicated, teachers and professionals working with students in a 1:1 setting, and working with students with limited verbal language ability may be the subgroup with the greatest need for this professional development and support.

Moreover, study findings imply that teachers know what the effective practices are, yet aren't necessarily using them. A network of PD and support may be needed to help teachers cross this bridge. Teachers of learners with ASD need to be trained in the use of multiple effective practices in order to be self-efficacious in teaching students with a spectrum of strengths and needs in the classroom. The finding that preparedness to use a collective group of effective practices impacts teacher self-efficacy and outcome expectancy implies that PD should not take the form of preparing teachers to use effective practices in isolation. Instead, PD needs to move toward training teachers to be knowledgeable in using a pool of effective practices, and training teachers to be knowledgeable in how to differentiate these practices by using them in combination to enhance comprehension instruction in the classroom. In this way a teacher working with a student struggling with the use of pronouns can respond to the need with anaphoric cueing; and a teacher noting a student striving to understand a fiction novel can respond with a supportive graphic story structure map.

In 2013, Brown and colleagues indicated a need for teachers to have knowledge of

multiple research-based practices, and to be able to individualize these practices for their students. The need to differentiate instruction is certainly relevant to instructing students on the autism spectrum, and it appears this need is paramount in the area of comprehension of text, resulting in a recommendation for training teachers, professionals, and therapists in how to differentiate usage of effective practices based on individualized student strengths and goals.

Additionally, support and training for teachers in how to access and find research-based practices efficiently emerges as important. Ultimately, professional development and training should include tools for teachers to self-identify effective practices and tools for teachers to stay current with research initiatives related to using instructional practices with fidelity.
For example, teachers may be provided with links to on-line clearinghouses, and teachers may be supported in locating comprehensive research syntheses in lieu of individual research studies through focused use of the 6S Pyramid to identify research-based instructional practices (Santangelo et al., 2015).

Furthermore, findings imply that professional development should be coupled with a high level of support from administrators in the form of financial support for college courses and comprehension workshops, needed instructional materials, and ongoing reinforcement for professional growth. School administrators are encouraged to consider methods for facilitating ongoing professional development for their staff to remain current with new research and strategies related to reading comprehension. For example, through the formation of professional learning communities, and through the formation of a university-school partnership or other forum(s) for establishing ongoing planned professional development.

Finally, as discussed, years of experience also emerged as an indicator of teacher self-efficacy. It is recommended that administrators support novice teachers through structured

teacher to teacher mentor programs in which mentor partnerships (and/or co-teaching partnerships when appropriate) connect less experienced novice teachers with more experienced partners.

Implications for policy. This study began with a research synthesis identifying no EBPs specific to teaching students with ASD. Due to the stringent nature and high quality EBP standards which aim to set precedent for elevated quality in future research, much of the existing research in reading comprehension is unable to receive this designation. Policy to define research-based practices including acceptance of effective practices when no, or limited, EBPs exist is essential to meeting the mandates of IDEA and to providing teachers with appropriate and effective options for instruction. Ultimately, studies with experimental design assessing larger populations of students with ASD are needed to further prove efficacy and prioritize effectiveness of the instructional practices identified as effective within this study. Of late, researchers and educators working to close the research to practice gap in education have turned their focus to EBPs (Cook et al., 2012). Unfortunately, it appears until EBPs become available specific to reading comprehension and learners with ASD, this gold standard meant to provide optimal support to teachers and optimal learning for students in the classroom may inadvertently be presenting an obstacle to accessing other research-based practices for professionals teaching comprehension to learners with ASD.

In addition to the recommendation of promoting teacher use of effective practices when EBPs are not available, a consideration of increasing course content related to teaching reading comprehension to learners with ASD (and all disabilities) at the university level is recommended. In 2000, NICHD recommended the requirement of formal instruction in how to teach reading comprehension in pre-service teacher education programs. This need remains in 2015. It is

recommended that university teacher preparation programs provide continuing education courses for classroom teachers, and increase the knowledge of future teacher candidates by considering integration of reading specialist certification coursework as part of the requirement of special education teacher certification programs. This shift may start with the recommendation of one or more courses serving to merge content provided in a general education reading methods course, with strategies for individualizing provided in a course focusing on differentiated instruction. Such a course could prepare pre-service teachers in lesson planning based on case studies, and/or prepare pre-service teachers to tier instruction based on profiles of learners with ASD. For example, three levels of a character map while reading leveled text may be provided in one classroom based on individual student profiles. One character map may support a student in sequencing character actions with pictures; another character map may be differentiated to provide space to both track character actions and make predictions in writing; and a third character map may be differentiated for a student working on ToM goals, and include space to make student to character connections. Findings of the present study imply that building on commonalities within profiles of learners with ASD with appropriate effective practices may increase both teacher self-efficacy, and learner outcomes in the area of comprehension.

Implications for future research. Research connecting learning needs of students with ASD, effective practices, teacher training, and teacher perceptions of their own ability to teach reading comprehension to learners with ASD is scarce. Results of this study warrant further investigation and research connecting single-subject design and true-experimental design methodology to teacher professional development in the area of effective practices, teacher self-efficacy and outcome expectancy. In addition, much of the current research is limited to single subject design investigations of specific effective practices analyzed in isolation. The

investigation of instructing teachers to identify, select, and implement a variety of effective strategies based on individualized student needs emerges as a future direction for research related to teaching reading comprehension to students with ASD.

Moreover, pre-posttest design studies assessing the impact of teacher professional development and administrator support on the variables of teacher self-efficacy and outcome expectancy are needed. As discussed, only 5% of teachers in the present study reported a high level of self-efficacy related to teaching reading comprehension to learners with ASD. The need for future research to investigate actual teacher experiences in the classroom emerges, along with future research to investigate the impact of targeted professional development in reading comprehension on teacher self-efficacy. In the present study, the prediction model of self-efficacy emerged as a stronger overall model than the outcome expectancy model. Future research using measures of actual student outcomes, as opposed to teacher expectation of future student outcomes, is recommended to better understand these results.

The present study identified a need for communication and collaboration among teachers and researchers. In addition to the present study confirming a research to practice gap, evidenced by teachers not reporting the effective practices found in the existing literature as the most effective in the classroom, a subsequent practice to research gap emerged. A recommendation for future research prioritizing consideration of the instructional practices that teachers deem effective in their classrooms as the foundation for empirical study emerges. For example teacher reported effective practices of annotating text, chunking text, re-teaching, using repeated reading, and using visual pictures warrant investigation specific to comprehension instruction and learners with ASD.

Furthermore, with regard to what is happening in the field, further research to understand

the relationship between instructional setting, and learner verbal language ability with comprehension instruction are recommended. With regard to instructional setting, findings were not statistically significant yet descriptive data implied that setting may have an impact on teacher access to, experience with, and/or use of effective practices while teaching comprehension to learners with ASD. This suggests that further research looking at the relationship among least restrictive and more restrictive learning environments on teacher use of comprehension related instructional practices may be of practical importance for planning professional development that matches teacher needs.

The verbal language ability of learners with ASD also emerged as warranting further investigation. Descriptive demographic data revealed that teaching learners of lower verbal ability decreased teacher self-efficacy, yet contrastingly, teaching learners of low verbal ability emerged as a significant predictor of increased teacher outcome expectancy. Research to better understand this relationship among teaching learners of low verbal ability, decreased teacher perceived self-efficacy, and increased outcome expectancy for student progress is likely to provide practical implications for instruction. For example, investigating whether learners of various verbal abilities are receiving access to the same amount and type of comprehension instruction, and investigating teacher beliefs about which instructional practices they deem as most effective while teaching learners at varying verbal abilities, may provide direction for increasing the use of the most effective instruction practices to optimally support all learners with ASD.

The concept of special education teachers as interventionists also appears to warrant future research in consideration of how teachers view themselves. Specifically, do special education teachers view themselves as interventionists? Do they view themselves as having the

knowledge of reading specialists? Do they feel that being an interventionist equates to having knowledge in instructional practices? Investigation into such questions may provide further insight into teacher self-efficacy, along with insight into teacher access to curriculum and instructional practices leading to increased understanding of teacher experiences that can guide future research.

Finally, a recent culture shift in schools has emerged, as many teachers now have their annual evaluation tied to student progress on growth objectives. In the present study, 62% of teachers reported having evaluations tied to student outcomes, and 56% of teachers reported that their students take state standardized assessments which assess reading comprehension related to literature as well as subject matter content. Teachers' experiences in relation to student performance on standardized tests and student performance tied to annual evaluations is a potential link to teacher self-efficacy. Future research investigating the relationship among teacher self-efficacy, student outcomes, professional development in reading comprehension, and teacher evaluation is recommended.

Summary

A consensus in the research community has emerged indicating a need to focus on reading comprehension for learners with ASD, along with a need to identify evidence-based and effective practices to instruct this population. This is the first study to investigate the relationships among teacher use of research-based instructional practices in reading comprehension, teacher perceived self-efficacy in teaching reading comprehension, and teacher outcome expectancy teaching comprehension to learners with ASD. A primary goal of this study was to glean insight from teachers into their perceptions and experiences surrounding teaching comprehension to learners with ASD in order to advance our understanding of what is currently

happening in classrooms, what teachers feel about using effective practices, and what job-related factors impact teacher self-perceptions and expectations for students.

In summary, the findings related to teacher preparedness to use the effective practices of anaphoric cueing, compare and contrast diagrams, cooperative learning, direct/explicit instruction, graphic organizers, question generation, read-alouds, reciprocal questioning, story structure maps/character event maps, systematic prompts, and a multiple strategy approach, indicate that teachers with a higher confidence in using these practices have both a higher perception of their own ability to teach comprehension (self-efficacy), and a higher expectation of their own ability to increase instructional outcomes in their students (outcome expectancy).

Furthermore, this study was conducted to identify means to support teachers in increasing comprehension outcomes in students, as poor reading comprehension may lead to lower independence and therefore, lower quality of life outcomes for learners with ASD.
Study results indicate that teacher perceptions of their own ability to teach reading comprehension to learners with ASD are further increased by supportive school principals and administrators, and by classroom experience. The support of school administrators was found to be equally influential on teacher expectations that their instruction will lead to increased student outcomes. These findings indicate that teachers of learners with ASD benefit from supportive school leaders, and from ongoing participation in professional development and education in the area of reading comprehension.

It would seem that all students should have access to effective reading comprehension instruction, and that all teachers should feel highly self-efficacious in the art of teaching, especially in the core subject of reading comprehension. Findings of the current study, that teachers are not self-efficacious using effective practices to teach comprehension to learners with

ASD, should be considered as a charge for action. It emerges as essential for teachers, administrators, and researchers to collaborate in order to ameliorate the current research to practice (and practice to research) gap, and to foster a strong foundation in comprehending text, in order to increase both academic outcomes, and post-school quality of life outcomes, for every individual with ASD.

