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Pragmatic language and behavioral and emotional functioning- a systematic review: Implications for research and interprofessional practice

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Pragmatic Language and Behavioral and Emotional Functioning-A Systematic Review:
Implications for Research and Interprofessional Practice

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FACULTY COMMITTEE:

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Dedication

This dissertation is dedicated to my family. Though I did not know my grandparents, they laid the foundation for future generations of a love of learning and language. This lived on through my parents who demonstrated through their own lives the importance of perseverance and openness to lifelong learning and have never wavered in their belief in my abilities. My older siblings, my lifelong role models, and my brother-in-law have always inspired me and been an example for pursuing your passions, while being flexible and able to adapt when things change. And lastly, my nephews, who throughout this journey have reminded me how important and fun it is to spend time with children, talk to them, and play. The support of my family has been invaluable both in achieving this milestone and in my continued growth.

This is also dedicated to the many students who inspired me to pursue my doctorate and highlighted the role of language in relationships and in getting needs met.

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I am extremely fortunate to have had a number of friends cheering in the wings. Tina, thank you for our forever friendship and especially for all the moral support and

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Abstract

Pragmatic language, or social communication, develops throughout childhood and adolescence. Deficits in pragmatic language ability have been found to impact social, emotional, and behavioral functioning in this population. This association has been found across a number of diagnostic presentations including autism spectrum disorder, specific language impairment, attention deficit-hyperactivity disorder, conduct disorder, and oppositional defiant disorder. This study utilized a systematic review methodology with an interprofessional approach, to explore the current literature for evidence of interventions targeting pragmatic language positively impacting emotional and behavioral outcomes in children and adolescents across a range of diagnoses and across multiple disciplines. Five interventions met inclusion criteria for this study, representing three disciplines: psychology, special education, and speech-language pathology. All five studies were school-based and spanned from elementary to high school age with a range in diagnostic presentations including autism spectrum disorder, emotional and behavioral disorder, and "at-risk" for behavioral and depressive difficulties. Results suggest that there may be a positive impact of targeting pragmatic language for emotional and behavioral outcomes as three of the studies reported improvement including decreases in depressive symptoms, levels of physical and verbal aggression, and a trend of decreased social anxiety. More research needs to be done to clarify this relationship, particularly as only one of the five interventions, implemented by a speech-language pathologist, exclusively targeted pragmatic language ability, while the other four included intervening with those skills as part of a larger intervention. This highlights a lack of familiarity with pragmatic language as a relevant concern for multiple diagnoses and an area of specific

intervention outside of the discipline of speech-language pathology. This lack of familiarity coupled with little evidence of interprofessionalism in these interventions despite language and behaviors being of concern to multiple disciplines calls attention to the need for a shared understanding of pragmatic language across disciplines and interprofessional practice in assessing and treating these types of deficits. The results of this study are applicable to researchers and service providers working with children and adolescents with pragmatic language and emotional and behavioral difficulties.

Chapter I

Introduction

"We tend to look through language and not realize how much power language has."
-Deborah Tannen

The Merriam-Webster dictionary defines *language* as "the words, their pronunciation, and the methods of combining them used and understood by a community" (Language [Def. 1a], n.d.) with a second definition of language as "a systematic means of communicating ideas or feelings by the use of conventionalized signs, sounds, gestures, or marks having understood meanings" (Language [Def. 1b(2)], n.d.). This ability to communicate ideas or feelings is fundamental to all people, regardless of age, language, or culture, to be able to get biological and social needs met. So essential is language to human existence that it is studied within multiple different disciplines such as linguistics, speech-language pathology, and psychology. An interprofessional perspective is relevant as language is researched and understood across discipline-specific vantage points, with focuses on exploring the structure, form, meaning, and context of language, assessing, diagnosing, treating and preventing speech and language difficulties, and understanding processing of language in the brain and how language is used interpersonally and to get needs met.

While there are different aspects of language that are studied including form and content, the function of language, known as pragmatics, is of particular importance with regard to social interactions and well-being. Pragmatic language skills develop throughout childhood and adolescence, with changing social and communication demands across multiple relationships throughout development. This type of communication involves the ability to express thoughts and ideas, including social and

emotional aspects of language, as well as to accurately understand others' thoughts and ideas. Pragmatic language, discussed in some fields as social communication or social language, plays an important role in the skills needed to interact with others, impacting relationship quality, ability to get needs met, and social-emotional wellness. Consequently, deficits in pragmatic language ability have been found to impact social, emotional, and behavioral functioning in children and adolescents and can have reverberating consequences across a variety of domains including relationships, academics, and adaptive behavior.

Disorders such as autism spectrum disorder, pragmatic language impairment, and social (pragmatic) communication disorder include deficits in pragmatic language ability as a defining feature. However, research has shown that there are other language disorders, such as specific language impairment (SLI), that also present with difficulties with pragmatic language skills (Andrés-Roqueta et al., 2016; Rinaldi, 2000). Across these diagnostic presentations, a relationship has been found between pragmatic abilities and social abilities including prosocial behavior and peer relationships (Helland & Helland, 2017; Mok et al., 2014) as well as between pragmatic deficits and emotional and behavioral difficulties including social withdrawal, impulsivity, hyperactivity, and conduct problems (Adams et al., 2012; Durkin & Conti-Ramsden, 2010; Ketelaars et al., 2010; St Clair et al., 2011; Stanton-Chapman et al., 2007).

The relationship between pragmatic deficits and social, emotional, and behavioral difficulties has also been demonstrated in research of language abilities in populations of children and adolescents who present with social-emotional and behavioral difficulties. With regard to general language ability, the literature suggests that many children with

emotional and behavioral disorders have clinically significant language deficits (Benner et al., 2002) and that poorer language skills are related to more behavior problems and internalizing behaviors (Bornstein et al., 2013; Chow & Wehby, 2018). However, the research also suggests that children with emotional and behavioral difficulties are weakest in pragmatic language skills compared to other language domains (Hollo et al., 2019) and that pragmatic deficits in children with psychiatric disorders may be independent of language disorders (Helland & Heiman, 2007).

Those diagnosed with ADHD have been found to have significantly poorer pragmatic language skills even after controlling for general language ability (Staikova et al., 2013), have presented with pragmatic impairments that were disproportionate to their general communication abilities (Helland, Helland, & Heimann, 2014), and have been shown to have pragmatic language deficits similar to those diagnosed with Asperger syndrome and Pervasive Developmental Disorder Not Otherwise Specified (PDDNOS) (Bishop & Baird, 2001; Helland et al., 2012). Pragmatic language difficulties have also been found in populations presenting with diagnoses of conduct disorder (CD) and oppositional defiant disorder (ODD) (Gilmour et al., 2004; Helland, Lundervold, et al., 2014). The literature suggests a significant association between pragmatic language deficits and problem behaviors, emotional, and social difficulties (Helland, Lundervold, et al., 2014; Law et al., 2015).

Given this demonstrated relationship between deficits in pragmatic language ability and social, emotional, and behavioral difficulties, interventions focused on improving pragmatic language skills have the potential to positively impact social, emotional, and behavioral outcomes. Interventions with children and adolescent

populations are especially important to consider because these skills are still being developed and increased pragmatic language ability could help mitigate potentially negative consequences later in life including poor interpersonal relationships and social-emotional difficulties. As pragmatic deficits are present in a number of different diagnostic presentations, not representing a homogenous population, it would be useful to gather knowledge across a range of diagnostic populations to gain a more comprehensive understanding of appropriate and effective treatment approaches for pragmatic difficulties. Furthermore, an interprofessional approach is necessary in order to gain a more thorough knowledge of the current research on these types of interventions as there are a number of disciplines that study and implement assessments and/or interventions with people who have difficulties with pragmatic or social language, including speech-language pathology, psychology, counseling, social work, and education.

This study utilized a systematic review to explore the current literature base for evidence of impact of pragmatic language interventions for children and adolescents on emotional and behavioral outcomes and to analyze the results. A systematic review is a predefined, explicit, and rigorous search of the literature to identify, select, and critically evaluate research and to gather and analyze data in response to a specific research question (Gough et al., 2017; Moher et al., 2009; Torgerson, 2003). Predefined inclusion and exclusion criteria were chosen to specify the boundaries of the research including types of literature, study designs, participants, interventions, outcomes, and data.

As pragmatic language deficits have been found across a broad range of diagnostic presentations, the inclusion/exclusion criteria allow for those with diagnoses including language disorders and emotional and behavioral disorders, while explicitly

excluding those with other medical diagnoses that impact pragmatic language. The review also was designed intentionally to reflect an interprofessional approach, including different fields that study pragmatic language by exploring a broad research field across disciplines, as evidenced by utilizing a range of databases in the fields of psychology, education, communication sciences and disorders, linguistics, social sciences, medicine, social work, sociology, and behavioral sciences, to capture as much data as possible. The results of the study are applicable to researchers and service providers in the fields of speech-language pathology, social work, counseling, psychology, and education as well as to interprofessional teams working with those with pragmatic language and emotional and behavioral difficulties.

Chapter II

Literature Review

The ability to communicate with others is essential to human existence. Using language to communicate enables people to gain knowledge, exchange ideas, connect with others, and get biological and social needs met. For children, the ability to use language to communicate ideas, hopes, and intentions helps facilitate social development. Moreover, language helps people organize their behavior, understand their feelings and experiences, and express their emotions (Im-Bolter & Cohen, 2007). Language is a "necessary ingredient of successful social adjustment and functioning in society" (Bornstein et al., 2013, p. 857).

Language, language acquisition, difficulties with language, how to treat those difficulties, impacts of those difficulties, and how to use language to communicate effectively and to get needs met are areas of study within different disciplines, in particular speech-language pathology and psychology. Among other areas of expertise, speech-language pathologists focus on preventing, assessing, diagnosing, and treating language, speech, and social communication disorders. Within the field of psychology, language is also addressed, both with regard to the study of development of language and also to connections between language, thoughts, feelings, and behaviors and the role language plays in interpersonal interactions and emotional regulation and understanding, including helping clients use language to improve social, emotional, and behavioral functioning. An interprofessional approach, incorporating the different vantage points of these disciplines, is vital to the study of language and how it impacts functioning as each of these fields has different understandings and expertise that complement each other.

Interprofessionalism

In 2010, the World Health Organization (WHO) published the *Framework for Action on Interprofessional Education & Collaborative Practice* to discuss interprofessional collaboration around the world and identify strategies to support successful interprofessional education and collaborative teamwork. In this document, the WHO defined collaborative practice as occurring "when multiple health workers from different professional backgrounds provide comprehensive services by working with patients, their families, carers and communities to deliver the highest quality of care across settings" (WHO, 2010, p. 13). This collaborative approach is vital when considering the care of children and adolescents. This population experiences developmental changes across multiple domains including cognitive ability, social-emotional ability, and language ability and each of these areas can have an impact on the others. Thus, having professionals with different expertise communicate and work with each other for assessment and intervention supports higher quality care, working towards shared goals, and greater likelihood of positive outcomes. This type of approach is also appropriate for this population as children and adolescents spend a large percentage of time in schools, where they come into contact with multiple different service providers who will experience and understand children and their functioning in diverse ways.

Despite the appropriateness and need for interprofessional collaboration, fields of study tend to be siloed into their individual disciplines, which can create barriers to interprofessionalism. These barriers include lack of understanding of the roles and responsibilities of different disciplines, different value systems in the disciplines, and lack of training in interprofessional approaches (Brown et al., 2011; Hall, 2005; Strunk et

al., 2017). In practice, other barriers include organizational constraints, time constraints, and fears of opposing viewpoints and conflict (Chong et al., 2013; Strunk et al., 2017). Though these barriers exist, professional associations, such as the American Psychological Association (APA) for the discipline of psychology and the American Speech-Language Hearing Association (ASHA) for the discipline of speech-language pathology, have demonstrated support of interprofessional practice by being among a group of 25 institutional members of associations, schools, and health professions that belong to the Interprofessional Education Collaborative (IPEC). The collaborative was formed in 2009 by a group of six national associations of health professions with the purpose of promoting and encouraging interprofessional learning and practice towards the goal of enhanced team-based care and improved outcomes (Interprofessional Education Collaborative, 2016). The collaborative established four core competency domains for interprofessional collaborative practice including values/ethics, roles/responsibilities, interprofessional communication, and teams and teamwork.