References

Adams, C. N. & Jarrold, C. (2009). Inhibition and the validity of the stroop task for children with autism. *Journal of Autism and Developmental Disorders, 30*(8), 1112-1121. doi:10.1007/s10803-009-0721-8

Alberto, P. A., Fredrick, L., Hughes, M., McIntosh, L., & Cihak, D. (2007). Components of visual literacy: Teaching logos. *Focus on Autism and Other Developmental Disabilities, 22*(1), 234-243.

American Psychiatric Association. (2012). Diagnostic and statistical manual of mental disorders (5th edition preliminary draft expected publication date May 2013). Washington, D.C. Retrieved October 3, 2012 from http://www.dsm5.org

Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York: Freeman.

Bandura, A., & Locke, E. A. (2003). Negative self-efficacy and goal effects revisited. *Journal of Applied Psychology*, *88*(21), 87-99.

Baron-Cohen, S. (2001). Theory of mind and autism: A review. *Special Issue of the International Review of Mental Retardation, 23,* 169-184.

Basil, C., & Reyes, S. (2003). Acquisition of literacy skills by children with severe disability. *Child Language Teaching and Therapy*, *19*, 27-48. doi:10.1191/0265659003ct242oa

Bölte, S., Golan, O., Goodwin, M. S. & Zwaigenbaum, L. (2010). What can innovative technologies do for autism spectrum disorders? *Autism*, *14*(3), 155-159. doi:10.1177/1362361310135028

Bowker, A., D'Angelo, N. M., Hicks, R., & Wells K. (2011). Treatments for autism: Parental choices and perceptions of change. *Journal of Autism and Behavioral Disorders*, *41*, 1373-1382. doi:10.1007/s10803 0110-1164-y

Browder, D. M., & Cooper-Duffy, K. (2003). Evidence-based practices for learners with severe disabilities and the requirement for accountability in "no child left behind." *The Journal of Special Education. 37*(3), 157-163.

Browder, D., Gibbs S., Ahlgrim-Delzell, L., Courtade, G. R., Mraz, M. & Flowers, C. (2009). Literacy for learners with severe disabilities: What should we teach and what do we hope to achieve? *Remedial and Special Education, 30*(5), 269-282. doi:10.1177/0741932508315054

Brown, H. M., Oram-Cardy, J., & Johnson, A. (2013). A meta-analysis of the reading comprehension skills of individuals on the autism spectrum. *The Journal of Autism and Developmental Disorders. 43*, 932-935. doi: 10.1007/s10803-012-1638-1

Burns, M. K., & Ysseldyke, J. E. (2009). Reported prevalence of evidence-based instructional practices in special education. *The Journal of Special Education, 43*(3), 3-11. doi:10.1177/0022466908315563

Calik, T., Sezgin, F., Kavgaci, H., & Kilinc, A. C. (2012). Examination of relationships between instructional leadership of school principals and self-efficacy of teachers and collective teacher efficacy. *Educational Sciences Theory & Practice, 12*(4), 2498-2502.

Callahan, K., Henson, R. K., & Cowan, A. K. (2008). Social validation of evidence-based practices in autism by parents, teachers, and administrators. *Journal of Autism and Behavioral Disorders, 38*, 678-692. doi:10.1007/s10803-007-0434-9

Cameto, R., Knokey, A. M., Nagle, K., Sanford, C., Blackorby, J., Sinclair, B., and Riley, D. (2009). State Profiles on Alternate Assessments Based on Alternate Achievement Standards. *A Report From the National Study on Alternate Assessments* (NCSER 2009-3013). Menlo Park, CA: SRI International. Retrieved June 15, 1015 from http://ies.ed.gov/ncser/pdf/20093013.pdf

Carnahan, C. R., & Williamson, P. S. (2013). Does compare-contrast text structure help students with autism spectrum disorder comprehend science text? *Exceptional Children, 79*(3), 347-363.

Carnahan, C. R., Williamson, P. S., & Christman, J. (2011). Linking cognition and literacy in learners with autism spectrum disorder. *Teaching Exceptional Children, 43*(6), 54-62.

Carnahan, C. R., Williamson, P. S., & Haydon, T. (2009). Matching literacy profiles with instruction for learners on the spectrum: Making reading instruction meaningful. *Beyond Behavior, (*Fall), 11-16.

Centers for Disease Control and Prevention. (2014, March 28). Prevalence of autism spectrum disorder among children age 8 years – Autism and developmental disabilities monitoring network, 11 sites, United States, 2010. *CDC Online Newsroom Press Release,* Retrieved March 30, 2014 from http://www.cdc.gov/mmwr/preview/mmwrhtml/ss6302a1.htm?s_cid=ss6302a1_w

Chandler-Olcott, K., & Kluth, P. (2009). Why everyone benefits from including learners with autism in literacy instruction. *The Reading Teacher, 62*(7), 548-557. doi:10.1598/RT.62.7.1

Chiang, H., & Lin, Y. (2007). Reading comprehension instruction for learners with autism spectrum disorders: A review of the literature. *Focus on Autism and Other Developmental Disabilities, 22*(4), 259-267. doi:10.1177/10883576070220040801

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003), *Applied multiple regression/correlation analyses for the behavioral sciences*, (3rd ed.), Mahwah, NJ: Lawrence Erlbaum.

Colle, L., Baron-Cohen, S., & Hill, J. (2007) Do children with autism have a theory of mind? A

non-verbal test of autism vs. specific language impairment. *Journal of Autism and Developmental Disorders, 37*, 716-723. doi: 10.1007/s10803-006-0198-7

Cook, B. G., Tankersley, M., & Cook, L. (2008). Nonexperimental quantitative research and its role in guiding instruction. *Intervention in School and Clinic, 44*(2), 98-104.

Cook, B. G., Smith, G. J., & Tankersley, M. (2012). Evidence-based practices in education. In K. R. Harris, S. Graham, & T. Urdan (Eds.), APA educational psychology handbook (Vol. 1, pp. 495-528). Washington, DC: American Psychological Association.

Cook, B. G., Tankersley, M., & Landrum, T. J., (2009). Determining evidence-based practices in special education. *Council for Exceptional Children, 75*(3), 365-383.

Cooper, H. (2010). *Research synthesis and meta-analysis: A step-by-step approach* (4th ed.). Los Angeles, CA: Sage Publications.

Coyne, P., Pisha, B., Dalton, B., Zeph, L. A., & Smith, N. C. (2010). Literacy by design: A universal design for learning approach for learners with significant intellectual disabilities.

Remedial and Special Education, 33(3), 162-172. doi:10.1177/0741932510381651

deBruin, C. L., Deppeler, J. M., Moore, D. W., & Diamond, N. T. (2013). Public school-based interventions for adolescents and young adults with autism spectrum disorder: A meta analysis. *Review of Educational Research, 1*, 1-30. doi:10.3102/0034654313498621

Dugan, E., Kamps, D., Leonard, B., Watkins, N., Rheinberger, A. & Stackhaus, J. (1995). Effects of cooperative learning groups during social studies for learners with autism and fourth-grade peers. *Journal of Applied Behavior Analysis, 28*(2), 175-188.

El Zein, F., Solis, M., Vaughn, S., & McCulley, L. (2014). Reading comprehension interventions

for learners with autism spectrum disorders: A synthesis of the research. *Journal of Autism and Developmental Disorders, 44*(6), 1303-1322. doi: 10.1007/s10803-013-1989-2

Enochs, L. G., Smith, L. P. & Huinker, D.(2000). Establishing factorial validity of the mathematics teaching efficacy beliefs instrument. *School Science and Mathematics, 100*(4) 194-202.

Fanning, Elizabeth (2005). Formatting a paper-based survey questionnaire: *Best Practices. Practical Assessment Research & Evaluation, 10*(12), 1-14.

Flores, M. M., & Ganz, J. B. (2007). Effectiveness of direct instruction for teaching statement inference, use of facts, and analogies to learners with developmental disabilities and reading delays. *Focus on Autism and Other Developmental Disabilities, 22*(4), 244-251.

Flores, M. M., & Ganz, J. B. (2009). Effects of direct instruction on the reading comprehension of learner with autism and disabilities. *Education and Training in Developmental Disabilities, 44*(1), 39-53.

Flores, M. M., Nelson, C., Hinton, V., Franklin, T. M., Strozier, S. D., Terry, L & Franklin, S. (2013). Teaching reading comprehension and language skills to students with autism spectrum disorders and developmental disabilities using direct instruction. *Education and Training in Autism and Developmental Disabilities, 48*(1), 41-48.

Gately, S. E. (2008). Facilitating reading comprehension for learners on the autism spectrum. *Teaching Exceptional Children, 40*(3), 40-45.

Goin-Kochel R. P., Mackintosh, V. H., & Myers, B. J. (2008). Parental reports on the efficacy of treatments and therapies for their children with autism spectrum disorders. *Research in Autism Spectrum Disorders, 3*, 528-537. doi: 10.1016/j.rasd.2008.11.001

Goin-Kochel R. P., Myers, B. J., & Mackintosh, V. H. (2006). Parental reports on the use of treatments and therapies for children with autism spectrum disorder. *Research in Autism Spectrum Disorders, 1,* 195-209. doi: 10.1016/j.rasd.2006.08.006

Green, V. A. (2007). Parental experience with treatments for autism. *Journal of Developmental & Physical Disabilities, 19,* 91-101. Doi:10.1007/s10882-007-9035-y

Green, V. A., Pituch, K. A., Itchon, J., Choi, A., O'Reilly, M., & Sigafoos, J. (2006). Internet survey of treatments used by parents of children with autism. *Research in Developmental Disabilities, 27,* 70-84. doi:10.1016/j.ridd.2004.12.002

Greene, J. C. (2007). Mixed methods in social inquiry. San Francisco, CA: Jossey-Bass.

Griffin, H. C., Griffin, L. W., Fitch, C.W., Albera, V., & Gingras, H. (2006). Educational interventions for individuals with Asperger Syndrome. *Intervention in School and Clinic, 41*(3), 150-155. doi:10.1177/10534512060410030401

Griswold, D. E., Barnhill, G. P., Myles, B. S., Hagiwara, T., & Simpson, R .L. (2002). Asperger syndrome and academic achievement. *Focus on Autism and Other Developmental Disabilities, 17*(2), 94-102. doi:10.1177/10883576020170020401

Gutstein, S. E., Whitney, T. (2002). Asperger syndrome and the development of social competence. *Focus on Autism and Other Developmental Disabilities, 17*(3), 161-171. doi:10.1177/10883576020170030601

Hagiwara, T. (2002). Academic assessment of children and youth with Asperger Syndrome, pervasive developmental disorders-not otherwise specified, and high-functioning autism. *Assessment for Effective Intervention, 27*(1&2), 89-100. doi:10.1177/073724770202700112

Hastings, P. (2012). Early career teachers self-efficacy for balanced reading instruction.

Australian Journal of Teacher Education, 37(6), 55-72.