Both APA and ASHA have demonstrated their investment in interprofessional practice by including or working to include interprofessional practice competencies into accreditation standards for training programs (American Psychological Association, 2015; American Speech-Language-Hearing Association, 2016). To further this investment, APA has published an interprofessional curriculum to support the development of competencies for collaborative practice in integrated primary care (Rozensky et al., 2018). This curriculum includes discussion of development of an interprofessional seminar as well as challenges and solutions in creating interprofessional learning experiences.

As this literature review and the systematic review that follows explore the relationship between language, in particular pragmatic or social language, and social, emotional, and behavioral functioning, a topic pertinent to speech-language pathology and psychology as these disciplines both have knowledge and responsibility for intervention/treatment in these areas, an interprofessional approach was taken in the review of literature and in data collection including research from both disciplines, with the goal of learning strategies from both fields to improve outcomes in children and adolescents.

Pragmatic Communication

Language is often thought of with regard to its form, including sounds, structure, and grammar, and its content, the meaning of the words and sentences. However, there is a third aspect of language, its function, also referred to as the pragmatics of language which has great importance for social, emotional, and behavioral functioning. Pragmatic language ability involves the expression of thoughts and ideas and accurate understanding of others' thoughts and ideas, including social and emotional aspects of language. This ability plays an important role in the skills needed to interact with others, impacting relationship quality, ability to get needs met, and social-emotional wellness including ability to understand and regulate emotions and behaviors. Separate from both form and content, pragmatics is an essential aspect of language for effectively communicating with others.

Rinaldi (2000) defined pragmatics in terms of one's ability to interpret meaning as the speaker intended, while Adams (2002) provided a broader definition of pragmatics referring to a "group of behaviors that are concerned with how language is used to

convey meanings" (p. 973). In their discussion of pragmatic development, Ninio and Snow (1996) talk about the need for children to learn to use language in a way that is interpretable by others as well as to correctly interpret the interpersonal significance of others' language. Further, they state that pragmatic rules "define appropriate and effective language use" (p.4) such that language is used to achieve communication goals without resulting in misunderstanding or offense (Ninio & Snow, 1996). It follows then that pragmatic skills are observed when two or more people use language to interact socially with each other (Im-Bolter & Cohen, 2007). As such, Matthews et al. (2018) defined pragmatics as the "linguistic component of social communication" (p.186).

In the literature, the term pragmatics seems to be utilized mostly in the fields of speech-language pathology and linguistics, while the field of psychology often uses the terms social communication or social language. This divide may in part be a result of the practice of using the term pragmatics mostly when describing significant social communication deficits, particularly when those deficits are a defining feature of the presentation and diagnosis of a disorder such as with autism spectrum disorder (ASD), thus implying a more narrow definition of pragmatic language. However, the American Speech-Language-Hearing Association (ASHA) definition of pragmatics as "functional and socially appropriate communication" (American Speech-Language-Hearing Association, 1993) is inclusive of a broader range of communication behaviors. For the purposes of this review, the ASHA definition is the one that will be utilized. Given that the term is not universally used across disciplines, it is worth further exploring what skills and competencies pragmatics includes.

In line with the ASHA definition of pragmatics, Russell and Grizzle (2008) discuss competency in pragmatic language as demonstrated by "the ability to appropriately and effectively use language in social contexts" (p. 59). A number of skills are necessary to demonstrate this ability including initiating conversation, turn taking, responding to questions as well as initiating questions, topic management including maintaining a topic and shifting to different topics when needed, repair of communication breakdowns through both requesting the repair and responding to a repair request such as for more information or clarification, contingent commenting, using language that is appropriate to context and situation, and narrating experiences and events (Im-Bolter & Cohen, 2007; Gerber et al., 2012). Additional pragmatic skills are also necessary in group social settings, such as entering conversations appropriately and addressing others when joining a group (Stanton-Chapman et al., 2007). These pragmatic language skills are essential for both successful communication and positive relationships with others. Deficits in these skills could have negative consequences throughout development for children and adolescents.

The environment for younger children is generally more controlled and supported such that when pragmatic language deficits occur, if they are not glaringly obvious, adults may not realize that they exist and might be impacting social, emotional, and behavioral functioning for these children. Many social interactions for younger children typically occur facilitated by shared games, toys and activities (Schley & Snow, 1992). Thus, these social communications tend to be more structured and concrete as they are centered around mutual tasks and there is a clear subject of conversation. Moreover, there are often more built-in supports in social interactions for children to both guide and

support pragmatic communication and for adults to provide intervention and manage communication difficulties. For instance, when children get into an argument at school, an adult will often step in and help mediate the situation by structuring the conversation between the children and scaffolding skills such as turn taking, expressing emotions, and responding to questions. Parents also may be more understanding and supportive with lower pragmatic skills in children, overtly explaining the language expectations, such as redirecting a child to maintain the topic and initiating repair when there is a communication breakdown. Thus, while pragmatic deficits may be present and impacting functioning, adults may not recognize that the child has developmentally inappropriate language skills or may view the problems purely as emotional and behavioral difficulties.

Often people think about the acquisition and development of language as occurring primarily during childhood. In fact, however, language skills, including pragmatic language ability, continue to develop in adolescence with increasing demands on communication skills across multiple relationships that have broad implications for adjustment and well-being (Durkin & Conti-Ramsden, 2010). Though pragmatic language ability is important for both children and adolescents, the presentation and impact of deficits across developmental stages may appear different.

Im-Bolter and Cohen (2007) note three particular integrative aspects of language that become increasingly important as children age—pragmatics, narrative discourse, and higher-order language. In Nippold's (2010) discussion of adolescent language development, she presents these aspects, and in particular pragmatics, in the context of adolescent cognitive and social emotional development, citing growth including understanding issues from multiple points of view, understanding other people's

thoughts, feelings, and beliefs, and using metacognition to analyze one's own behavior, feelings, and beliefs. This growth is reflected in language development including gains in listening attentively while others are speaking, taking others' perspectives and using it to adjust to the needs of the listener, such as providing explanations, considering others' views, and focusing on the needs and interests of the listener to convince him/her during persuasive conversations (Nippold, 2010). As the social and communicative demands increase in adolescence, these particular gains, as well as others encompassed in pragmatic communication, become increasingly significant.

During adolescence, there are more social interactions that have to be navigated across a number of different domains, including with peers, family, at school, in the workplace, during extracurricular activities etc. and the consequences of poor pragmatic skills may negatively impact more areas of life than for younger children. Social interactions also begin to be less structured around shared activities, resulting in a less clear subject of conversation (Schley & Snow, 1992). Consequently, the task demands of peer communication become increasingly more difficult. When an adolescent has difficulty with socially appropriate interactions, there is a greater risk for rejection and ridicule, which can have an impact on emotional well-being. Unlike younger children, many social interactions between adolescents are more likely to happen out of sight of adults, so there are fewer opportunities for adult intervention and scaffolding of pragmatic skills. Moreover, it is not socially desirable in adolescence to have adults intervening with peer relationships and conflicts.

In addition to negative consequences in peer relationships, adolescents with poor pragmatic skills may have difficulty with their interactions with adults across various

settings. One such difficulty is that children with deficits in social communication do not generally use language that recognizes social hierarchies, which may impact socially appropriate interactions with adults (Gilmour et al., 2004). Other communication problems with parents, teachers, and other adults may result from pragmatic difficulties such as trouble initiating questions or misunderstandings and an inability to repair or respond to a request to repair the misunderstandings. With increased independence, there are greater expectations for adolescents to be able to use language to solve problems and get needs met without scaffolding and support from others. If these abilities are not developed to be fairly successful such that adolescents are able to navigate social interactions and understand and regulate their own emotions and behaviors, these deficits could result in longer-lasting impacts on adolescent well-being including social-emotional difficulties such as anxiety, depression, and withdrawal.

Pragmatic deficits, by definition, suggest difficulties in functional and socially appropriate communication. Pragmatic language develops during childhood and adolescence, so that those children and adolescents who have difficulties with pragmatic language may very well have difficulties with interpersonal relationships, with peers and others, as well as difficulties with appropriately and effectively communicating feelings and needs. These difficulties may be exhibited through emotional and behavioral problems, which in turn may lead to greater difficulties with well-being. As such, it is important to have a greater understanding of which populations might be more likely to have pragmatic language weaknesses.

Pragmatic Communication and Language Disorders Diagnoses

Within the fields of psychology and speech-language pathology, the group most often recognized as having pragmatic language concerns is that of those diagnosed on the autism spectrum (ASD). The disorder is characterized by difficulties both in social communication and social interactions along with restricted, repetitive patterns of behavior, interests, or other activities (American Psychiatric Association, 2013). Additionally, over the years in the literature and in diagnostic manuals, there has been discussion of diagnostic presentations of those having difficulties with social communication specifically, using multiple labels with accompanying criteria to categorize these difficulties. Two of these labels include pragmatic language impairment (PLI) and social (pragmatic) communication disorder (SCD). Ketelaars and colleagues (2010) note that a PLI diagnosis is given when difficulties with the use of language in context are demonstrated. Adams et al. (2015) define SCD as "a persistent deficit in pragmatic development that affects social functioning with additional persistent language difficulties but without restricted, repetitive behaviors" (p. 294). Both definitions are broad enough to encompass a range in pragmatic language ability and thus a range in ability to communicate with others, even amongst those with deficits. It then follows that PLI/SCD and other difficulties in pragmatic language may impact the ability to create and maintain relationships, as well as to navigate the social world, negatively impacting social-emotional well-being.

Despite the fact that only ASD, PLI, and SCD explicitly discuss weaknesses in pragmatic language within their diagnostic criteria, research suggests that those diagnosed with other language impairments may also have difficulties with pragmatic

communication. Rinaldi (2000), in a study of students aged 11-14 years old, found that compared to a group with normally developing language, those with specific developmental language disorder were less able to use context to understand implied meaning. These pragmatic comprehension difficulties occurred despite these students demonstrating the necessary semantic knowledge to successfully complete the tasks. Other studies have shown that children with language impairment also have been found to have greater difficulty making sense of emotional content (Yuill & Little, 2018). This finding was supported even when the emotional content and mode of response was non-verbal or gestural (Merkenschlager et al., 2012) and when the task was to produce emotional inferences through a non-verbal task, such as drawing (Vendeville et al., 2015).

Whether one has been identified as diagnosed with ASD, PLI, SCD or a specific language impairment (SLI), pragmatic deficits have been found across these diagnoses. These deficits are linked with such difficulties as understanding language in context, implied meaning, and emotional content. While autism spectrum disorder and social (pragmatic) communication disorder diagnostic criteria specifically include impacts on social interactions and functioning, pragmatic deficits found in those diagnosed with other language disorders are also likely to negatively impact social functioning.

Pragmatic and Language Disorders: Relationship Between Pragmatic Abilities and Social Abilities

Discussion about an interconnection between pragmatic language and social abilities is not a new idea. Over twenty-five years ago, Schley and Snow (1992) noted an association between conversational ability and establishing and maintaining social

relationships. Those with age-appropriate conversational skills had greater success at forming friendships and being accepted by peers. More current research findings have continued to support a relationship between pragmatic and social abilities. Compared to their same age peers, a group (n=35) of children ages 5-6 diagnosed with specific language impairment were found to have significantly lower pragmatic abilities and were also found to have lower scores on social cognition (Andrés-Roqueta et al., 2016). Helland and Helland (2017) were specifically interested in comparing children ages 6-15 diagnosed with either ASD (n=23) or SLI (n=20) and determining whether there was a relationship between weaknesses in pragmatic skills and other difficulties. Their results demonstrated a significant relationship between stronger pragmatic abilities and prosocial behavior in the total sample of children with ASD or SLI.