Hendricks, D. (2011). Special education teachers serving learners with autism: A descriptive study of characteristics and self-reported knowledge and practices employed. *Journal of Vocational Rehabilitation 35,* 37-50. doi:10.3233/JVR-2011-0552

Hendricks, D. R., Wehman, P. (2009). Transition from school to adulthood for youth with autism spectrum disorders: review and recommendations. *Focus on Autism and Other Developmental Disabilities, 24*(2), 77-88. doi:10.1177/1088357608329827

Hess, K. L., Morrier, M. J., Heflin L. J., & Ivey, M. L. (2008). Autism treatment survey: Services received by children with autism spectrum disorders in public school classrooms. *Journal of Autism and Behavioral Disorders, 38,* 961-971. doi:10.1007/s10803-007-0470-5

Horner, R. H., Carr, E. G., Halle, J., McGee, G., Odom, S., & Wolery, M. (2005). The use of single-subject research to identify evidence-based practice in special education. *Council for Exceptional Children, 71*(2), 165-179.

Hua, Y., Hendrickson, J. M., Therrien, W. J., Woods-Groves, S., Ries, P. S., Shaw, J. J. (2012). Effects of combined reading and question generation on reading fluency and comprehension of three young adults with autism and intellectual disability. *Focus on Autism and Other Developmental Disabilities, 27*(3) 135-146. doi: 10.177/1088357612 448421

Huemer, S. V., & Mann, V. (2010). A comprehensive profile of decoding and comprehension in autism spectrum disorders. *Journal of Autism and Developmental Disorders, 40*(4), 485-493. doi:10.1007/s10803-009-0892-3

Huerta, M., Bishop, S. L., Duncan, A., Hus, V., Lord, C. (2012). Application of DSM-5 criteria

for autism spectrum disorder to three samples of children with DSM-IV diagnoses of pervasive developmental disorders. *American Journal of Psychiatry, 169*(10), 1056-1064. Retrieved October 4, 2012 from http://ajp.psychiatryonline.org

Iavonnone, R., Dunlap, G., Huber, H, & Kincaid, D. (2003). Effective educational practices for learners with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities, 18*(3), 150-165.

Individuals With Disabilities Education Act, 20 U.S.C. § 1400 (2004).

International Reading Association. (2002). *Summary of the (U.S.) National Reading Panel report: Teaching children to read.* Newark, DE: U.S. Division of Research and Policy. Retrieved from http://www.reading.org/Libraries/reports-and-standards/nrp_summary pdf?sfvrsn=0

Jennett, H. K., Harris, S. L., & Mesibov, G. B. (2003). Commitment to philosophy, teacher efficacy, and burnout among teachers of children with autism. *The Journal of Autism and Developmental Disorders, 33*(6), 583-593.

Johnstone, C. J., & Thurlow, M. L. (2010). Statewide testing of reading and possible implications for learners with disabilities. *The Journal of Special Education, 46*(1), 17-25. doi:10.1177/0022466910371984

Kachigan, S. K. (1986), *Statistical analysis: An interdisciplinary introduction to univariate & multivariate methods,* New York, NY: Radius Press.

Kamps, D. M. (1995). Cooperative learning groups in reading: An integration strategy for learners with autism and general classroom peers. *Behavioral Disorders: Journal of the Council for Children with Behavioral Disorders, 21*(1), 89-109.

Kamps, D. M., Barbetta, P. M., Leonard, B. R., & Delquadri, J. (1994). Classwide peer tutoring:

An integration strategy to improve reading skills and promote peer interactions among learners with autism and general education peers. *Journal of Applied Behavior Analysis, 27*(1), 49-61.

Kamps, D. M., Leonard, B., Potucek, J., & Garrison-Harrell, L. (1995). Cooperative learning groups in reading: An integration strategy for learners with autism and general classroom peers. *Behavioral Disorders: Journal of the Council for Children with Behavioral Disorders, 21*(1), 89-109.

Klecan-Aker, J. S., & Gill, C. (2005). Teaching language organization to a child with pervasive developmental disorder: A case study. *Child Language Teaching and Therapy, 21*(1), 60-74. doi:10.1191/0265659005ct281oa

Kratochwill, T. R., Hitchcock, J. H., Horner, R. H., Levin, J. R., Odom, S. L., Rindsopf, D. M. & Shadish, W. R. (2013). Single-case intervention research design standards. *Remedial and Special Education, 34*(1), 26-38. Doi:10.1177/0741932512452794

Kretlow, A. G., & Blatz, S. L. (2011). The ABCs of evidence-based practice for teachers. *Teaching Exceptional Children, 43*(5), 8-19.

Lanter, E., Watson, L. R., Erickson, K. A., & Freeman, D. (2012). Emergent literacy in children with autism: An exploration of developmental and contextual dynamic processes. *Language, Speech, and Hearing Services in Schools, 43*, 308-324. doi:10.1044/0161-1461(2012/10-0083)

LaBarbera, R., & Soto-Hinman, I. (2009, March). Toward a model of promoting literacy for learners with autism spectrum disorder in the general education classroom. *The Forum on Public Policy: A Journal of the Oxford Round Table, 1*, 1-14. Retrieved from http://forumonpublicpolicy.com/spring09papers/archivespr09/labarbera.pdf

Leech, N. A., Barrett, K. C., & Morgan, G. A. (2011). *IBM SPSS for Intermediate statistics: Use and interpretation (4th ed.).* New York, NY: Routledge/Taylor & Francis Group.

Livanis, A., & Mouzakitis, A. (2010). The treatment validity of autism screening instruments. *Assessment for Effective Intervention, 35*(34), 206-217. doi:10.1177/1534508410381041

Makintosh, V. H., Goin-Kochel, R. P., Myers, B. J. (2012). "What do you like about the treatments you're currently using?": A qualitative study of parents of children with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities,* 27(1), 51-60. doi:10.177/1088357611423542

Mayton, M. R., Wheeler, J. J., Menendez, A. L., & Zhang, J. (2010). An analysis of evidence-based practices in the education and treatment of learners with autism spectrum disorders. *Education and Training in Autism and Developmental Disabilities, 45*(4), 539-551.

Mazzotti, V. L., Rowe, D. R., & Test, D. W. (2012). Navigating the evidence-based practice maze: Resources for teachers of secondary learners with disabilities. *Intervention in School and Clinic 48*(3), 159-166. doi: 10.1177/1053451212454004

McMillan, J. H., & Schumacher, S. (2006). *Research in education: Evidence-based inquiry (6th ed.).* Boston: Pearson

Mesibov, G. B., Shea, V. (2010). The TEACCH program in the era of evidence-based practice. *Journal of Autism and Developmental Disorders, 40*, 570-579. doi:10.1007/s10803-009-0901-6

Mesibov, G. B., & Shea, V. (2011). Evidence-based practices and autism. *Autism 15*(1), 114-133. doi:10.1177/136236130934-8070

Mims, P. J., Hudson, M. E., & Browder, D. M. (2012). Using read-alouds of grade-level biographies and systematic prompting to promote comprehension for learners with

moderate and severe developmental disabilities. *Focus on Autism and Other Developmental Disabilities, 27*(2), 67-80. doi: 10.117/1088357612446859

Mirenda, P. (2003). "He's not really a reader…": Perspectives on supporting literacy development in individuals with autism. *Topics in Language Disorders, 23*(4), 271-282.

Myles, B. S., Hilgenfeld, T. D., Barnhill, G. P., Griswold, D. E., Hagiwara, T., & Simpson, R. L. (2002). Analysis of reading skills in individuals with Asperger Syndrome. *Focus on Autism and Other Developmental Disabilities, 17*(1), 44-47.

National Institute of Child Health and Human Development. (2000). *Report of the National Reading Panel. Teaching children to read: An evidence-based assessment of the scientific research literature on reading and its implications for reading instruction.* (NIH Publication No. 00-4769). Washington, DC: U.S. Government Printing Office.

No Child Left Behind Act of 2001, Pub. L. No. 107-110, 115 Stat. 1452 (2002).

Norbury, C. F. (2004). Factors supporting idiom comprehension in children with communication disorders. *Journal of Speech, Language, and Hearing Research, 47*(Oct.), 1179-1193.

O'Connor, I. M., & Klein, P. D. (2004). Exploration of strategies for facilitating the reading comprehension of high-functioning learners with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 34*(2), 115-127.

Odom, S. L., Brantlinger, E., Gersten, R., Horner, R. H., Thompson, B., & Harris, K. R. (2005). Research in special education: Scientific methods and evidence-based practices. *Council for Exceptional Children, 71*(2), 137-148.

Odom, S. L., Brown, W. H., Frey, T., Karasu, N., Smith-Canter, L. L., & Strain P. S. (2003). Evidence-based practices for young children with autism: Contributions for single-subject design research. *Focus on Autism and Other Developmental Disabilities, 18*(3),

166-175.

Odom S. L., Collet-Klingenberg, L., Rogers, S. J., & Hatton, D. D. (2011). Evidence-based practices in interventions for children and youth with autism spectrum disorders. *Preventing School Failure 54*(4), 275-282. doi: 10.1080/1045988100378556

Pennington, R. C. (2010). Computer-assisted instruction for teaching academic skills to learners with autism spectrum disorders: A review of the literature. *Focus on Autism and Other Developmental Disabilities, 25*(4), 239-248. doi:10.1177/1088357610378291

Pituch, K. A., Green, V. A., Didden, R., Lang, R., O'Reilly, M. F., Lancioni, G. E., & Sigafoos, J. (2010). Parent reported treatment priorities for children with autism spectrum disorders. *Research in Autism Spectrum Disorders, 5,* 135-143. doi:10.1016/j.rasd.2010.03.003

Reichow, B., Volkmar, F. R., Cicchetti, D. V. (2008). Development of the evaluative method for evaluating and determining evidence-based practices in autism. *Journal of autism and developmental disorders 31,* 1311-1399. doi:10.1007/s10803-007-0517-7

Ricketts, J. (2011). Research review: reading comprehension in developmental disorders of language and communication. *The Journal of Child Psychology and Psychiatry, 52*(11), 1111-1123. doi: 10.1111/j.1469-7610.2011.02438.x

Roux C., Dion, E., Barrette, A., Depere, V., & Fuchs, D. (2014). Efficacy of an intervention to enhance reading comprehension of students with high-functioning autism spectrum disorder. *Remedial and Special Education,* 1-12.

Ruble, L. A., Toland, M. D., Birdwhistell, J. L., McGrew, J. H., & Usher, E. L. (2013). Preliminary study of the autism self-efficacy scale for teachers. *Research in Autism Spectrum Disorders, 7,* 1151-1159.

Ruble, L. A., Usher, E. L., McGrew, J. H. (2011). Preliminary investigation of the sources of self-efficacy among teachers of students with autism. *Focus on Autism and Other Developmental Disabilities, 26*(2), 67-74. doi: 10.1177/1088357610397345

Rumpf, A. L., Kamp-Becker, I., Becker, K. & Kauschke, C. (2012). Narrative competence and internal state language of children with Asperger syndrome and ADHD. *Research in Developmental Disabilities, 33,* 1395-1407. doi:10.1016/j.ridd.2012.03.007

Santangelo. T. & Graham, S. (February, 2012). *Spelling Instruction for elementary-aged learners: A meta-analytic review.* Presentation given at the annual Pacific Coast Research Conference, Coronado, CA.

Santangelo, T., Novosel, L C., Cook, B. G., & Gapsis, M. (2015). Using the 6S pyramid to identify research-based instructional practices for students with learning disabilities. *Learning Disabilities Research & Practices, 30*(2), 91-101.

Shyman, E. (2010). Identifying predictors of emotional exhaustion among special education paraeducators: A preliminary investigation. *Psychology in the Schools, 47*(8), 828-840. doi:10.1002/pits.20507

Simonsen, B., Shaw, S. F., Fraggella-Luby, M., Sugai, G., Coyne, M. D., Rhein, B., …Alfano, M. (2010). A schoolwide model for service delivery: Redefining special educators as interventionists. *Remedial and Special Education, 31*(1), 17-23. doi:10.1177/0741932508324396

Siwatu, K. O., Frazier, P., Osaghae, O. J., & Starker, T. V. (2011). From maybe I can to yes I can: Developing pre-service and inservice teachers' self-efficacy to teach African American students. *The Journal of Negro Education, 80*(3), 209-222.

Smith, S. W., & Barnhill, G. P. (2001). Current topics in review: What's new in AS research: A

synthesis of research conducted by the Asperger syndrome project. *Intervention in School and Clinic, 36*(5), 300-305. doi:10.1177/105345120103600507

Smith, V., Mirenda, P. & Zaidman-Zait, A. (2007). Predictors of expressive vocabulary growth in children with autism. *Journal of Speech, Language, and Hearing Research, 50*, 149-160. doi:10.1044/1092-4388(2007/013)

Solis, M., McCulley, L. & Zein, F. E. (2013). *An alternating treatments comparison of reading comprehension interventions for learners with autism spectrum disorders.* Presentation given at The Meadows Center. Texas

Spector, J. E. (2011). Sight word instruction for learners with autism: An evaluation of the evidence base. *Journal of autism and developmental disorders 41*, 1411-1422. doi: 10.1007/s10803-010-1165-x

Spooner, F., & Browder, D. M. (2015). Raising the bar: Significant advances and future needs for promoting learning for students with severe disabilities. *Remedial and Special Education, 36*(1), 28-32. Doi:10.1177/074193251455022

Spooner, F., Knight, V. F., Browder, D. M., & Smith, B. R. (2011). Evidence-based practice for teaching academics to learners with severe developmental disabilities. *Remedial and Special Education, 33*(6), 374-387. doi:10.1177/0741932511421634

Stringfield, S. G., Luscre, D. & Gast, D. L. (2011). Effects of a story map on accelerated reader postreading test scores in learners with high-functioning autism. *Focus on Autism and Other Developmental Disabilities, 26*(4), 218-229. doi:10.1177/1088357611423543

Szabo, S. M. & Mokhtari, K. (2004). Developing a reading teaching efficacy instrument for teacher candidates: A validation study. *Action in Teacher Education, 26*(3), 59-72.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using Multivariate Statistics, Fifth Edition.* Boston:

Pearson Education, INC.

Teddlie, C., & Tashakkori, A. (2009). *Foundations of mixed methods research: Integrating quantitative and qualitative approaches in the social and behavioral sciences.* Thousand Oaks, CA: Sage.

Torres, C., Farley, C. A., & Cook, B. G. (2012) A special educator's guide to successfully implementing evidence-based practices. *Council for Exceptional Children 45*(1), 64-73.

Trembath, D., Germano, C., Johanson, G., & Dissanayake, C. (2012). The experience of anxiety in young adults with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities,* Advance online publication. doi:10.1177/108837612454916

U.S. Department of Education, National Center for Education Statistics. (2015). *Digest of Education Statistics, 2013* (NCES 2015-011). Retrieved June 15, 2015 from http://nces.ed.gov/programs/digest/d13/tables/dt13_209.20.asp

Westby, C. (2012). Explaining comprehension in children with autism. *Word of Mouth, 23*(5), 7-10. doi:10.1177/1048395012440418b

Whalon K. J., Al Otaiba S., & Delanos, M. E. (2009). Evidence-based reading instruction for individuals with autism spectrum disorders. *Focus on Autism and Other Developmental Disabilities*, *24*(1), 3-16. doi:10.1177/1088357608328515

Whalon K. J., & Hanline, M. F. (2008). Effects of reciprocal questioning on the question generation and responding of children with autism spectrum disorder. *Education and Training in Developmental Disabilities, 43*(3), 367-387.

Whalon K. J., Hanline, M. F., & Woods, J. (2007). Using interactive storybook reading to increase language and literacy skills of children with autism spectrum disorder. *Young Exceptional Children, 11*(1), 16-26. doi:10.1177/109625060601100102

Whalon K. J., & Hart, J. E. (2011a). Adapting an evidence-based reading comprehension strategy for learners with autism spectrum disorder. *Intervention in School and Clinic, 46*(4), 195-203. doi:10.1177/1053451210389036

Whalon K. J., & Hart, J. E. (2011b). Children with autism spectrum disorder and literacy instruction: An exploratory study of elementary inclusive settings. *Remedial and Special education, 32*(3), 243-255. doi:10.1177/0741932510362174

Williams, C., Wright, B., Callaghan, G., & Coughlan, B. (2002). Do children with autism learn to read more readily by computer assisted instruction or traditional book methods?: A Pilot Study. *Autism, 6*(1), 71-91. doi:10.1177/1362361302006001006

Williamson, P., Carnahan, C. R., Birri, N. & Swoboda, C. (2014). Improving comprehension of narrative using character event maps for high school students with autism spectrum disorder. *The Journal of Special Education,* 1-11. Doi:10.1177/0022466914521301

Williamson, P., Carnahan C., & Jacobs J. (2012). Reading comprehension profiles of high-functioning learners on the autism spectrum: A grounded theory. *Exceptional Children, 78*(4), 449-469.

Witmer, S. E., & Ferreri, S. J. (2014). Alignment of instruction, expectations, and accountability testing for students with autism spectrum disorder. *Focus on Autism and Other Developmental Disabilities, 29*(3), 131-144.

Worley, J. A. & Matson, J. L. (2012). Comparing symptoms of autism spectrum disorders using the current DSM-IV-TR diagnostic criteria and the proposed DSM-V diagnostic criteria. *Research in Autism Spectrum Disorders,* 6, 965-970. doi:10.1016/j.rasd.2011.12.012

Appendix

A. Research Synthesis Coding Manual

B. Effective Practices Survey

C. Reading Teacher Efficacy Instrument adapted (RTEI-a)

D. Job-related Factors Survey & Demographic Survey

E. Invitation to Participate- Teachers

F. Invitation to Participate- Post on CEC & NASET Professional Forums

G. Participant Contact Sources & Initial List

H. Informed Consent Document

I. Survey Coding Guide

J. Self-efficacy Histogram & Scatterplot

K. Outcome Expectancy Histogram & Scatterplot

L. Self-efficacy Correlation Matrix

M. Outcome Expectancy Correlation Matrix

Appendix A

Coding Manual: Single Case Research/Reading Comprehension Strategies and ASD

VARIABLE	DESCRIPTION	CODE/EXAMPLE & PAGE #
Title of Article	Include full title (Exclude from summary tables)	Copy full title
Author(s) & Year	Include author(s) & year of publication	(Author, year) or (Author et al., year)
Research Design	Determine the type of Single Case Design	ABAB ATD= Alternating Treatment Design MBA= Multiple Baseline Across- B= Behaviors P= Participants/People S= Settings i.e. MBAP
	SETTING & PARTICIPANTS	
Intervention Location	Public school, private school or other; Implemented in special ed., general ed. or other setting	Pb= Public School Pr= Private School U= University H= Home G= General Ed I= Inclusion S= Special Ed NR= Not Reported O= Other _____ i.e. Pr/S
# settings	# of settings/any significant characteristics	# /characteristics NR= Not Reported i.e. classroom in 3 separate schools=3 i.e. two classrooms same school = 1/guidance office
Familiar	Familiar environment to participant	Y= Yes N= No NR= Not Reported
Participants #	Total number of participants with ASD	# ASD i.e. 3
Grade	Indicate grade (may estimate from age)	Grade(s): K, 1, 2 …12 P= Post High School NR= Not Reported i.e. 6
Diagnosis	DSM IV Diagnosis	ASD, PDD, Asp= Asperger's, HFASD= high funct ASD N= No Diagnosis NR= Not Reported i.e. ASD
Reading Comprehension Level	Identify reading comprehension level. May estimate, i.e. by comparison of actual grade level to reading comp. grade level. If levels not reported, identify any relevant comprehension	Comprehension: A= Average (on grade level) BA= Below Average (1-2 years below grade level) SBA= Significantly Below Average (3 or more years

	information as other.	below grade level) NR= Not Reported i.e. SBA O= Other/_____ i.e. O/Comp. IEP goals
Other Participants (beyond those w/ASD)	# of Participants beyond those with ASD, and diagnosis or general education	G= General ed NR= Not Reported N= No other Participants i.e. 4/ADHD i.e. 6/G
	INDEPENDENT VARIABLE(S)	
Baseline Condition	Baseline Instruction; Type of Instruction prior to Intervention	i.e G= Gen. ed. reading S= Spec. ed. reading Other=O/_____ NR= Not Reported
Independent Variable: **Specific Comprehension Intervention**	NRP Recommended: comprehension monitoring, cooperative learning, graphic organizers, question answering, question generation, story structure, summarization, multiple strategies Other: i.e. direct instruction, peer tutor	CM= Comp. Monitoring CL= Cooperative Learning GO= Graphic Organizer QA= Question Answer QG= Question Generation SS= Story Structure Sum= Summarization MS= Multiple Strategies Other= O/i.e. peer tutoring
Secondary Interventions	Identify if more than 1 intervention implemented/beyond intervention above	Yes= Y /_____ No=N i.e. Y/Anaphoric Cuing
Duration (minutes)	Report total number of minutes of intervention. Calculate from data given.	NR= Not Reported i.e. 300
Materials	Report the type of Reading Material used during intervention. Describe genre if reported.	P=Paragraph/Passage B=Book /Novel S= Sentence F= Fiction NF= Nonfiction Other =O/_____ NR= Not Reported i.e. S i.e. P/F
Material Individualization	Were reading levels individualized to each participant, i.e. multiple grade levels of reading material used?	Yes= Y/_____ N= No NR= Not Reported i.e. Y
Pre-teaching	Was intervention pre-teaching reported? If yes, list pre-intervention skills taught.	Y=Yes/_____ N=No i.e. Y/components of story
Strategies Co-occurring	Describe the strategies used in addition to the intervention; Use of visuals or graphic organizers, varied modalities, etc.	V= Visuals/Describe, i.e. pictures; graph org, charts S= Social Skills /Describe M= Motivational/Describe B= Behavioral/Describe A= Auditory /Describe N=No or Not Reported i.e V/PECS
Grouping Format	Specify the format for the intervention: Individual, dyads or	I= Individual D= Dyad or partners SG= Small Group