Mok and colleagues (2014) were also interested in looking at those with SLI and their peer interactions, with particular interest in whether there was any predictability between the relationship of language ability and peer problems over time. Studying children (n=171) over the course of nine years, from ages 7-16, they found that pragmatic language ability was a significant predictor for the long-term trajectory of peer relationships; those at greater risk for a poor trajectory were those with pragmatic language difficulties. Moreover, they found a relationship between pragmatic language abilities and age of onset of social problems. Children who had persistent peer problems over time were found to be two-and-a-half times more likely to have had pragmatic language difficulties at age 7 than those with fewer to no social problems. Additionally, children whose peer problems began later, in adolescence, had better pragmatic language abilities than those with persistent problems that began in childhood.

In examining the relationship between pragmatic language skills and peer relations, these researchers also found other areas of functioning that played a role in the development of peer relationships. These areas of functioning included hyperactivity, conduct problems, and emotional problems. They found that those who were more prosocial, with better pragmatic language abilities, and fewer difficulties in those areas of functioning, tended to have an easier time developing peer relationships from childhood to adolescence (Mok et al., 2014). What is unclear from these findings is whether there is a relationship between pragmatic language ability and those other areas of emotional and behavioral functioning that might be playing a role in overall functioning and well-being.

Pragmatic and Language Disorders: Relationship Between Pragmatic Abilities and Emotional and Behavioral Abilities

Studies of those with pragmatic language struggles have found not only a relationship with social difficulties, but also a correlation between pragmatic abilities and other difficulties. Children with these deficits have been found to be at risk for long term behavioral issues (Adams et al., 2012), including lack of prosocial skills, reticence behaviors and social withdrawal, and impulsivity (Stanton-Chapman et al., 2007; Durkin & Conti-Ramsden, 2010). In addition to less prosocial behavior, Ketelaars et al. (2010), in studying four-year-olds (n=1364), found that those with pragmatic language impairment had elevations in all behavioral problems measured, compared with normally developing children. Specifically, they found a high correlation between pragmatic language impairment and behavioral problems, particularly hyperactivity. Further, results showed that once pragmatic competence was accounted for, structural language abilities did not predict behavioral problems.

Research with older children has also shown a relationship between lower pragmatic language abilities and behavioral difficulties as well as emotional difficulties. Utilizing the same longitudinal study of children ages 7-16 referenced in the previous section, St Clair and colleagues (2011), in addition to social difficulties, also examined behavioral and emotional difficulties of those diagnosed with SLI. The researchers found that lower pragmatic abilities were related to higher levels of behavioral, emotional, and social difficulties. Specifically, they found that pragmatic language had a significant linear association with conduct problems and hyperactivity, emotional symptoms, and peer relationship problems. Helland and Helland (2017), in their study comparing 6-15-year-olds diagnosed with SLI or ASD, reported findings consistent with that research. Specifically, in addition to the previously discussed finding of a relationship between stronger pragmatic ability and prosocial behavior, they found that for both diagnostic groups, there was a significant negative correlation between pragmatic language ability and emotional and behavioral difficulties. While they did not report data relating pragmatic language ability to specific emotional and behavioral difficulties, their results showed that pragmatic language ability accounted for a significant percentage of the variance in the total difficulties score (consisting of four problem scales: emotions, conduct, hyperactivity/inattention, and peer problems), with 58% for the ASD group and 43% for the SLI group.

Whether examining those diagnosed with ASD, PLI, or SLI, the research shows a clear connection in those diagnosed with language disorders between pragmatic language ability and other difficulties. Though it logically follows that pragmatic impairments would impact social abilities, the research also suggests that there is a relationship

between pragmatic language skills and emotional and behavioral difficulties. Does this relationship hold true such that those presenting primarily with social, emotional, and behavioral difficulties also will demonstrate weaknesses in pragmatic language ability?

Language Abilities of Those with Social, Emotional and Behavioral Difficulties

Pragmatic language ability is often examined within the scope of generalized language ability. As such, it is important to first review generalized language abilities in those with social, emotional and behavioral difficulties to understand whether there is a relationship overall between language abilities and the presentations of internalizing and externalizing behaviors. With this knowledge, one can further explore whether those with social, emotional, and behavioral difficulties might have deficits specifically in pragmatic abilities and more specifically, whether there is an association between those types of difficulties and pragmatic language ability.

Generalized Language Ability of Youth with Social, Emotional, and Behavioral Difficulties

Across a number of studies there have been consistent findings that there is a relationship between language ability and social, emotional, and behavioral difficulties. In their discussion of the relationship between language development and other developmental domains, Im-Bolter and Cohen (2007) noted the importance of language ability in children's ability to have positive peer interactions and to form friendships. They discussed that language ability impacts the ability to talk about feelings, solve social problems, and get support and understanding from others. Beck et al. (2012) examined the relationship between components of language competence and emotional competence. The researchers defined language competence as measured by receptive

vocabulary, verbal fluency, literacy, narrative structure, and the narrative use of evaluative devices and defined emotional competence as measured by expressive emotion vocabulary, declarative emotion knowledge, awareness of mixed emotions, and facial emotion recognition. They studied a community sample of 210 school-age children, performing a bivariate correlational analysis and a confirmatory factor analysis. Beck et al. (2012) found significant positive correlations between measures of language competence and emotional competence, suggesting a general relationship between these two areas, with the closest relationships between receptive vocabulary and declarative emotion knowledge and receptive vocabulary and awareness of mixed emotions.

Zadeh et al. (2007) sought to explore the relationship between language, social cognition, and externalizing psychopathology using structural equation modeling. They studied a sample of 354 children referred for emotional and behavioral problems. The researchers found significant correlations between measures of language, social cognition, and externalizing psychopathology. Moreover, results from their study suggested that language plays a mediating role between social cognition and externalizing psychopathology. Bornstein and colleagues (2013) were interested in exploring the interconnections between language and internalizing and externalizing behaviors across childhood and early adolescence. Through two independent longitudinal, multi-wave designed studies, the researchers studied a community sample of 224 children at ages 4.5 and 7 (study 1) and ages 4, 10, and 14 (study 2). Using a nested path analysis model, findings from both studies suggest that poorer language skills in early childhood are related to more internalizing behaviors in later childhood and adolescence. Other findings from the studies suggest a relationship between lower

language ability and higher levels of externalizing behaviors, found at ages 4.5 and 7 as well as at ages 4, 10, and 14.

Petersen et al. (2013) also examined the relationship between language ability and behaviors, looking at inattentive-hyperactive and externalizing problems and whether there was a direction of effect between language ability and behavior difficulties. They performed two longitudinal studies. Study 1 used a community sample of 585 children from age 7 to 13, measuring language ability annually using a nationally normed standardized academic achievement test. Study 2 used a national sample of 11,506 children from age 4 to 12, using a measure of receptive language and vocabulary given every two years to determine language ability. Both studies utilized individual growth models and an autoregressive latent trajectory model. In the first study, the researchers found a significant negative association between language and teacher-reported inattention-hyperactivity. They also found that language ability was significant in predicting mother-reported inattention-hyperactivity and externalizing behaviors. Study 2 results were consistent with the first study, finding significant negative associations between language and both inattention-hyperactivity and externalizing problems. Additionally, in the second study, Petersen et al. (2013) found that the effect of language ability on later behavior problems was stronger than the reverse direction. Overall, both studies suggest a significant relationship between language ability and behavioral difficulties.

Chow and Wehby (2019) explored relationships between language and emotional and behavioral disorders in students with or at risk of such disorders. Their sample included 300 students, in both general and special education classrooms, from

kindergarten through fourth grade across three school districts. Language ability was measured through an oral language cluster on an achievement measure. Behavior was measured through teacher ratings and four 15-minute direct observations by research assistants. Data were analyzed by plotting bivariate relations between language and individual behavior constructs and through repeated measures ANOVA. While according to teacher ratings of behavioral subscales (affective, anxiety, somatic, attention, oppositional, and conduct) no significant differences were found based on language ability, across the subscales mean scores of teacher-rated behavior was found to be significantly different across the language ability groups. Behaviors also were different based on the data from the direct behavioral observations. The researchers found that lower language was associated with more negative behaviors, particularly higher rates of aggression as well as with the least amount of time engaged academically, while higher language ability was associated with greater academic engagement.

Salmon et al. (2016) in their narrative review of longitudinal studies, presented research exploring the relationship between language ability and emotional and behavioral difficulties. They did not note specific criteria for inclusion or exclusion of research in their review. Three of the areas highlighted in the review included: language skill and emotional and behavioral problems, language and self-regulation, and language and emotion understanding. Salmon et al. (2016) reported that findings from their review of the literature suggested a longitudinal relationship between language skill and emotional and behavioral difficulties, particularly externalizing behavior problems. Further, they discussed findings suggesting a predictive relationship between early language skills and later self-regulation skills. Notably, though, it was pointed out that

typical measures of early language skill often assess language only through expressive and receptive vocabulary. Their review of the research also suggested that there is a positive relationship between language skill and emotional understanding including ability to identify, express and communicate emotions. Overall, the researchers concluded that "language bears a predictive relationship to the development and growth of children's emotional and behavioral problems" (p. 365).

In addition to these individual studies and the narrative review, a relationship between language ability and social, emotional, and behavioral difficulties has consistently been reported in systematic reviews and meta analyses. Benner and colleagues (2002) reported their findings from a systematic review focused on the language skills of children who were formally identified with emotional and behavioral disorders (EBD). In the literature, the classification of EBD is based on the Individuals with Disabilities Education Act (IDEA) definition for Emotional Disturbance and individual state regulations reflecting those criteria. The authors also included anyone identified as EBD based on DSM criteria across multiple editions (DSM-IV, DSM-III-R, DSM-III, and DSM-II). They noted that "on average, 71% of children with EBD experienced clinically significant language deficits" (Benner, et al., 2002, p.48).

Hollo et al. (2014) sought to further explore the relationship between those identified or diagnosed with emotional, affective, disruptive or behavioral disorders and language deficits by examining the prevalence of previously unidentified low language ability in these populations. Results of their meta-analysis, looking at participants between the ages of 5-13, showed a prevalence of 81% presenting with at least mild language difficulties that had not yet been identified and 47% with moderate to severe

difficulties (Hollo et al., 2014). In a more recent systematic review, Chow and Wehby (2018) sought to examine the associations between language and behavioral problems in a more heterogeneous sample of children including studies with representative or typically developing samples as well. They found a significant correlation between low language and higher levels of behavior problems across the samples.

Overall, across the literature, as exhibited in individual studies as well as systematic reviews and a meta-analysis, a relationship between general language ability and social, emotional and behavioral difficulties is extremely evident, with estimates of over 70% of individuals presenting with emotional and behavioral difficulties also experiencing language difficulties. Data from research with children and adolescents ranging from ages 4.5 to 14 suggest that decreased language ability is related to increased internalizing and externalizing behaviors, including inattention-hyperactivity and negative behaviors. Moreover, there was also a finding that there is a relationship between language ability and self-regulation. Research about general language ability, however, may include pragmatic abilities within the general language skills, so it is necessary to parse out whether this relationship between language ability and emotional and behavioral difficulties exists when examining only pragmatic language abilities.

Pragmatic Language Ability of Youth with Social, Emotional, and Behavioral Difficulties

While there is a clear demonstrated association between general language ability and social, emotional, and behavioral difficulties, it is also important to consider the relationship between pragmatic language ability and these difficulties, as pragmatic weaknesses may be independent of general language problems (Staikova et al., 2013). As

pragmatic language involves the appropriate and effective use of language within social contexts, pragmatic abilities may also overlap with social skills (Beitchman & Brownlie, 2013). Im-Bolter and Cohen (2007) note the necessity of pragmatic skills in combination with other language and cognitive skills to be able to initiate and sustain social interaction. In their discussion about pragmatic language assessments, Russell and Grizzle (2008) suggest that language used within social environments may be more pertinent to adjustment and social success than other language areas that are more traditionally assessed. This belief is supported by their observation that the research field has increasingly demonstrated links between deficits in pragmatic language competencies and not only autism spectrum disorder, but also externalizing and internalizing disorders.

One such study in the field supporting this relationship is a pilot study comparing the prevalence of pragmatic language impairments in children referred for psychiatric services (n=21) to a typically developing sample of children (n=29). Though not all children in the clinical sample were formally diagnosed, the group included children diagnosed with conduct disorders, emotional disorders, and adjustment disorder and did not include anyone with an autism spectrum disorder. Helland and Heimann (2007), using a non-parametric test, found a highly significant difference between mean pragmatic scores of the two groups, suggesting pragmatic deficits in the clinical sample independent of any language disorders.