		WC= Whole class instruction NR= Not Reported
Interventionist	State who delivered the intervention & State if familiar to participants	Interventionist/Familiar T= Teacher R= Researcher O= Other _____ Familiar: Y= Yes N= No i.e. Familiar Teacher= T/Y I.e. 2 unfamiliar Researchers= 2R/N
***Training** Professional Development	Did interventionist receive professional development, or is interventionist a known expert?	(1) Y= Yes (0) N= No or NR= Not Reported i.e. Y
length	If yes above, type and/or length of training	i.e. Y/1 week video training
	RESULTS	
Results & Measure(s) Measures Findings	List measures and provide a brief statement of findings.	Type of Measure: SA= Standardized Assessment (i.e. SRI) CBA= Curriculum Based Assessment RCA= Researcher Created Assessment TCA= Teacher Created Assessment i.e. RCA Probes- 10 comp. questions based on 5 Ws and inferencing ; For 2 of the 3 students, performance…
Data Points	Data related to Comprehension assessment above (baseline & intervention).	M= Mean B= Baseline I= Intervention i.e. RCA: B 25%M/I 90%M
***Reliability of Measures**	Identify reliability criteria. Is there evidence of >.80 or higher (any form) on each measure?	(1) Y=Yes: .8 or higher all measures (.5) P= Partial: .8 or above some measures (0) N= No (0) NR= Not Reported
	Additional QUALITY INDICATORS	
***Functional Relation**	Did the design have the potential to demonstrate experimental control?	(1) Y= Yes (0) N= No
***Fidelity of Treatment**	Is there direct evidence the treatment was administered as intended with integrity (.8 or higher)? Data or %	(1) Fidelity reported at .8 or higher, Yes= Y (.5) Fidelity reported lower than .8, No= N (0) NR= Not Reported i.e. Y/.9 -Observational data collected for 40% sessions to verify script= 90%
***Baseline Stability**	Is there evidence of a stable baseline before intervention?	(1) Y= Yes (0) N= No i.e. Y
***Floor Effect-Baseline**	Was the measure appropriate at each Baseline in terms of floor effect?	(1) Y= Yes (0) N= No i.e. Y

***Ceiling Effect- Baseline**	Was the measure appropriate at each Baseline in terms of ceiling effect?	(1) Y= Yes (0) N= No i.e. Y
***Floor Effect- Intervention**	Was the measure appropriate at each Intervention in terms of floor effect?	(1) Y= Yes (0) N= No i.e. Y
***Ceiling Effect- Intervention**	Was measure appropriate at each Intervention in terms of ceiling effect?	(1) Y= Yes (0) N= No i.e. Y
***Maintenance**	Did authors examine maintenance (data collected over extended time)?	(1) Y= Yes (0) N= No i.e. = Y
Results	If yes, briefly describe (state length & measure)	Detail if Yes above: i.e. 1 month/M 90%
***Generalization**	Did the authors examine generalization (functional relation extending to other behavior-environment relations)?	(1) Y= Yes (0) N= No i.e. Y
Results	If yes, briefly describe	i.e. Rdg comp. applied to science text/M 85%
***Social Validity**	Did authors assess social validity (intervention holds up in real world classroom setting)?	(1) Y= Yes (0) Not Reported
Results	If yes, briefly describe	T- Teacher P- Parent S- Student i.e. T Surveys
"Additional Insights"	Record additional insights. Indicate if a functional relation was established.	i.e. FR established between CL and comp. of analogies when…

* Quality Indicator

Appendix B: Effective Practices Survey

Directions: Please respond to the following question and statements considering teaching comprehension to students with autism spectrum disorder (ASD) on your most recent caseload.

Initial Open-ended Question:

1. Please list all the strategies you have found to be effective in teaching reading comprehension to students with ASD.	

Directions: Read each statement below and select the column that you feel most accurately indicates your agreement.

Statements	Strongly Agree 5	Agree 4	Undecided 3	Disagree 2	Strongly Disagree 1
2. I understand ***direct instruction*** well enough to use it as an effective strategy to teach reading comprehension to students with ASD.					
3. I understand ***story structure*** well enough to use it as an effective strategy to teach reading comprehension to students with ASD.					
4. I understand ***cooperative learning*** well enough to use it as an effective strategy to teach reading comprehension to students with ASD.					
5. I understand ***question generation*** well enough to use it as an effective strategy to teach reading comprehension to students with ASD.					
6. I understand ***compare and contrast charts*** well enough to use it as an effective strategy to teach reading comprehension to students with ASD.					
7. I understand ***anaphoric cueing*** well enough to use it as an effective strategy to teach reading comprehension to students with ASD.					
8. I understand ***read-alouds*** well enough to use it as an effective strategy to teach reading comprehension to students with ASD.					
9. I understand ***reciprocal questioning*** well enough to use it as an effective strategy to teach reading comprehension to students with ASD.					
10. I understand ***graphic organizers*** well enough to use it as an effective strategy to teach reading comprehension to students with ASD.					
11. I understand ***systematic prompts*** well enough to use it as an effective strategy to teach reading comprehension to students with ASD.					
12. I understand ***a multiple strategy approach*** well enough to use it as an effective strategy to teach reading comprehension to students with ASD.					

Appendix C: Reading Teacher Efficacy Instrument- adapted (RTEI-a)

Directions: Please respond to the following statements considering teaching comprehension to students with ASD on your most recent caseload. Read each statement and select the column that most accurately indicates your agreement.

Statements	Strongly Agree 5	Agree 4	Undecided 3	Disagree 2	Strongly Disagree 1
13. When a student with ASD does better than usual in reading comprehension it is often because the teacher extended a little extra effort.					
14. I continually look for better ways to teach reading comprehension to students with ASD.					
15. Even when I try very hard, I do not teach reading comprehension as well as I teach other subjects to students with ASD.					
16. When the reading performance of students with ASD improves, it is often because their teacher has found a more effective way to support comprehension.					
17. I know several ways to teach reading comprehension effectively.					
18. I am not very effective in monitoring reading comprehension activities.					
19. When a low-achieving child with ASD progresses in reading comprehension, it is usually due to extra support offered by the teacher.					
20. I understand the process of reading well enough to be effective in teaching reading comprehension.					
21. The teacher is generally responsible for the achievement of students with ASD in the area of reading comprehension.					
22. Student's achievement in reading comprehension is directly related to their teacher's effectiveness in the teaching of reading.					
23. If parents comment that their child with ASD is showing more interest in reading, it is probably due to the performance of the child's teacher.					
24. I find it difficult to teach students with reading comprehension problems and ASD.					
25. When teaching reading comprehension, I will usually welcome student questions.					
26. I find it difficult to explain to students with ASD how to improve their reading comprehension.					
27. I do not know what to do to turn students with ASD on to reading.					
28. I use community resources to help get support for literacy in my classroom.					

Appendix D: Job-related Factors Survey

Directions: Please respond to the following question and statements considering teaching comprehension to students with ASD on your most recent caseload.

Instructional Setting	A full time inclusive setting	A partially inclusive, partially small group setting	A full time self-contained or small group setting
29. I primarily teach students with ASD in…			

Other: _____

Learner Characteristics	Typical to high functioning in terms of verbal language ability	Moderately to mildly impaired in terms of verbal language ability	Severely limited in verbal language ability and/or non-verbal learners
30. I primarily teach students with ASD that I consider…			

Other: _____

Educational Experiences	10+ years	3-9 years	0-2 years
31. # of years teaching			

Other: _____

Administrator Support	High Level of Support including consistent encouragement, financial reimbursement for PD, and provided classroom materials.	Some Support Including encouragement, or classroom materials, or financial reimbursement for PD	Lack of Support including no financial reimbursement for PD, limited classroom materials, and no encouragement
32. Support received by school administration in teaching comprehension to learners with ASD?			

Other: _____

Demographics

Certifications	Special Education	Reading Specialist	Elementary Ed	Autism Consult.	Content Specific Teacher
33. I have the following certifications… (check all that apply)					

Other: _____

34. What is your primary professional role?	

Grade Level	K-2nd grade	3rd -5th grade	6th -8th grade	9th -12th grade
35. Current Grade level teaching				

Other: _____

Setting	Public School	I work in both public and private schools	Private School
36. Type of School			

Other: _____

37. State of employment (pull down menu)	

Setting	General Academic	Content specific	ABA	TEACCH
38. Classroom type				

Other: _____

Learner Characteristics	Participate in Statewide Assessment Testing	Participate in Alternate Statewide Assessments
39. I primarily teach students with ASD that…		

Other: _____

Learner Characteristics	Have a diagnosis of ASD without intellectual disability	Have a diagnosis of ASD and intellectual disability
40. I primarily teach students with ASD that…		

Other: _____

Educational Experiences	Bachelor's Degree	Bachelor's Plus	Master's Degree	Master's Plus
41. My highest degree				

Other: _____

Education & Professional Development	Yes	No
42. I have taken college courses specific to teaching reading *comprehension* to students with ASD (If yes, indicate estimated # of courses taken)		
43. I have been provided with professional development specific to teaching reading *comprehension* to students with ASD		
44. I would like professional development specific to teaching reading *comprehension* to students with ASD		

Other: _____

Administration	Yes	No
45. My school or district reimburses me financially for attending professional development conferences		
46. My school or district reimburses me financially for graduate education credits		
47. Student progress toward learning objectives is a component of my employee evaluations		

Professional Organizations	National Association of Special Education Teachers	Council for Exceptional Children	Autism Society of America	National Autism Association
48. I am a member of the following professional organizations (check all that apply)				

Other: _____

Thank you for participating in this study! Please pass the survey link along to other professionals with primary instructional responsibility for students with ASD.

Appendix E

Invitation to Participate- Teachers

Dear Teacher,
Please consider this opportunity to participate in a research study and feel free to forward this invitation to colleagues who are also teachers of students with autism spectrum disorder. Thank you.

Best regards,
Amy Accardo
aaccardo@arcadia.edu

My name is Amy Accardo and I am a doctoral student at Arcadia University. I am inviting you to participate in an on-line research survey related to the use of strategies to promote reading comprehension skills in students with autism spectrum disorder (ASD). This study is being conducted in partial fulfillment of the requirements for my doctoral degree.

The purpose of this study is to gain an understanding of teacher experiences related to teaching reading comprehension to learners with ASD.

If you self-identify as a teacher of a student with ASD in any capacity, you are invited to participate in this study. Only participants who are 18 years or older are eligible to complete the survey. Survey completion is approximated at 10-20 minutes.

Your survey responses will be confidential, and you will not be asked to provide your name or contact information. Participation is completely voluntary. You may skip any question(s) you choose and continue with the survey, or completely terminate the survey at any point by exiting your web browser. Only responses to questions you complete will be used in the study, and skipped questions will be excluded from the study. This study has received approval from the Arcadia University Institutional Review Board. Your school or organization contact was obtained online, or this opportunity has been forwarded to you by a professional colleague.

To begin the survey, click on the link below:

https://www.surveymonkey.com/s/comprehensionASD

Appendix F

Invitation to Participate- Teacher Form Post

Post to CEC Online Professional Forum & NASET Teacher to Teacher Forum

If you are a teacher of students with autism spectrum disorder (ASD) please consider this opportunity to participate in a research study and feel free to forward this invitation to colleagues who are also teachers of students with ASD. Thank you.

Best regards,
Amy Accardo
aaccardo@arcadia.edu

My name is Amy Accardo and I am a doctoral student at Arcadia University. I am inviting you to participate in an on-line research survey related to the use of strategies to promote reading comprehension skills in students with autism spectrum disorder (ASD). This study is being conducted in partial fulfillment of the requirements for my doctoral degree.

The purpose of this study is to gain an understanding of teacher experiences related to teaching reading comprehension to learners with ASD.

If you self-identify as a teacher of a student with ASD in any capacity, you are invited to participate in this study. Only participants who are 18 years or older are eligible to complete the survey. Survey completion is approximated at 10-20 minutes.

Your survey responses will be confidential, and you will not be asked to provide your name or contact information. Participation is completely voluntary. You may skip any question(s) you choose and continue with the survey, or completely terminate the survey at any point by exiting your web browser. Only responses to questions you complete will be used in the study, and skipped questions will be excluded from the study. This study has received approval from the Arcadia University Institutional Review Board.

To begin the survey, click on the link below:

https://www.surveymonkey.com/s/comprehensionASD

Appendix G

PARTICIPANT CONTACT SOURCES & INITIAL LIST

Pennsylvania Public Schools
Downloadable List from the PA state website
http://www.edna.ed.state.pa.us/Screens/Extracts/wfExtractPublicSchools.aspx

Pennsylvania Private Schools
30 e-mail contacts from the Pennsylvania Department of Education document:
Directory of Approved Private Schools and Charter Schools
file:///C:/Users/Amy/Desktop/APS%20Directory%202013%20Deaf,%20Blind%20&%20ASD%20PA%20Participants.pdf

PENNSYLVANIA APPROVED PRIVATE SCHOOLS FOR SPECIAL EDUCATION
APPROVED PROGRAMS AND AGE RANGE SERVED

SCHOOL	AUT/ PDD	BL	CP	DF	MD	ID	NI	SED
ACLD Tillotson School							4.7-21	
Camphill Special Schools, Inc.						5-21R		
Centennial School	6-13							6-21
The Day School at The Children's Institute	2.7-21		2.7-21				2.7-21	
Clarke School for Hearing and Speech				3-5				
Community Country Day School								6-21
Davidson School (Elwyn)	3-21R	3-21R		3-21R		3-21R	3-21R	3-21R
Delta School	4-21						4-21	6-21
DePaul School for Hearing and Speech				3-14				
Devereux Schools	5-21R					5-21 R	5-21R	6-21R
Barber National Institute	3-21		3-21		3-21	3-21	3-21	
Easter Seal Society of Western PA	2-8		2-8		2-8		2-8	
Easter Seals of Southeastern PA (Philadelphia Area)	2-8		2-8		2-8		2-8	
Education Center at the Watson Institute	3-21R		3-21R		3-21R		3-21R	
George Crothers Memorial School			3-21			3-21	3-21	
Green Tree School	4.7-21							6-21
HMS School for Children with Cerebral Palsy			2-21R				2-21R	
Martin Luther School	5-14.5					5-14.5		5-14.5
Melmark School	5-21R					5-21R	5-21R	
Overbrook School for the Blind		3-21R						
Pace School	5-16						5-16	5-16
The Pathway School	6-21					6-21	6-21	8-21
Pennsylvania School for the Deaf				2-21				
Pressley Ridge Day School								6-21
Pressley Ridge School for the Deaf				6-21R				6-21R
Royer-Greaves School for Blind*		4.7-21R				4.7-21R		
The Timothy School	5-21							
The Valley Day School	4-21						4-21	4-21
The Vanguard School	4-21						4-21	4-21
The Vista School	3-21							
The Watson Institute Friendship Academy	6-21							6-21
Wesley Spectrum Highland School	6-21							6-21
Western Pennsylvania School for Blind Children**		2-21R						
Western Pennsylvania School for the Deaf				2-21R				
Woods Services							4.7-21R	
Wordsworth Academy	5-21R						5-21R	6-21R

New Jersey Private Schools
70 e-mail Contacts from the Autism New Jersey document, Directory of New Jersey Schools Serving Children with Autism Spectrum Disorder
http://www.autismnj.org/document.doc?id=124

New Jersey Public Schools
From the NJ School Directory of public and non-public schools
http://education.state.nj.us/directory/
Listing of public schools by county (Atlantic through Warren) and excel spreadsheet of principal contact and e-mail at each school. 1298 schools Atlantic thru Mercer, and another 1237 from Middlesex thru Warren. It is not known how many of these schools serve students with ASD.

Appendix H

INFORMED CONSENT DOCUMENT

DESCRIPTION OF THE RESEARCH

Thank you for your participation in this research study. The purpose of this study is to gain an understanding of teacher experiences and training related to teaching reading comprehension to learners with autism spectrum disorder. If you would like to know the results of the study and/or you would like to participate in future related research, please contact Amy Accardo, the primary investigator, at aaccardo@arcadia.edu.

CONFIDENTIALITY

The data collected in this research project will be kept confidential and you will not be asked to provide your name or contact information. Participant e-mails will not be linked to survey responses. This survey is being conducted through the third party server, Survey Monkey.

VOLUNTARY PARTICIPATION/WITHDRAWAL

Participation is completely voluntary. If you self-identify as a teacher of a student with ASD in any capacity, you are invited to participate in this study. You may skip any question(s) you choose and continue with the survey, or completely terminate the survey at any point by exiting your web browser. Only responses to questions you complete will be used in the study, and skipped questions will be excluded from the study. Only participants who are 18 years or older are eligible to complete the survey.

TIME INVOLVEMENT

This survey consists of one open-ended question followed by questions of a closed response format. There are a total of 48 survey questions, and the time involvement is approximated at 10 - 20 minutes.

RISKS AND BENEFITS

The risks associated with this study are minimal and commensurate with those encountered in the course of a typical day. You will receive no direct benefits for participating in this study.

QUESTIONS & CONTACTS

If you have any questions regarding this research study, please contact Amy Accardo at aaccardo@arcadia.edu or 215-416-4500. You may also contact the Arcadia University project advisor, Dr. Clare Papay at papayc@arcadia.edu or 215-572-4047. This study has been approved by the Arcadia University Institutional Review Board (IRB). *To ensure that this research continues to protect your rights and minimizes your risk, the IRB reserves the right to examine and evaluate the data and research protocols involved in this project*. If you wish additional information regarding your rights in this study you may contact the Office for the Committee on the Protection of Research Subjects at 267-620-4111.

STATEMENT OF INFORMED CONSENT

I understand the nature and purpose of this project and completing this survey provides consent for the information to be used confidentially in the study. I am 18 years of age or older. I understand that I can choose to leave a question blank if I would rather not answer it. Clicking "next" or turning this page constitutes my informed consent to participate in this research.

Appendix I: Survey Coding Guide

Reading Comprehension, Teacher Self-efficacy & Learners with ASD

Question #	Abbreviated Label	Type	Label	Value & Label	Measure
1	OpenEPs	Open-ended Response	Open ended response-Effective practices to teach comprehension	Code per #2-12 Labels (EP-DI; EP-SS; EP-CL …) 1= Direct Instruction 2= Story Structure 3= Cooperative Learning 4= Question Generation 5= Compare & Contrast Charts 6= Anaphoric Cueing 7= Read-alouds 8= Reciprocal Questioning 9= Graphic Organizers 10= Systematic Prompts 11= Multiple Strategy Approach	Nominal (when coded)
Effective Practices Survey (predictor variable 1)					
2	EPQ1DI	Numeric	Direct Instruction	5=Strongly Agree; 4=Agree; 3=Undecided; 2=Disagree; 1=Strongly Disagree	Ordinal Scale
3	EPQ2SS	Numeric	Story Structure	5=SA; 4=A; 3=U; 2=D; 1=SD	Ordinal Scale
4	EPQ3CL	Numeric	Cooperative Learning	5=SA; 4=A; 3=U; 2=D; 1=SD	Ordinal Scale
5	EPQ4QG	Numeric	Question Generation	5=SA; 4=A; 3=U; 2=D; 1=SD	Ordinal Scale
6	EPQ5CCC	Numeric	Compare & Contrast Charts	5=SA; 4=A; 3=U; 2=D; 1=SD	Ordinal Scale
7	EPQ6AC	Numeric	Anaphoric Cueing	5=SA; 4=A; 3=U;	Ordinal

				2=D; 1=SD	Scale
8	EPQ7RA	Numeric	Read-alouds	5=SA; 4=A; 3=U; 2=D; 1=SD	Ordinal Scale
9	EPQ8RQ	Numeric	Reciprocal Questioning	5=SA; 4=A; 3=U; 2=D; 1=SD	Ordinal Scale
10	EPQ9GO	Numeric	Graphic Organizers	5=SA; 4=A; 3=U; 2=D; 1=SD	Ordinal Scale
11	EPQ10SP	Numeric	Systematic Prompts	5=SA; 4=A; 3=U; 2=D; 1=SD	Ordinal Scale
12	EPQ11MSA	Numeric	Multiple Strategy Approach	5=SA; 4=A; 3=U; 2=D; 1=SD	Ordinal Scale
	EPSumPV1	Numeric	EP Survey Total Predictor Value 1 (sum of #2-#12 above) range of 11-55 possible		Scale
Reading Teacher Efficacy Instrument- *adapted* (RTEI-a) (Criterion Variable 1- Self-efficacy; 2- Outcome Expectancy)					
13	OE1	Numeric	RTEI-a Outcome Expectancy 1	5=SA; 4=A; 3=U; 2=D; 1=SD	Ordinal Scale
14	SE2	Numeric	RTEI-a Self-Efficacy 2	5=SA; 4=A; 3=U; 2=D; 1=SD	Ordinal Scale
15	SE3rev	Numeric	RTEI-a Self-Efficacy 3 Reversed	5=SA; 4=A; 3=U; 2=D; 1=SD	Ordinal Scale
16	OE4	Numeric	RTEI-a Outcome Expectancy 4	5=SA; 4=A; 3=U; 2=D; 1=SD	Ordinal Scale
17	SE5	Numeric	RTEI-a Self-Efficacy 5	5=SA; 4=A; 3=U; 2=D; 1=SD	Ordinal Scale
18	SE6rev	Numeric	RTEI-a Self-Efficacy 6 Reversed	5=SA; 4=A; 3=U; 2=D; 1=SD	Ordinal Scale
19	OE7	Numeric	RTEI-a Outcome Expectancy 7	5=SA; 4=A; 3=U; 2=D; 1=SD	Ordinal Scale
20	SE8	Numeric	RTEI-a Self-Efficacy 8	5=SA; 4=A; 3=U; 2=D; 1=SD	Ordinal Scale
21	OE9	Numeric	RTEI-a Outcome Expectancy 9	5=SA; 4=A; 3=U; 2=D; 1=SD	Ordinal Scale
22	OE10	Numeric	RTEI-a Outcome Expectancy 10	5=SA; 4=A; 3=U; 2=D; 1=SD	Ordinal Scale
23	0E11	Numeric	RTEI-a Outcome Expectancy 11	5=SA; 4=A; 3=U; 2=D; 1=SD	Ordinal Scale
24	SE12rev	Numeric	RTEI-a Self-Efficacy 12 Reversed	5=SA; 4=A; 3=U; 2=D; 1=SD	Ordinal Scale
25	SE13	Numeric	RTEI-a Self-Efficacy 13	5=SA; 4=A; 3=U; 2=D; 1=SD	Ordinal Scale
26	SE14rev	Numeric	RTEI-a Self-Efficacy 14 Reversed	5=SA; 4=A; 3=U; 2=D; 1=SD	Ordinal Scale