Mackie and Law (2010) also completed a pilot study specifically looking at the strength of the relationship between pragmatic language difficulties and emotional/behavioral difficulties. The study included seventeen participants ages 7-11 who had been identified as having behavioral concerns at school along with a comparison

group of sixteen matched by age and sex, though pragmatic language data were only able to be analyzed for eleven in the identified group and twelve in the control group. Based on a measure of emotional and behavioral difficulties, 94% of the total identified group were considered at high risk of receiving a classification of an emotional/behavioral disorder. Using a two-tailed test, researchers reported a significant difference of pragmatic language skills between the two groups, with seven of the eleven identified children scoring low enough on the scale to be considered for pragmatic language difficulties. Though, it should be noted that in this small pilot study, the data suggested that three of these seven identified children with pragmatic deficits might qualify for a possible diagnosis on the autism spectrum.

Law and colleagues (2015) studied the interaction between pragmatic language, early social disadvantage, and adolescent behavior, exploring whether pragmatic ability functioned as a mediator between early social disadvantage and adolescent behavior. The participants were drawn from a longitudinal population-based cohort study using language data from participants at 9 years old and behavioral data at 13 years old. Through univariable analysis, the authors found that pragmatic language ability was significantly associated with measures of children's behavior including a total difficulties score (-.331), as well as each of the measured subscales: emotional problems (-.063), conduct problems (-.058), hyperactivity (-.131), and peer problems (-.080). Law and colleagues (2015) further performed mediational analyses and found that the relationship between social disadvantage and behavior (total difficulties score) was partially mediated by pragmatic language (52%). The partial mediation relationship held true for each of the behavioral subscales as well: emotional difficulties (59%), conduct difficulties (37%),

hyperactivity (49%), and peer problems (64%). In order to check for the impact of children diagnosed with autism spectrum disorder (ASD), the researchers also repeated the analyses excluding children with a diagnosis of autism and found no significant differences in the relationships found.

Though two of these studies were pilot studies, not all of the participants had formal diagnoses, and there were some children diagnosed with ASD within some of the participant groups, the findings of all three studies do suggest that those with social, emotional, and behavioral difficulties have significantly different pragmatic language skills than those who are typically developing. Moreover, the results suggest that these pragmatic difficulties are independent of language disorders. As there is evidence that children and adolescents with behavioral and emotional disorders that are non-autism spectrum disorders present with weaknesses in pragmatic language ability, it is worth further exploration of the relationship between pragmatic language ability and other specific diagnoses.

Pragmatic language ability and attention-deficit hyperactivity disorder

(ADHD). One of the consistent relationships reported in the research has been between pragmatic language ability and behaviors including impulsivity, hyperactivity, and inattention. As such, it follows that there should be a relationship between pragmatic difficulties and a diagnosis of attention-deficit hyperactivity disorder (ADHD), as those three behaviors are symptoms of the disorder. Research exploring this relationship has both looked at comparing pragmatic language ability in those diagnosed with other disorders including Asperger syndrome and specific language impairment (SLI) and

those with a diagnosis of ADHD as well as comparing pragmatic language ability in those with a diagnosis of ADHD and typically developing peers.

Bishop and Baird (2001), in researching the clinical utility of the Children's Communication Checklist (CCC), a measure of pragmatic communication difficulties, compared how children with a range of diagnostic criteria, including ASD, Asperger syndrome, pervasive developmental disorder not otherwise specified (PDDNOS), ADHD, and specific learning disability (SLD) performed on the measure. Diagnoses were given according to ICD-10 criteria, the Autism Diagnostic Interview-Revised, the Conners Rating Scale, and the Strengths and Difficulties Questionnaire. Participants (n=151) were 5-17-year olds who were referred to a center specializing in the assessment of pervasive developmental disorders. The CCC was given to parents and a professional (e.g., a teacher) who was familiar with the child for at least three months. Data were analyzed using Cronbach's alpha, Pearson's correlations, and a 3-way ANOVA. The researchers found that those with ADHD scored similarly to children with diagnoses of Asperger syndrome or PDDNOS. Specifically, according to parent ratings, 86% of those with ADHD, 87% for Asperger syndrome, and 90% for PDDNOS fell in the clinical range for pragmatic difficulties, while according to the professional ratings 69% with ADHD, 83% for Asperger syndrome, and 71% for PDDNOS fell in the clinical range. These percentages can also be compared to those with diagnoses of ASD (parent rating 100%, professional rating 93%) and SLD (parent rating 67%, professional rating 46%).

In a more recent study comparing communication abilities of children with ADHD to those with Asperger syndrome as well as with a typically developing group, Helland and colleagues (2012) studied 77 children, ages 6-15, used a parent completed

measure of communication skills. A one-way MANOVA and post hoc analyses were performed to analyze the data. Utilizing a composite measure of general communication ability, both the ADHD group and the Asperger syndrome group were found to have clinically significant communication problems. Of those identified as having communication problems, 69.6% of those in the ADHD group were found to have pragmatic language difficulties that were greater than their language structure difficulties, with 84.7% in the Asperger's group. Compared to the typically developing group on the composite measure of pragmatic difficulties, those with ADHD had descriptively lower scores, though the difference was not statistically significant. Of note, however, there was significant difference between the two groups found on two of the scales within the composite, stereotyped language and nonverbal communication. These two scales look at the frequency of such items as using sentences in inappropriate contexts, saying things that are not fully understood, seeming to be repeating something heard, not responding to conversational initiations by others, and standing too close to others when they are talking. There was also a significant difference in these two scales between the ADHD group and the Asperger syndrome group, which was also significantly lower than the typical developing group.

Helland, Helland, and Heimann (2014) sought to explore whether children with specific language impairment (SLI) could be differentiated from those with attention-deficit hyperactivity disorder (ADHD) through their language profiles. They studied 59 children, ages 6-12, across three groups, those with an SLI classification, those with a parent-reported diagnosis of ADHD, and a typically developing group. Using a one-way ANOVA to analyze parent-reported measures of language ability, the researchers found

that the SLI and ADHD groups were similar on an overall measure of communication, though there were some clear differences between the two groups including measures of speech and syntax. Both groups were found to display equivalent levels of significant pragmatic difficulties compared to the typically developing group, as demonstrated on subscales measuring inappropriate initiation, stereotyped language, use of context, and nonverbal communication and the pragmatic composite. However, 57.1% of the ADHD group compared to only 5.3% in the SLI group and 10.5% in the typically developing group were found to have pragmatic impairments that were disproportionate to their general communication abilities. This finding suggests that for the majority of the ADHD group the pragmatic impairments were largely responsible for lower measures of overall communication.

Leonard et al. (2011) explored the relationship between hyperactivity and inattention and social skills, in particular looking at the role of pragmatic language use in these relationships. The study included a community sample of 54 children, ages 9-11, recruited through schools, including only one participant who carried a diagnosis of ADHD. Researchers utilized correlation coefficients and multiple linear regressions to analyze the data. In addition to finding an inverse relationship between hyperactivity or inattention and social skills, there was also a significant inverse relationship found between hyperactivity or inattention and pragmatic language use. Results also suggested a significant correlational relationship between pragmatic language use and social skills. Furthermore, Leonard et al. (2011) found that pragmatic language use fully mediated the relation between hyperactivity and social skills difficulties and partially mediated the relation between inattention and social skills difficulties. As the authors found no

significant correlation between general language ability and pragmatic language use, they concluded that these findings were not due to a more general language impairment.

In a study specifically looking at children with a diagnosis of ADHD, Staikova and colleagues (2013) were also interested in exploring the relationship between pragmatic language ability and social skills. Using a variety of measures of pragmatic language abilities, they sought to better understand what effect pragmatic deficits have on social skills within that population. Sixty-three children from ages seven to eleven were included, with 28 who met the DSM-IV-TR criteria for ADHD and 35 in the typically developing group. Measures used to assess pragmatic language ability included the Children's Communication Checklist, second edition (CCC-2), selected subtests from the Comprehensive Assessment of Spoken Language (CASL), Tests of Pragmatic Language, second edition (TOPL-2), and the Narrative Assessment Profile: discourse analysis (NAP). Using those measures, the authors created three pragmatic language constructs: Discourse Management, Presupposition, and Narrative Discourse. Subtests of the Clinical Evaluation of Language Fundamentals, fourth edition (CELF-4) were also administered to assess receptive and expressive language abilities as was the Social Skills Improvement System (SSIS) to measure social behavior. Data were analyzed using a multivariate analysis of covariance (MANCOVA), bivariate correlations, and a series of multiple linear regressions. Results showed significant group differences between the ADHD and typically developing groups on measures of pragmatic language. The finding of those with ADHD having significantly poorer pragmatic language skills across all measures held even after controlling for general language scores. With regard to social skills, the researchers found that discourse management, derived from the pragmatic

language composite from the CCC-2, was significantly correlated with ADHD and social skills. Furthermore, they found that discourse management fully mediated the relationship between ADHD and social skills.

Across these studies, with children and adolescents ranging in age from 5-17, those with ADHD diagnoses and symptomatology were found to have significantly lower pragmatic language ability than their typically developing peers and a relationship was found between greater pragmatic language use and decreased hyperactivity and inattention. Moreover, there is evidence that those with ADHD present with similar pragmatic language abilities as those with Asperger syndrome and PDDNOS, both diagnoses which have included difficulties with pragmatic abilities as one of the defining features, as well as similar to those with diagnoses of Specific Language Impairment (SLI). However, the research also suggests that the pragmatic difficulties for those with ADHD presentations are not related to general language ability. While the association between pragmatic language deficits and ADHD has clear evidence, as those deficits have also been related to social, emotional, and behavioral difficulties, it is important to explore what literature exists for a relationship between pragmatic language ability and those diagnostic presentations.

Pragmatic language ability and behavioral disorders (oppositional defiant disorder [ODD], conduct disorder, emotional and behavioral disorder [EBD]). As discussed, in addition to findings relating pragmatic language ability and ADHD presentations, research has suggested a relationship between pragmatic deficits and children referred for difficulties with emotion management and behavioral concerns. It then follows that those who have been identified with behavioral disorders

such as oppositional defiant disorder (ODD) and conduct disorder (CD) or classified with an emotional and behavioral disorder (EBD) will also demonstrate deficits in pragmatic language abilities. Findings from a systematic review of language skills of children with EBD support this idea with researchers reporting prevalence rates of language deficits experienced by children with EBD, including 71% of those with language deficits experiencing pragmatic deficits (Benner et al., 2002). Other studies have also supported this relationship between pragmatic deficits and those with behavioral disorders and symptomatology.

Gilmour and colleagues (2004) sought to test their hypothesis that children identified with conduct disorders would present with a deficit in pragmatic language abilities. Two different samples were researched. The first was a clinically referred school-age sample in which groups with conduct disorder/ODD (n=55), autism spectrum disorder (n=87), and a typically developing group (n=60) were compared. Diagnoses of conduct disorder/ODD were made through clinical judgment and the Strengths and Difficulties Questionnaire. The second was a community sample, ages 5-10, of 54 children who had been suspended or were at risk of suspension from school. Parents and teachers completed the Children's Communication Checklist as an assessment of pragmatic skills. Data were analyzed by multiple analysis of variance procedures. For the clinically referred sample, the researchers found that there were no significant group differences across the diagnostic groups in parent rated pragmatic skills, though all diagnostic groups were highly significantly different from the typically developing group. According to parent ratings, 78% of those with conduct disorder were in the clinical range for pragmatic difficulties compared to 8% of those in the typically developing

group. Teachers rated 69% of those identified with conduct disorder to be in the clinical range for pragmatic difficulties. When accounting for the possibility of comorbidity in this sample of CD/ODD and ASD, teachers still rated a large percentage of the CD group in the clinical range for pragmatic difficulties (61%), with parents rating 44%. Among the community sample, teachers rated 69% of those who had been suspended or at risk for suspension in the clinically significant range. Overall, the authors reported that two-thirds of those with conduct disorders had pragmatic language impairments.

Helland, Lundervold, and colleagues (2014) also explored the association between pragmatic language function and behavioral difficulties. Utilizing participants from a population-based study, the researchers identified a subset of children (n=40) as having behavior problems based on high symptom levels of an externalizing disorder according to the Kiddie Schedule for Affective Disorders and Schizophrenia for School-Age Children-Present and Lifetime version (K-SADS-PL), looking at symptoms of Oppositional Defiant Disorder (ODD), Conduct Disorder (CD) or ADHD. Assessments of language, emotional, and behavioral difficulties were given at two different times, when participants were 7-9 and also when they were 12-15. At the later time an additional assessment of pragmatic language ability was also given to the identified group as well as to a control group. Data were analyzed using one-sample t-tests, independent-samples t-tests, correlation analyses and backward multiple regression analysis. The researchers found a strong correlation between language, emotional, and social difficulties at 7-9 and pragmatic language impairments at 12-15. Parents reported more language problems for this group with behavioral symptomatology at 7-9 compared to the general population and rated them at 12-15 poorly on nine out of ten subscales on a

measure of communication skills including pragmatic abilities. As there was no assessment of pragmatic ability given when participants were 7-9, though, it is unclear whether these pragmatic difficulties were existent at that time as well. Of note, the researchers found that 70% of the group identified with behavior problems scored in the clinical range for language impairments, split almost evenly with 35% displaying mainly structural language problems and 35% displaying pragmatic difficulties. Further, compared to the control group, at 12-15, a significant difference was found on all pragmatic subscales of the given language measure.

Hollo and colleagues (2019) sought to further explore whether different behavioral difficulty presentations, i.e., internalizing only, externalizing only, both internalizing and externalizing, were related to differences in types of language difficulties. Forty-six boys, ages 7-17, from both rural and urban school districts, with classifications of emotional disturbance were included in the study. Responses on the Teacher Report Form of the Achenbach System of Empirically Based Assessment were utilized to group the students in the three behavioral presentations groups, with 17.39% (8) categorized as internalizing only, 23.91% (11) as externalizing only, and 52.17% (24) as both internalizing and externalizing. Language ability was assessed using the Comprehensive Assessment of Spoken Language (CASL) and data were analyzed using profile analysis MANOVA. Overall, results showed that the entire sample of students on average was approximately one SD below the mean across all language domains measured, including semantic, syntactic, higher order skills, expressive, receptive, and pragmatic. Moreover, all three behavioral/emotional presentations performed lowest on pragmatic language skills compared to other language domains. Examining differences

between the three behavioral presentations, results suggested that the group with both internalizing and externalizing behaviors performed the lowest on all language types; however, composite language scores were not significantly different between the both internalizing and externalizing and externalizing only presentations. The internalizing only group performed the highest on language measures, though their pragmatics score was significantly lower than their expressive and receptive scores. The authors did discuss the limitations of these results in understanding group differences due to the small sample sizes of the internalizing and externalizing groups.

Though the researchers do not specifically use the term pragmatic language, O'Kearney and Dadds (2005) researched aspects of "emotion language" in 55 adolescents, ages 13-17, comparing those with externalizing disorders, internalizing disorders, and a group without behavioral or emotional disorders. The authors did not specifically define "emotion language," though described that in order to be coded within the study, language needed to refer to emotions, emotional states, and emotional experiences. Participants were recruited from those referred for a group program to enhance coping skills and resilience. The Diagnostic Interview Schedule for Children and Adolescents and Parents (DISCAP) was utilized to identify participants who met diagnostic criteria for a primary internalizing or externalizing disorder, including major depressive disorder, generalized anxiety disorder, social phobia, panic disorder, oppositional defiant disorder, and conduct disorder. The Child Behavior Checklist (CBCL) was also administered to parents of the participants to support these identifications. Researchers explored a variety of different aspects of emotion language including structure, quality, and intensity of language and class of negative emotion (i.e.,

anger, sadness, fear). Emotion language was evaluated through tasks such as discussing vignettes designed to elicit negative emotions and being asked to recall a memory where participants experienced similar feelings. Data were analyzed using comparative analyses with probability of occurrence, multivariate analyses of covariance, analysis of variance, and exploratory analyses. Results suggest that emotion language is negatively impacted by clinical presentation of internalizing and externalizing behaviors. Compared to those without presentations of emotional or behavioral difficulties, adolescents from both the externalizing and internalizing presentation groups used less specific emotion terms, specifically for anger, sadness, and fear. Moreover, findings suggest that those with externalizing presentations may use less frequent and less complex emotion language. Internalizing adolescents were also found to be less likely than the externalizing and comparison groups to use anger terms in response to anger and sad material, and more likely to use sad terms. These findings support the idea that pragmatic language, in this case in particular communication of feelings, may be impacted by emotional and behavioral disorders.

Similar to the findings for those presenting with ADHD, the research suggests that there are significant differences between the pragmatic language ability of those with emotional and behavioral disorders such as conduct disorder and oppositional defiant disorder and their typically developing peers, and that this population may present with pragmatic language ability more similarly to those diagnosed with ASD. Moreover, a correlation has been found between pragmatic language deficits, including communication of emotions, and emotional and social difficulties. In those with

externalizing and/or internalizing presentations, all groups performed weakest in measures of pragmatic language compared to other language skills.

Summary

Pragmatics is defined by ASHA as "functional and socially appropriate communication" (American Speech-Language-Hearing Association, 1993). Pragmatic language includes social and emotional aspects of language and effective expression of thoughts and ideas. There is substantial evidence in the literature that deficits in pragmatic language ability for children and adolescents are present not only in those with diagnoses that are defined by these deficits, such as autism spectrum disorder, social (pragmatic) communication disorder, and pragmatic language impairment, but also in those with specific language impairment and in other social, emotional, and behavioral disorders including attention-deficit hyperactivity disorder, conduct disorder, oppositional defiant disorder and the special education classification of emotional disturbance. The relationship has been demonstrated in both directions as children and adolescents with pragmatic deficits also have social, emotional, and behavioral difficulties and those with social, emotional, and behavior difficulties have been found to have deficits in pragmatic language. Given this relationship, interventions targeting improving pragmatic language ability have the potential to positively impact social, emotional, and behavioral outcomes. Children and adolescents are an important population to research as these skills are still being developed and these interventions could help mitigate potentially negative consequences later in life including poor interpersonal relationships and social-emotional difficulties.

Frequently, intervention research is done with discrete diagnostic groups; however, as the relationship between pragmatic language deficits and social, emotional, and behavioral difficulties has been found across a range of diagnostic presentations, important data allowing for a more comprehensive understanding of appropriate and effective treatment approaches could be gathered by exploring the current literature including interventions with these different groups. Additionally, as there are a number of disciplines that study and implement interventions with children and adolescents who have difficulties with pragmatic or social language, an interprofessional approach to the research is necessary to locate all relevant data. Speech-language pathologists, who assess, diagnose, and treat speech and language disorders and psychologists who study language and how it is connected to thoughts, feelings, and behaviors, in addition to counselors, social workers, and educators, all may have contributed from their own discipline-specific viewpoint to the research field. By including all relevant disciplines, a complete picture of what interventions exist and their effectiveness can be achieved along with setting the stage for interprofessional practice with future implementation of interventions for more effective outcomes.

A systematic review is the most appropriate methodology to use for this type of research as it ensures the inclusion of all relevant studies across disciplines, while minimizing bias, through the use of explicit, predetermined procedures to determine relevance. Thus, the research was done systematically to allow for the inclusion of different diagnostic presentations, while also narrowing the included studies for relevance to the research topic. Moreover, a systematic review allowed for the purposeful search through a variety of discipline-specific databases as predetermined for the research

question, in this case including databases from the fields of psychology, education, communication sciences and disorders, linguistics, social sciences, medicine, social work, sociology, and behavioral science.

Purpose of the Current Study and Research Question

The purpose of this dissertation research project was to systematically review and evaluate the literature of interventions targeting improving pragmatic language ability for children and adolescents, across a range of diagnostic presentations, and to assess their effectiveness in positively impacting internalizing and externalizing behaviors. Analyses of these results provide information to researchers and service providers about interventions used with different diagnostic presentations to have a better understanding of what characteristics might lead to effective intervention as well as areas of need for future research. A systematic review methodology, using an interprofessional approach to include research from pertinent disciplines, was used to identify all relevant studies.

The primary research question was whether interventions that target pragmatic language positively impact emotional and behavioral outcomes. In addition to evaluating whether the interventions were effective, the research examined what characteristics made them effective and whether there were any commonalities of interventions across diagnostic presentations. Of interest in evaluating the studies was also whether there was the presence of interprofessional practice in the creation or implementation of interventions, including analyzing the roles of practitioners across different disciplines in the interventions.

Chapter III

Methods

As discussed in the literature review, there is substantial evidence that there is a relationship between social, emotional, and behavioral difficulties and deficits in pragmatic language ability. This has been found not only in disorders characterized by deficits in pragmatic language ability, such as ASD, but also in disorders such as ADHD, ODD, CD, and the special education classification of emotional disturbance (ED). This demonstrated relationship, and the role of pragmatic language in getting needs met, communication about wants and needs, and social interactions lead to the question of whether interventions targeting improving pragmatic language ability positively impact emotional and behavioral difficulties. With pragmatic deficits present in a wide range of diagnostic presentations, useful information about interventions could be gathered through exploring the research across a broad range of presentations. Moreover, as interventions addressing pragmatic language, social communication, or social language may occur across a number of fields including speech-language pathology, psychology, counseling, social work, and education, a review of the research across these fields is important to better understand the types of interventions that currently exist as well as their effectiveness.

Purpose of the Systematic Review

The purpose of a systematic review is to identify, select, and critically evaluate relevant research in response to a specific question and then to gather and analyze data from the research included in the review (Moher et al., 2009). Designed to minimize bias by including all relevant studies, a systematic review follows a step-by-step process to

evaluate the relevance of studies towards answering the research question. Procedures in a systematic review are predefined, explicit, transparent, and rigorous (Gough et al., 2017; Torgerson, 2003), allowing for a comprehensive synthesis of the data.

Research Objectives

The objective of this review was to gather and summarize available intervention data targeting pragmatic language for children and adolescents across a variety of diagnostic presentations that research has shown are related to lower pragmatic ability, in order to determine to what extent these interventions are effective in positively impacting emotional and behavioral outcomes. Where possible, additional goals of the review were to:

- Determine characteristics of interventions that make them more effective;

- Determine any commonalities of interventions across diagnostic presentations; and

- Evaluate the presence of interprofessional practice and the roles of practitioners across different disciplines in the interventions.

Inclusion and Exclusion Criteria

Systematic reviews require inclusion and exclusion criteria in order to specify what type of research will be considered and the boundaries of the evidence base (Gough et al., 2017). Specific criteria were determined prior to exploring the literature for what research would be included and excluded based on the research question and in order to minimize bias (Torgerson, 2003).

Types of Literature

Eligible research included articles published in journals, dissertations, and master's theses reporting original research. Reviews of literature, books, and conference presentations were excluded.

Types of Study Designs

This review included studies with interventions designed to target pragmatic language skills with at least one outcome measure of emotional or behavioral functioning. Studies had to include either a control or comparison group or pre- and post-measures of emotional or behavioral functioning to demonstrate the impact of intervention on those outcomes. Single-subject research designs were also included. Case studies with an n=1 and qualitative-only studies were excluded. Studies meeting inclusion criteria were then assessed using the Integrated quality Criteria for the Review of Multiple Study designs (ICROMS) for robustness of study quality.

Types of Participants

The review focused on children and adolescents from ages 4-19. Studies considered for inclusion had to explicitly state the participants' diagnoses. Participants considered at-risk for emotional or behavioral difficulties were included. Studies including English learners were eligible for inclusion only if the intervention was implemented in the participants' first language. Studies were excluded if participants had an IQ score of less than 85. Participants with diagnoses or classifications of learning disability or nonverbal or minimally verbal presentations of ASD were excluded. Studies with participants with other medical diagnoses (e.g., traumatic brain injury (TBI),

Noonan syndrome, neurofibromatosis type 1, fragile x, Down syndrome, epilepsy) were

excluded.