27	SE15rev	Numeric	RTEI-a Self-Efficacy 15 Reversed	5=SA; 4=A; 3=U; 2=D; 1=SD	Ordinal Scale
28	SE16	Numeric	RTEI-a Self-Efficacy 16	5=SA; 4=A; 3=U; 2=D; 1=SD	Ordinal Scale
	SEtotalCV1	Numeric	Self-efficacy Total Criterion Variable 1 (Sum of _____ after reversing responses)	Range = 10-50 (Low=10-35; Average=36-46; High=47-50)	Scale
	OEtotalCV2	Numeric	Outcome Expectancy Total Criterion Variable 2 (Sum of_____ after reversing responses)	Range = 6-30 (Low=6-17; Average=18-24; High=25-30)	Scale
	SE_HAL		Self-efficacy (RTEI) broken into RTEI scoring	3= High (47-50) 2= Average (36-34) 1= Low (10-35)	
	OE_HAL		Outcome Expectancy (RTEI) broken into RTEI scoring	3= High (25-30) 2= Average (18-24) 1= Low (6-17)	
Job-Related Factors (predictor variables 2-Setting; 3-verbal language; 4- years teaching; 5-administrator support.)					
29	SettingPV2	Numeric	Instructional Setting Job Factor Predictor Variable 2	1= Inclusive 2= Partially Inclusive 3= Self-Contained 4= 1:1 setting	Ordinal Scale
	Inclusive			1= Evident 0= Not Evident	
	PartInclus			1= Evident 0= Not Evident	
	SelfCont			1= Evident 0= Not Evident	
	1:1 setting therapyhome			1= Evident 0= Not Evident	
30	VerbLanPV3	Numeric	Verbal Language Ability of Students Job Factor Predictor Variable 3	1= Highly Verbal 2= Moderately Verbal 3= Low Verbal or Non-verbal 4= All levels	Ordinal Scale
	HighVerbal			1= Evident	

				0= Not Evident	
	ModVerbal			1= Evident 0= Not Evident	
	LoworNV			1= Evident 0= Not Evident	
	Mixed levels			1= Evident 0= Not Evident	
31	YrsTeachPV4	Numeric	Years of Teaching Experience Job Factor Predictor Variable 4	1= 10+ years 2= 3-9 years 3= 0-2 years	Ordinal Scale
	10+yrs			1= Evident 0= Not Evident	
	3-9yrs			1= Evident 0= Not Evident	
	0-2yrs			1= Evident 0= Not Evident	
32	AdmSupPV5	Numeric	Administrator Support Job Factor Predictor Variable 5	1= High Level of Support 2= Some Support 3= Lack of Support	Ordinal Scale
	HighSup			1= Evident 0= Not Evident	
	SomeSup			1= Evident 0= Not Evident	
	LackSup			1= Evident 0= Not Evident	
Demographics					
33					Nominal
	Cert	Numeric	Certification Area(s) Demographics Multiple possible	1= Special Education 2= Reading 3= Elementary Ed 4= Autism Cert. 5= Content Cert. 6= speech Language Pathologist	Nominal (when coded)
	Sped			1= Evident 0= Not Evident	
	Rdg			1= Evident	

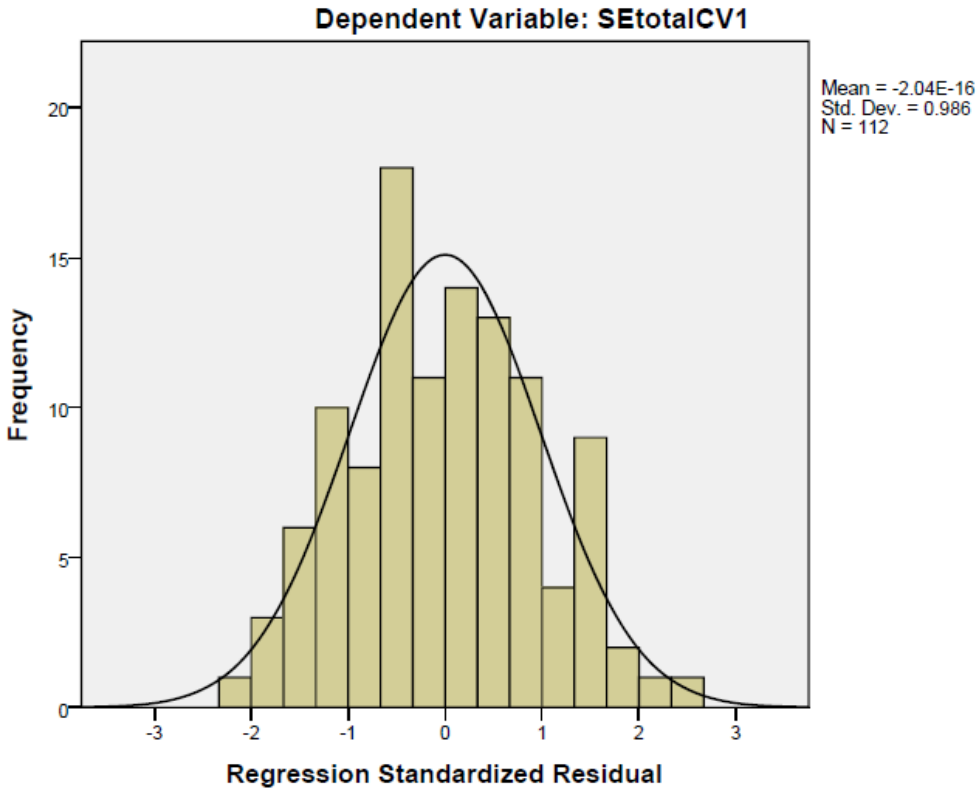
				0= Not Evident	
	ElEd			1= Evident 0= Not Evident	
	Aut			1= Evident 0= Not Evident	
	Cont			1= Evident 0= Not Evident	
	SLP			1= Evident 0= Not Evident	
34	Role	Open-ended Response	Open ended response- Primary Professional Role	(Code by hand)	Nominal (when coded)
35	Grade Level	Numeric	Current Grade Level Teaching Demographics	0 = pre K/EC 1= K-2nd grade 2= 3rd- 5th 3= 6th – 8th 4= 9th- 12th 5 = 18-21 6 = All grades	Nominal
	Pre-K			1= Evident 0= Not Evident	
	K2nd			1= Evident 0= Not Evident	
	3rd5th			1= Evident 0= Not Evident	
	6th8th			1= Evident 0= Not Evident	
	9th12th			1= Evident 0= Not Evident	
	Age 18 - 21			1= Evident 0= Not Evident	
	All Grades			1= Evident 0= Not Evident	
36	TypSch	Numeric	Type of School Demographics	1= Public School 2= Public & Private 3= Private School 4= Home or Therapy Office	Nominal
	Public			1= Evident 0= Not Evident	
	PubPriv			1= Evident 0= Not Evident	

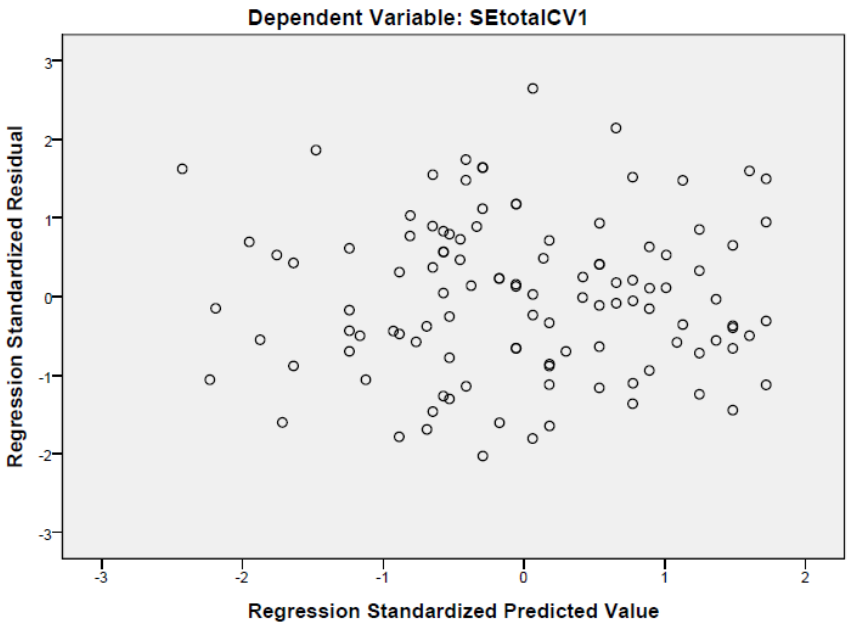
	Privat			1= Evident 0= Not Evident	
	1:1 or Home School			1= Evident 0= Not Evident	
37	State		State of Employment Demographic (selected from pull-down menu)	(report by state abbreviation 1-50 from survey Monkey)	
38	TypClass	Numeric	Type of School Demographics	1= General Academic 2= Content Specific 3= ABA 4= TEACCH 5 = Eclectic 6 = Non classroom	Nominal
	GenAcad			1= Evident 0= Not Evident	
	ContSpec			1= Evident 0= Not Evident	
	ABA			1= Evident 0= Not Evident	
	TEACCH			1= Evident 0= Not Evident	
	Eclectic			1= Evident 0= Not Evident	
	Nonclassroom 1:1 therapeut			1= Evident 0= Not Evident	
39	StTest	Numeric	Statewide Assessment Testing demographics	1= Students participate in testing 2= Students participate in alternate testing 3 = Students do not participate	Nominal
	Test			1= Evident 0= Not Evident	
	Alt Test			1= Evident 0= Not Evident	
	Do not part-icipate N/A			1= Evident 0= Not Evident	
40	Intellect	Numeric	Diagnosis related to	1= Students- ASD	Nominal