Types of Interventions

Eligible interventions included at least one component designed to target

pragmatic language skills. To be included, the intervention had to be provided directly to

the child or adolescent. Acceptable interventions included those initially provided to

others (e.g., parents, teachers, caregivers, and peers) who then provided intervention to

the child or adolescent. Any service provider was acceptable (e.g., speech-language

pathologists, mental health professionals, parents, teachers, and researchers). Any

duration of intervention was included. Studies that used only the Picture Exchange

Communication System (PECS) as an intervention were excluded, as the intervention is

targeted for those with little or no communication ability. Pharmaceutical-only

interventions were excluded.

Types of Outcomes

The primary outcomes of interest were emotional and behavioral functioning,

including internalizing (e.g. anxiousness, depression, withdrawal) and externalizing (e.g.

aggression, hostility, antisocial behavior) symptoms. Studies eligible for inclusion needed

to include a measure of either emotional or behavioral functioning. Social functioning

outcomes, though not necessary for inclusion in the review, were also collected as were

any pragmatic language outcomes. Studies could include multiple measures to evaluate

outcomes in more than one category of symptoms or functioning. Outcomes presented

only as individual participant results and not aggregated were excluded.

Types of Data

Acceptable measures included researcher-developed measures, standardized measures, and/or checklists and could be completed by parents, teachers, professionals, peers, or study participants. Data were also gathered with regard to types of measures and the role of those completing the measures. Additional data were extracted for demographic information including age, grade level, gender, ethnicity, and diagnosis/classification, as well as information about the interventions including the focus of the intervention, skill(s) targeted, type of intervention, duration/frequency and setting/mode of the delivery, and the role of the interventionist. Other data of interest included presence of interprofessionalism in creation and/or implementation of intervention.

Search Methods for Identification of Relevant Studies

As the goal of a systematic review is to find as many eligible studies as possible and speech, language, and emotional and behavioral difficulties are studied across a variety of fields, an interprofessional approach was utilized in the selection of resources. The following databases were thoroughly searched for studies that met the inclusion criteria: PsycINFO, PsycEXTRA, ERIC, Education Research Complete, ComDisDome, Linguistics and Language Behavior Abstracts (LLBA), Scopus, PubMed, Social Work Abstracts, Child Development and Adolescent Studies, and Soc Index. There were no date restrictions on the search; all databases were searched in November 2019 (see Table 1 in Appendix A for specific dates and search results data). These databases included literature from disciplines including psychology, education, communication sciences and

disorders, linguistics, social sciences, medicine, social work, sociology, and behavioral sciences. Studies were excluded if they were not published in the English language.

Hand Search

As a focus of interest in this study was the presence of interprofessionalism in the creation or implementation of relevant interventions, interprofessional journals were purposefully sought to be included in the search for relevant studies. A hand search was completed for two interprofessional journals that were not included in the electronic database search (Journal of Interprofessional Care was indexed within PsycNET). These were the Journal of Interprofessional Education and Practice (2015 through 2019, online) and the Journal of Research in Interprofessional Practice and Education (2009 through 2019, online). All titles and abstracts were reviewed utilizing electronic copies of the journals to determine if any articles met inclusion and exclusion criteria for the study.

Search Terms for Database Search

A review of relevant literature guided the choice of appropriate keywords. A single, long search string was utilized in order to attempt to identify, retrieve, and code the entire population of eligible studies. Wildcard characters (e.g., *) were used to account for international spelling variations and varied forms of the same word. Boolean operators (e.g., AND, OR) were used to connect similar concepts and to combine search criteria allowing for a wide net, while also narrowing the search to contain all concepts of interest (Gough et al., 2017). The search strategy included the following terms:

1	(pragmatic* OR "social language" OR "emotion language" OR "social communication")
2	(child* OR teen* OR adolesc* OR "school-age")
3	(behav* OR emotion* OR conduct OR externali* OR internali* OR socioemotion* OR socio-emotion* OR social-emotion* OR "emotion regulation" OR "prosocial" OR "pro-social" OR "peer relation*" OR psychopathology OR "EBD" OR "ED")
4	(intervention OR treatment)
5	NOT ("intellectual disabilit*" OR "learning disabilit*" OR "mental retard*")

Data Collection

Review of Titles and Abstracts and Methods Sections

The results of the electronic searches and the hand search were merged into one list of titles and abstracts using the RefWorks database manager. Then, as many duplicates as could be identified were removed. As the number of records was too large for RefWorks to find duplicates, the records were loaded into the Zotero reference manager, where records were screened for deduping. Duplicate records were then deleted in RefWorks as that system was more user-friendly for the rest of the screening and coding process. All citations then were listed in an Excel worksheet, where results of the review were documented. Titles and abstracts of identified articles were then screened for broad inclusion/exclusion criteria. Any study that was clearly ineligible was eliminated. Studies with any potential to be included were moved on to the next round of screening,

where full-texts of potentially relevant studies were retrieved. Method sections of these studies were then screened for inclusion and exclusion criteria, with ineligible studies eliminated. Full-texts of all studies with any potential to be included were then reviewed. Full-texts were retrieved online or requested from James Madison University Interlibrary Loan. Three articles were not available through the interlibrary system and could not be reviewed.

Study Coding Categories and Data Extraction

Forms designed *a priori* were used to guide the review and record data extracted from the reports. Data corresponding to these forms were entered into the Excel document. The Pragmatic Intervention Screening Form (Appendix B) was used for screening at three different levels. At Level 1, the title and abstract were reviewed to determine if the study met basic inclusion criteria without violating any exclusion criteria such as subject matter and participant demographics. Studies not eliminated through the title and abstract review were moved on to the next stage where full-texts were retrieved. At Level 2, the methods sections of potentially relevant studies were reviewed utilizing the Pragmatic Intervention Screening Form to evaluate specific eligibility criteria of studies. Criteria reviewed at this stage included any unclear data from Level 1 including participant demographics, type of intervention, and outcome variables. Any study that was clearly ineligible at this stage of review (Level 2) was eliminated. Next, studies with any potential to be included in the final review were moved on to a full-text review (Level 3). Criteria reviewed through the full-text review included any unclear data from Levels 1 and 2. Study eligibility decisions were made after the completion of the full-text review.

Once the final set of eligible reports was identified, studies were coded for characteristics of interest identified *a priori*. The Pragmatic Intervention Data Form (Appendix D) was used for data extraction (Level 4), including study characteristics, participant characteristics, intervention characteristics, measures used, and results. Study characteristics included data on the source of the study and location of each study. Participant characteristics included data on recruitment pools, demographics, and number. Intervention characteristics included focus of intervention, targeted skills, structure and length of intervention, service providers, and any potential models of teamwork/interprofessionalism. Measures used included pre-, post-, and any follow-up measures for pragmatic language, emotional and behavioral functioning, and social functioning, types of measures used, and who administered and completed the measures. Results included the method of analysis and outcome data.

Reliability of Coding

At each level of review, including screening, coding and quality assessment, studies were double-coded, performed independently by two reviewers. Coders were an undergraduate psychology student, graduate students in fields of psychology, counseling, and social work, and a therapeutic day treatment provider practicing in the public schools. They were trained in the methodology, research topic, and coding process (see Appendix E for Coder Training Materials). Through the different levels of review, training was adapted to further develop adeptness at the screening process (see Appendix F for Coding Consensus Process). For the first three levels, all studies were double-coded by two reviewers independently reading and evaluating titles and abstracts, methods sections, and full-text, and then comparing notes, creating a consensus list of eligible

studies. When reviewers disagreed about a study's eligibility for inclusion, they resolved disagreements through discussion, and when necessary, through including a third reviewer. A third reviewer was only needed for one disagreement at the first level of screening. Consensus rates at levels of screening were 97% (level 1), 88% (level 2), and 87% (level 3). At Level 4, double-coding was also performed by two reviewers independently reading full-texts and then comparing extracted data, as well as quality assessments of studies. Any disagreements were resolved through discussion. The reviewers were not blind to identifying information on journals, authors, affiliations, or outcomes.

Quality Assessment of Studies

The identified final set of eligible reports were assessed, with double-coding, for quality using the Integrated quality Criteria for the Review of Multiple Study designs (ICROMS) tool (Zingg et al., 2016). The ICROMS was designed to assess the quality of a range in study designs included in systematic reviews. The tool consists of a list of quality criteria specific for multiple study designs across seven dimensions including clear aims and justification, managing bias in sampling or between groups, managing bias in outcome measurements and blinding, managing bias in follow-up, managing bias in other study aspects, analytical rigor, and managing bias in reporting/ethical considerations. The ICROMS utilizes a scoring system associated with these criteria for each study design including identified minimum scores to determine level of quality.

Data Analysis: Thematic Summary

The results that follow are reported in narrative fashion as a thematic summary. A thematic summary contains an assessment of characteristics of the included studies, such

as participants, type of intervention, and environment, organized into meaningful themes, followed by an analysis of the results based on these themes (Gough et al., 2017). This type of summary is utilized to answer the review questions by reporting on what is known and works, what remains unknown, and to make recommendations for future research and practice.

Chapter IV

Results

This chapter presents the results of the systematic review. Included are the results of the search process and descriptions of the studies that met inclusion criteria. Also discussed are themes relevant to the research question.

Search Results for Relevant Studies

A total of 10,853 records (including duplicates) were identified through the search process described in Chapter 3 (see Table 1 in Appendix A for search results data). The electronic database searches yielded 10,852 citations before duplicate removal. An additional citation was identified through the hand search. Of the total citations located in the search process, 3,485 were duplicates, with a total of 7,368 unduplicated records.

A PRISMA flow chart (Figure 1) documents the complete search and coding process including the status of studies and decision points (Moher et al., 2009). Ninety-six percent (7,051 of 7,368) of the unique studies located in the search were eliminated based on title and abstract alone. Full-texts were then either downloaded from available databases or obtained via interlibrary loan from James Madison University. Three studies were not retrievable and thus excluded from this study. Thirteen studies were excluded because they were not available in English, nine at level 1, title and abstract review, and four at level 2, method section review. Of the 317 records reviewed at level 2, eighty percent (255) were eliminated based on method section review. The majority of studies excluded at level 2 were due to not having a pragmatic language component to the intervention (40) or not having a behavioral or emotional outcome measure (156).

Figure 1:

PRISMA Flow Diagram (Selection Process for Including in the Thematic Summary)
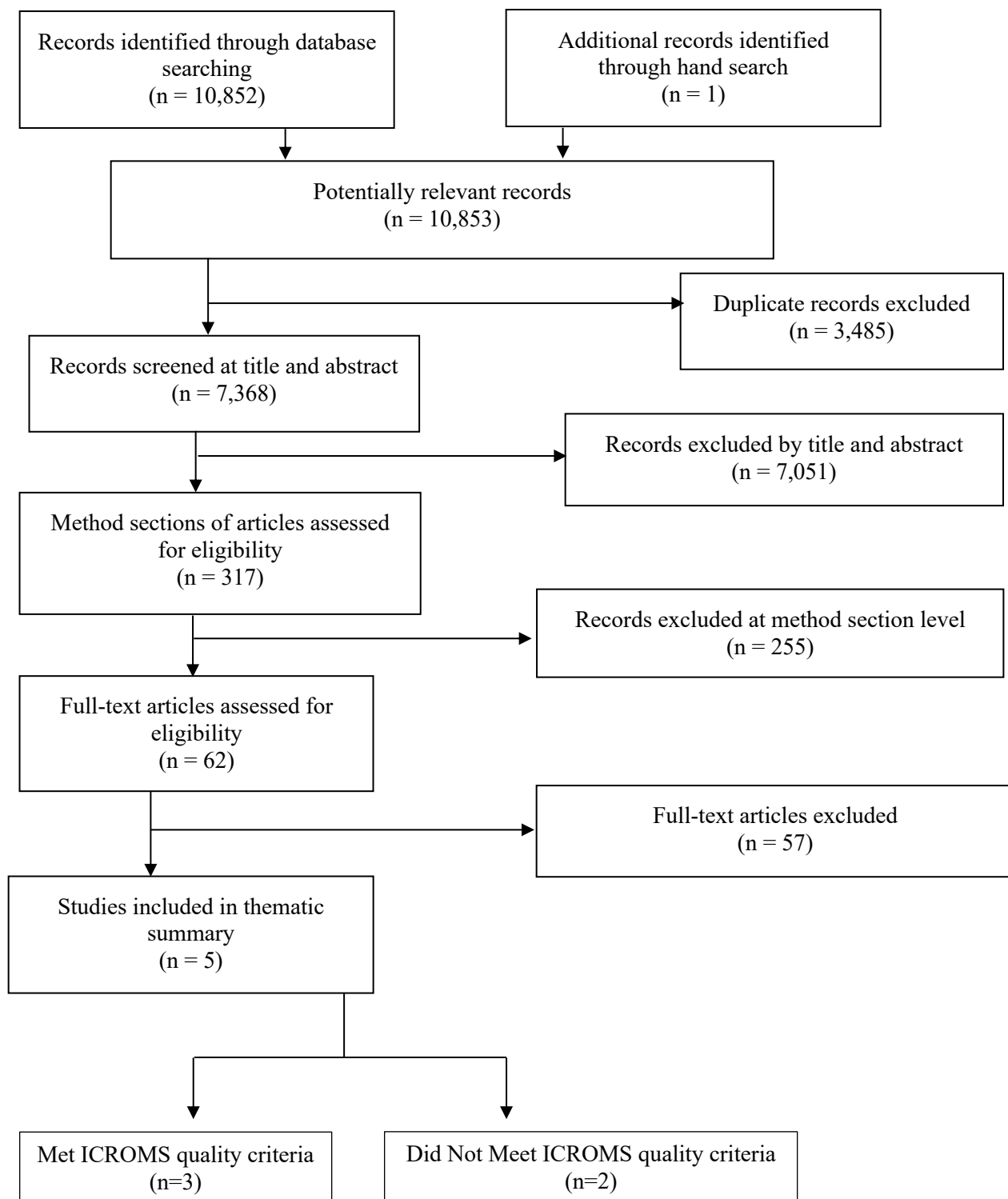
A total of 62 articles were reviewed at the full-text level. Of those, ninety-two percent (57) were excluded for not meeting criteria. The most common reasons for exclusion at level 3, full-text review, were no pragmatic language component to the intervention (9), age of participants included those younger than 4 or older than 19 (11), no behavioral or emotional outcome measure (11), and included those with IQ scores less than 85 (20) (see table 2 in Appendix C for full-text exclusion reasons). Five studies met inclusion criteria, though four did not include information about participants' IQ scores. Data for the five studies were extracted using the Pragmatic Intervention Data Form created *a priori (*see Appendix D)*. All extracted data were entered into an Excel spreadsheet.

Inter-Rater Reliability

To verify inclusion and exclusion decisions, each study was double-coded at every level of review, including title and abstract screening (level 1), method section screening (level 2), and full-text review (level 3). The principal investigator/trainer coded every study and one of the other coders, an undergraduate, graduate student, or therapeutic day treatment provider, was the second coder. At level 1, there was 97% consensus between the coders. At level 2, there was 88% consensus. At level 3, there was 87% consensus. At level 1, a third reviewer was needed to review the coding of one study due to a disagreement between the two coders. All other disagreements were resolved with discussion to 100% agreement.

ICROMS Quality Assessment of Studies

The five studies which met inclusion criteria for the study were assessed for quality using the Integrated quality Criteria for the Review of Multiple Study designs

(ICROMS) tool (Zingg et al., 2016). One study (Hyter et al., 2001) did not use a study design which fully reflected any of those included in the ICROMS tool. Though the study was a before-after design with no control group, it did not appear to meet criteria for a "non-controlled before-after" design as outlined by questions in the ICROMS, due to a lack of a comparison group, or to meet criteria for any of the other study designs included in the tool. Two coders agreed to adapt the tool for this study design by using the "non-controlled before-after" criteria, while scoring as "unclear" the specific criterion regarding baseline assessments conducted with no substantial differences between intervention groups (see Appendix F, IV, Level 4 Consensus). Even with the adaptation, the study did not meet the minimum score required to be deemed a quality study.

Three of the five studies (Fleming et al., 2012; Hayman, 2014, Obsuth et al., 2017) that met inclusion criteria also met quality criteria (see Appendix G, Table 3). Of those that did not meet quality criteria (Hyter et al., 2001; Laugeson et al., 2014), some areas of weakness included rationale for number of pre-and post-intervention points or adequate baseline measurement, attempts to mitigate effects of no control, and free of other bias (see Appendix G, Table 4 for detailed scoring criteria). Both of these studies were pretest-posttest design. The data and results of all five studies which met inclusion criteria are discussed in this section and presented in the study data (Appendix H) with notations for which studies also met quality criteria. An overview of the five studies is presented below, followed by further discussion of characteristics of the studies, participants, interventions, interprofessionalism in the interventions, targeted pragmatic language skills, measures used, and results of the studies.

	Met Quality Criteria			Did Not Meet Quality Criteria	
	Fleming et al. (2012)	Hayman (2014)	Obsuth et al. (2017)	Hyter et al. (2001)	Laugeson et al. (2014)
Aim	To reduce symptoms of depression, anxiety, and hopelessness	To decrease aggression	To reduce fixed-period school exclusion	To improve pragmatic language	To improve social skills
Grade Level	High School	Elementary	High School	Elementary	Middle
Treatment N	20	9	300	6	40
Diagnosis/ SPED Classification	At-risk for major behavioral difficulties, history of school exclusions and scoring over 70th percentile of depressive symptoms	ASD diagnosis and ≥ 2 documented incidents of verbal or physical aggression per month	At-risk for exclusions	Classified E/BD	Autistic disorder, Asperger disorder or Pervasive Disorder-NOS
Brief Description of Intervention	Computer-based CBT program with direct instruction and experiential gameplay. Character in game world uses skills from a "shield against depression."	Modeling and role-play of scenarios with feedback to identify triggers, recognize anger patterns, replace aggressive and negative behaviors with positive communication and social skills.	Combination of group sessions with structured curriculum and individual sessions with greater flexibility focusing on interpersonal skills. Support for teaching staff through training sessions.	Four pragmatic skill topics were covered with 4 lessons for each area. Lessons included an introduction of the activity to the participants, oral and written step-by-step instructions of the activity, and a role-played model of the desired communication.	Didactic instruction, role-play demonstrations of targeted skills, skill rehearsal with feedback, socialization homework for generalization of skills, parent psychoeducation about skills
Brief Description of Emotional/ Behavioral Outcomes	Significantly greater reductions in depressive symptoms compared to waitlist	Decrease in levels of physical and verbal aggression	No statistically significant differences between treatment and control on behavioral outcomes and disciplinary measures	No statistically significant difference between pre and posttest on behavioral measures	Trend of parent-reported decreased social anxiety for treatment group compared to active control

Study Characteristics

Four of the five studies that met inclusion criteria were journal articles, while the fifth (Hayman, 2014) was a doctoral dissertation. None of the studies were published in the same journal or in an interprofessional journal. Three of the five studies (Hayman, 2014; Hyter et al., 2001; Laugeson et al, 2014) took place in the United States, while the other two were in New Zealand (Fleming et al., 2012) and the UK (Obsuth et al., 2017). Two different study designs were represented: two randomized controlled trials (Fleming et al., 2012; Obsuth et al., 2017) and three pretest-posttest designs (Hayman, 2014; Hyter et al., 2001; Laugeson et al., 2014). Each study stated a unique expressed aim of the intervention, including reducing symptoms of depression and anxiety, decreasing aggression, reducing school exclusion, improving pragmatic language, and improving social skills. More complete information about the characteristics of the studies included in this review are presented in Table 5 (Appendix H).

Participant Characteristics

The studies ranged in size from small (6 and 9 participants) to medium (20 and 40 participants) to large (300 participants). In all five studies, either 100% (2 studies) or the majority of participants (92.1%, 65.3%, and 56%) were male. Of the four studies that reported race/ethnicity of participants, each study included multiple racial/ethnic backgrounds (see Table 6 in Appendix H for more complete information about participant characteristics).

Interestingly, all five studies recruited participants from a variety of school-based populations, with three of the five studies recruiting from schools with specialized populations based on diagnosis or special education identification: a school for children

with autism (Hayman, 2014), a school for children with autism without intellectual disabilities (Laugeson et al., 2014), and a school for children with emotional and behavioral disorders (Hyter et al., 2001). Another study (Fleming et al., 2012) recruited from alternative education programs, a program for students at risk of exclusion (suspension or expulsion), and a program for students who aged out of alternative education, while the last study (Obsuth et al., 2017) recruited from schools with a free school meal eligibility rate of greater than or equal to 28%. The recruitment pools reflected the diagnoses/special education classifications in the studies: two studies (Hayman, 2014; Laugeson et al., 2014) included participants with autism diagnoses (one of which also required participants to have at least two documented incidents of verbal or physical aggression per month), one included participants classified with an emotional and behavioral disorder (Hyter et al., 2001), and the other two were at-risk populations: one for exclusions (Obsuth et al., 2017) and the other for exclusions, behavioral difficulties, and depressive symptoms (Fleming et al., 2012). The grade levels included elementary (2), middle (1), and high school (2).

Intervention Characteristics

As noted previously that each study stated a unique aim, the focus of each study was different reflecting those aims, including improving social interactions, increasing communicative competence, and decreasing behavioral and emotional difficulties. Consequently, the skills targeted for intervention across the studies also represented a range, summarized below.

	Met Quality Criteria			Did Not Meet Quality Criteria	
	Fleming et al. (2012)	Hayman (2014)	Obsuth et al. (2017)	Hyter et al. (2001)	Laugeson et al. (2014)
Targeted Skills	Emotion regulation: psycho-education, relaxation, problem solving, activity scheduling, challenging and replacing negative thinking, and social skills	Social skills, anger control	Communication skills: awareness and understanding of different styles, adjusting speech to partner and location, asking when comprehension difficulty, assertiveness, and non-verbal skills; anger management, handling conflicts, understanding alternatives, setting goals, strategies for self-improvement	Pragmatic skills of: 1. Describing 2. Giving directions 3. Providing personal opinions 4. Negotiating	Conversational skills, electronic forms of communication, appropriate use of humor, peer entry and exit strategies, resolving arguments, developing friendships, good host/guest behavior, good sportsmanship, strategies for handling: teasing, physical bullying, managing rumors and gossip, changing reputations

With regard to the actual intervention, all five studies included structured instruction of skills. Three of the five interventions (Hayman, 2014; Hyter et al., 2001; Laugeson et al., 2014) involved modeling and/or role-plays of targeted skills, two of which also included feedback from the interventionists about the role-plays. A fourth study (Fleming et al., 2012), a computer-based intervention, included experiential gameplay using skills taught in the game. Two of the interventions also included additional support for others not providing the intervention, training sessions for teachers (Obsuth et al., 2017) and parent psychoeducation (Laugeson et al., 2014). More complete information about intervention characteristics of the studies included in this review is presented in Tables 7 and 8 (Appendix H).

Four of the five studies were manualized or structured, while the fifth (Obsuth et al., 2017) was a combination of a structured intervention with some adaptation for individualization. All five studies were conducted in the school environment, though there was a range in size of intervention groups from whole special education classroom, to a combination of whole group and small group, to small group, to a combination of small group and individual, to individual. The length of intervention ranged from 5 weeks to 14 weeks, with the majority of the interventions being implemented twice a week. In the shortest intervention (Fleming et al., 2012), participants received intervention one to two times a week for a total of 7 sessions over five weeks. In the longest intervention (Laugeson et al., 2014), participants received intervention five times a week for a total of 70 sessions over 14 weeks. Four of the intervention sessions lasted for 30 minutes, while the fifth (Obsuth et al., 2017) was an hour for the group intervention and the authors did not report the length of the individual sessions. Each intervention was implemented by a different professional, summarized below.