			Intellectual Ability demographics	*without* intellectual disability 2= Students- ASD *with* intellectual disability	
	NoIntDis			1= Evident 0= Not Evident	
	IntDis			1= Evident 0= Not Evident	
	Mix of students			1= Evident 0= Not Evident	
41	Degree	Numeric	Participants highest degree demographics	1= Bachelor's Degree 2= Bachelor's Plus 3= Master's Degree 4= Master's Plus	Nominal
	Bach			1= Evident 0= Not Evident	
	BachPlus			1= Evident 0= Not Evident	
	Mast			1= Evident 0= Not Evident	
	MastPlus			1= Evident 0= Not Evident	
Education & Professional Development- demographics					
42	RdgClass	Numeric	Participants has taken reading classes	1= Yes 2= No	Nominal
43	RdgPD	Numeric	Participants has been provided reading Professional Development	1= Yes 2= No	Nominal
44	WantPD	Numeric	Participants would like reading Professional Development	1= Yes 2= No	Nominal
Administration- demographics					
45	PDReim	Numeric	Participant's school reimburses for PD conferences	1= Yes 2= No	Nominal
46	EdReim	Numeric	Participant's school reimburses for graduate ed. credits	1= Yes 2= No	Nominal
47	EvalObj	Numeric	Participant's employee eval. Considers	1= Yes 2= No	Nominal

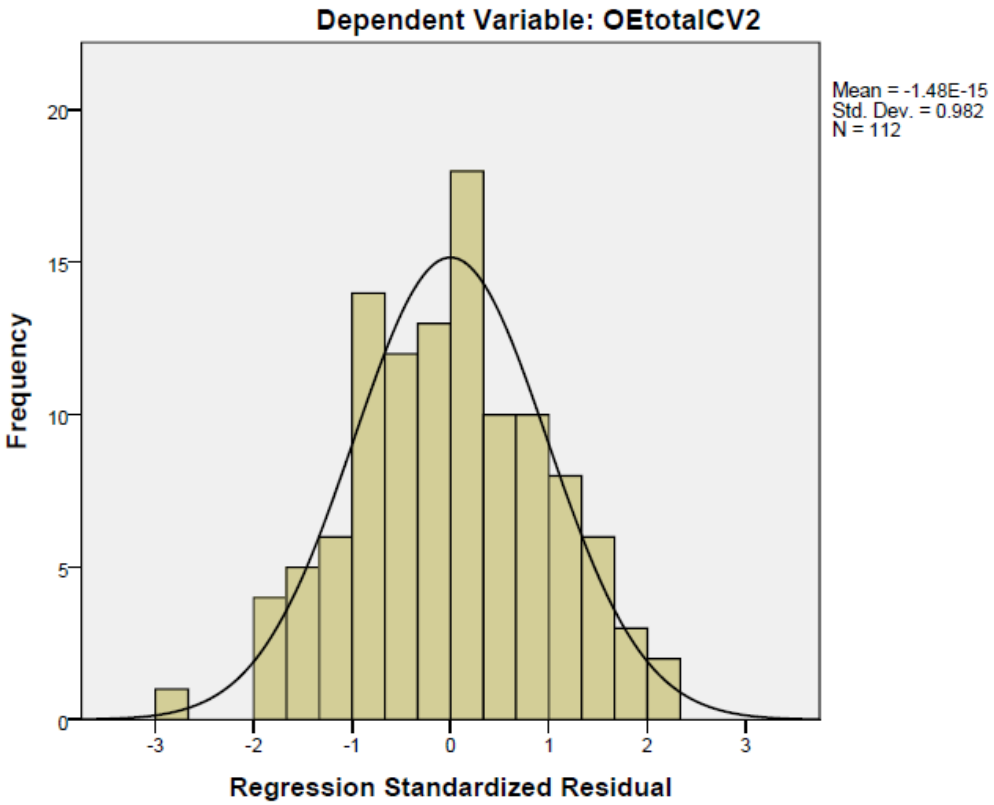
			student progress toward learning objectives		
Organization- demographics					
48	Org	Numeric	Professional organizations participants belong to	1= NASET Nat Assoc of Spec Ed Teachers 2= CEC Council Except Children 3= ASA Autism Society of America 4= NAA National Autism Association	Nominal
	NASET	Numeric		1= Yes 2= No	Nominal
	CEC	Numeric		1= Yes 2= No	Nominal
	ASA	Numeric		1= Yes 2= No	Nominal
	NAA	Numeric		1= Yes 2= No	Nominal
		Numeric		1= Yes 2= No	Nominal
		Numeric		1= Yes 2= No	Nominal
					End of Survey

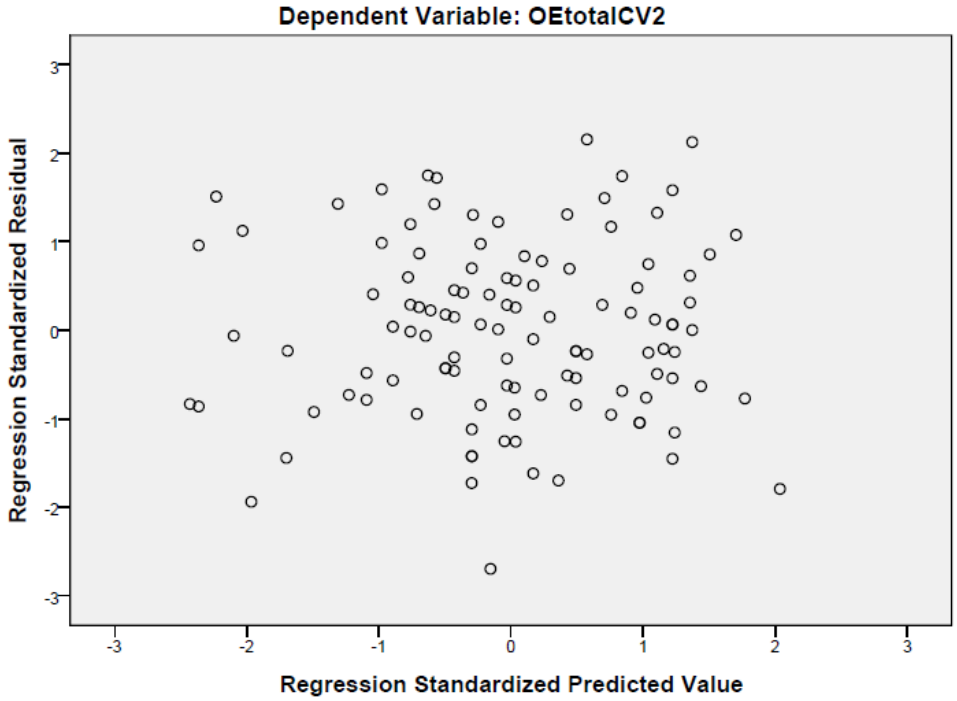
Appendix J: Self-efficacy Histogram & Scatterplot





Appendix K: Outcome Expectancy Histogram & Scatterplot





Appendix L **Self-efficacy Correlation Matrix**

	Self-effic	EP Sum	10+ yrs	3-9yrs	0-2 yrs	High Sup	Some Sup	Lack Sup	High Vrbl	Mod Vrbl	Low/ NV	Mix Vrbl	Inclusive	Part Incl	Self Cont	1:1
Self-eff	1															
EP Sum	.607**	1														
10+ yrs	.229*	.077	1													
3-9yrs	-.102	.017	-.774**	1												
0-2 yrs	-.208*	-.142	-.434**	-.234*	1											
HighSup	.265**	.235*	.054	-.081	.033	1										
SomeSup	-.055	-.089	-.056	-.011	.101	-.674**	1									
LackSup	-.257**	-.177	.029	.091	-.174	-.291**	-.489	1								
HighVrbl	.065	.139	.063	.034	-.145	.070	-.021	-.066	1							
ModVrbl	.031	.178	-.041	-.001	.064	-.049	-.032	.131	-.381**	1						
Low/NV	-.222*	-.360**	-.021	-.011	.048	-.070	.104	-.066	-.333**	-.381**	1					
MixVrbl	.135	.036	.002	-.024	.031	.056	-.053	-.007	-.285**	-.326**	-.285**	1				
Inclusive	-.141	-.147	.002	-.024	.031	-.096	-.053	.166	.234*	-.033	-.182	-.018	1			
Part Incl	.138	.287**	-.006	.078	-.102	.126	.011	-.128	.118	.063	-.268**	.091	-.376**	1		
Self Cont	.051	-.060	-.044	-.003	.072	.043	-.063	.015	-.225*	.022	.375**	-.189*	-.376**	-.577**	1	
1:1	-.118	-.192*	.066	-.086	.022	-.156	.232*	-.124	-.149	-.170	.106	.244**	-.128	-.196*	-.196*	1

Note. Significance (2-tailed): ** <.01; *<.05

Appendix M **Outcome Expectancy Correlation Matrix**

	Out. Expect	EP Sum	10+ yrs	3-9yrs	0-2 yrs	High Sup	Some Sup	Lack Sup	High Vrbl	Mod Vrbl	Low/ NV	Mix Vrbl	Inclusive	Part Incl	Self Cont	1:1
Outcome Expect.	1															
EP Sum	.153	1														
10+ yrs	-.017	.077	1													
3-9yrs	.071	.017	-.774**	1												
0-2 yrs	-.074	-.142	-.434**	-.234*	1											
HighSup	.057	.235*	.054	-.081	.033	1										
SomeSup	.155	-.089	-.056	-.011	.101	-.674**	1									
LackSup	-.243**	-.177	.029	.091	-.174	-.291**	-.489**	1								
HighVrbl	-.136	.139	.063	.034	-.145	.070	-.021	-.066	1							
ModVrbl	.091	.178	-.041	-.001	.064	-.049	-.032	.131	-.381**	1						
Low/NV	.176	-.360**	-.021	-.011	.048	-.070	.104	-.066	-.333**	-.381**	1					
MixVrbl	-.149	.036	.002	-.024	.031	.056	-.053	-.007	-.285**	-.326**	-.285**	1				
Inclusive	-.243**	-.147	.002	-.024	.031	-.096	-.053	.166	.234*	-.033	-.182	-.018	1			
Part Incl	.059	.287**	-.006	.078	-.102	.126	.011	-.128	.118	.063	-.268**	.091	-.376**	1		
Self Cont	.162	-.060	-.044	-.003	.072	.043	-.063	.015	-.225*	.022	.375**	-.189*	-.376**	-.577**	1	
1:1	-.039	-.192*	.066	-.086	.022	-.156	.232*	-.124	-.149	-.170	.106	.244**	-.128	-.196*	-.196*	1

Note. Significance (2-tailed): ** <.01; *<.05