	Met Quality Criteria			Did Not Meet Quality Criteria	
	Fleming et al. (2012)	Hayman (2014)	Obsuth et al. (2017)	Hyter et al. (2001)	Laugeson et al. (2014)
Intervention Delivered By:	Computer-based intervention	Researcher (Special education Ph.D. student)	Trained interventionists with support from trained communication specialists	SLP with support by special education teacher	Teacher, trained by researchers

Interprofessionalism in Interventions

Given the World Health Organization (2010) definition of collaborative practice including multiple people from different professional backgrounds working together to provide comprehensive services, the majority of the studies showed little evidence of interprofessionalism or collaborative teamwork, though there was a range demonstrated

(see Table 9, Appendix H). In the dissertation (Hayman, 2014), there did not appear to be any collaboration with other professions. In another study (Laugeson et al., 2014), though there was no evidence of teamwork in the intervention, researchers from the field of psychology created the curriculum and then trained classroom teachers who provided the intervention. In a computer-based intervention (Fleming et al., 2012), there was evidence of interdisciplinary work for the development of the intervention content, with clinical and academic experts getting advice from cultural advisors and working with a computer games company. For the two studies that presented with more evidence of collaboration between disciplines, one study (Obsuth et al., 2017) demonstrated teamwork in the development of material by interventionists and communication specialists, as well as the communication specialists providing support and training to teachers, while the other study (Hyter et al., 2001) demonstrated collaboration in having the SLP and special education classroom teacher work together to deliver the intervention.

Focus on Targeted Pragmatic Language Skills

Only one of the studies (Hyter et al., 2001) exclusively targeted pragmatic language as the main focus of the intervention. In the other four studies, pragmatic language skills were targeted as one aspect of a broader intervention. Table 10 (Appendix H) details the pragmatic language skills targeted by each intervention. Three of the interventions (Fleming et al., 2012; Laugeson et al., 2014; Obsuth et al., 2017) included conversational/interpersonal skills including listening, adjusting speech for the conversation partner and location, 2-way conversations, entering and leaving conversations, and when to interrupt appropriately. Three of the interventions (Fleming et al., 2012; Hyter et al., 2001; Laugeson et al., 2014) included negotiation skills or skills

for resolving arguments. Three (Fleming et al., 2012; Hayman, 2014; Obsuth et al., 2017) included assertive communication, such as skills to ask for explanations and how to make a complaint.

Measures Used

Across the five included studies, a wide variety of measures were used, with only one measure, the Social Skills Rating System, used by two studies (see Table 11, Appendix H for full list of measures by study). Only the one study (Hyter et al., 2001), with the sole target of improving pragmatic language ability, assessed pragmatic language skills. The two studies with the aims of improving depression and anxiety (Fleming et al., 2012) and aggression (Hayman, 2014) for the most part utilized emotional/behavioral measures with the former focusing on emotional measures and the latter focusing on aggression and anger. Hayman (2014) also administered one social measure. For emotional/behavioral measures, four of the five studies used norm-referenced measures, while the fifth (Obsuth et al., 2017) used only researcher-created measures, with a focus on school exclusion as the primary outcome. Only two studies performed follow-up assessment. Fleming et al. (2012) repeated their emotional/behavioral measures five weeks after the intervention was completed (intervention duration was 5 weeks). Obsuth et al. (2017) gathered data on the number of arrests of their participants four months post-treatment.

With regard to the administration of the measures, in four out of five studies this was done by the researcher. In the fifth study (Hyter et al., 2001), the person administering the measures was a speech-language pathologist (SLP) who provided the intervention and was part of the research team. In three of the five studies (Fleming et al.,

2012; Obsuth et al., 2017; Laugeson et al., 2014), the researchers were from the discipline of psychology. The dissertation (Hayman, 2014) was from the field of special education and the fifth study (Hyter et al., 2001) included people from both special education and speech-language pathology. In all five studies measures were completed by more than one person, though the combination of people was different in each study. In four studies (Hayman, 2014; Hyter et al., 2001; Laugeson et al., 2014; Obsuth et al., 2007) teachers completed measures. Three studies (Fleming et al., 2012; Laugeson et al., 2014; Obsuth et al., 2017) had student-completed measures. Three (Fleming et al., 2012; Hayman, 2014; Hyter et al., 2001) included measures completed by researchers. Only one study (Laugeson et al., 2014) included measures completed by parents. More complete information about measurement administration and completion in the studies is presented in Table 12 (Appendix H).

Results of Interventions Meeting Inclusion Criteria

Method of Analysis

A variety of statistical methods were used to analyze the results of the studies (see Table 13, Appendix H). Three of the five studies (Fleming et al., 2012; Hayman, 2014; Hyter et al., 2001) used paired t-tests for at least some of their analyses. This included two of the three pretest-posttest design studies, one of which also reported using visual analysis (Hayman, 2014). The other pretest-posttest design (Laugeson et al., 2014) used a generalized linear model and conversion to difference scores. Of the two RCTs, one (Fleming et al., 2012), in addition to paired t-tests, also reported using ANOVA, ANCOVA, and Fisher's Exact Test. The other RCT, Obsuth et al. (2017), used multilevel

logistic regression models, multilevel linear regression models, and single-level linear regression models.

Emotional/Behavioral Outcomes of Included Interventions

As stated previously, no two studies used the same outcome measures for emotional/behavioral outcomes. Of the three that met quality criteria, two of the three demonstrated outcomes of improvements in emotional/behavioral difficulties, including significant reductions in depressive symptoms (Fleming et al., 2012) and decreases in levels of physical and verbal aggression (Hayman, 2014). The third study (Obsuth et al., 2017) did not find any statistically significant differences in behavioral or disciplinary measures and is the only study that did not use any standardized measures for emotional and behavioral difficulties.

Of the two studies that did not meet quality criteria, one (Hyter et al., 2001) found no statistical difference in behavior after the intervention, while the other (Laugeson et al., 2014) reported a trend of parent-reported decreased social anxiety. Both of these studies reported that small sample size might have impacted these outcomes. The first (Hyter et al., 2001) had 6 participants, so while some participants demonstrated decreases in behavior, these decreases did not reach significance. The second (Laugeson et al., 2014) only had 23% of parents complete pretests and posttests about social anxiety. So again, while a difference was noted, it did not reach significance. More complete information about the emotional/behavioral outcomes of the studies included in this review are presented in Table 14 (Appendix H).

Pragmatic Language and Other Language Outcomes of Included Interventions

Hyter et al. (2001), which exclusively targeted improving pragmatic language as its aim, was the only study to measure pragmatic language ability (see Table 15, Appendix H). Results showed significant improvements on both formal and informal measures of pragmatic language skills, with noted improvements on the informal measure of skills in describing and giving directions. The participants also demonstrated improvements on a measure of global language development. One other study, Obsuth et al. (2017), while not measuring pragmatic language, did give a measure in communication skills. They found nonsignificant teacher-reported increases in communication skills compared to the control group.

Social Outcomes of Included Interventions

Two of the five studies reported social outcomes, one that met quality criteria and one that did not (see Table 16, Appendix H). The study meeting quality criteria (Hayman, 2014) reported nonsignificant increases on two different teacher-reported measures, one measuring social skills and the other prosocial skills. The other study (Laugeson et al., 2014), which was targeting social skills, reported on multiple measures of social skills. Results across a range of assessments show greater improvement as compared to an active treatment control group. Areas of improvement included: knowledge of social skills, frequency of social interactions and reciprocal social interactions, social awareness, social communication, social motivation, and social cognition. Teachers also noted decreased ASD mannerisms and symptoms relating to social responsiveness.

Chapter V

Discussion

The purpose of the current study was to systematically review and evaluate the literature of interventions targeting improving pragmatic language ability for children and adolescents and to assess their effectiveness in positively impacting internalizing and externalizing behaviors. After a thorough search of the literature, five studies met inclusion criteria as set out prior to the start of this review. The studies were further evaluated using quality assessment, with three studies meeting quality criteria. As there was a wide variety across the studies both meeting quality criteria and not, a discussion of all five studies is relevant to understanding the landscape of pragmatic language interventions with emotional and behavioral outcomes. To begin the discussion of the outcomes of this systematic review, I will review the characteristics of the interventions, comparing those that had positive versus no significant impacts on internalizing and externalizing behaviors.

Three studies (two of which met quality criteria) presented findings with positive impacts on emotional and/or behavioral outcomes. These outcomes included significant reductions in depressive symptoms, a trend of decreased social anxiety as reported by parents, and decreased levels of physical and verbal aggression (as reported through visual analysis). Of the two studies that did not demonstrate improvement in emotional and/or behavioral functioning, one had a sample size of 6, with four participants showing improvement in behavioral functioning. Compared to the sample sizes in the studies presented in the literature review, a sample size of six is very small and it is unclear whether with a larger study population the results might have reached significance for

positive impact of the intervention on the behavioral outcome. The other study that did not demonstrate improvement utilized three researcher-created measures, two of which there was no reported evidence regarding the soundness of their psychometric properties, with the third only providing information about internal consistency. This leaves open the possibility of different outcomes if standardized measures had been used.

Of the three studies with positive outcomes, all utilized manualized treatments with two cognitive-behaviorally based interventions (SPARX, Aggression Replacement Training) and a social skills curriculum (PEERS). Consistent with the literature investigating pragmatic language and emotional and behavioral functioning, there was wide variety in other characteristics of the studies including duration of the intervention, ranging from five to fourteen weeks, size of intervention group, including individual (computer-based), small group, and whole classroom, and age group of participants including elementary, middle, and high school.

As demonstrated in the literature review, weaknesses in pragmatic language are present throughout childhood and adolescence with corresponding negative outcomes and the range in age groups targeted reflects that intervention need. In addition, the variability in duration as well as size reflects how the intervention designs were targeted to meet different needs of the participants based on their disparate diagnostic presentations, contexts, and developmental levels. The two interventions with the longest duration were for populations diagnosed with ASD, while the shortest intervention was provided for students in an "at-risk" population, consistent with the research that those with ASD presentations are weakest in pragmatic language ability and likely will need more intervention. The intervention with the longest duration was provided as part of a

classroom curriculum within a school where the entire population was diagnosed with ASD and received some type of social skills curriculum. The middle range of duration was also provided to students within a school population with diagnoses of ASD, but to a particular subset also demonstrating physically and verbally aggressive behaviors, so that those receiving the intervention were pulled out from their regular classroom activities, potentially impacting the duration of the intervention. The shortest as well as individually and independently facilitated intervention was provided to behaviorally and emotionally at-risk students at the high school level. Developmentally, it may be more difficult to engage an adolescent in treatment, and a shorter time commitment as well as ability to engage independently might support greater buy-in from this age group.

The two interventions that did not report improvements in behavioral and emotional outcomes showed similar variability to the three discussed above. Though both interventions were structured, one used a specific, outlined intervention and the other manualized with some flexibility for individualizing based on areas of need. Though both were focused on communication skills, one specifically targeted pragmatic language. In terms of duration, one lasted eight weeks and the other twelve weeks. These interventions also varied in age of participants with one at the elementary school level and one at the high school level.

Notably, one difference between those that positively impacted emotional and behavioral outcomes and those that did not, was that the interventions that did not demonstrate significant emotional and behavioral change had hybrid designs with regard to size of intervention group with one intervention having one small group and one individual session per week and the other having one small group and one classroom

group session per week. Given the diagnostic presentations/school-contexts and developmental level of these students, this combination of intervention group size each week may have introduced another variable to the effectiveness of the intervention curricula. The intervention with one small group and one individual session was implemented at a high school, specifically aimed toward students at-risk for exclusion. Being pulled from class for both individual and group session, in a class where others are not being pulled, may highlight for peers the student's participation in an intervention and awareness of others in the small group about the student's difficulties, impacting engagement in the intervention. The other intervention with a combination of small group and full classroom sessions was implemented in an elementary classroom at a school specifically for those classified with an emotional and behavioral disorder. Both developmentally and with the EBD presentation, switching back and forth between group sizes/formats every other session could impact the participants' ability to manage anxieties and behaviors within the different contexts.

Across the five studies there were a number of commonalities. All interventions included in the review were school-based with four of the five conducted in schools with special populations, based on diagnosis/classification or discipline issues. As evidenced by a number of studies in the literature with school-based populations, schools are a rich resource for research with children and adolescents because of special education classifications of disorders including ASD and EBD as well as identification of behaviorally at-risk students, reflective of the study populations in these interventions. Given the focus of this review in looking at interventions targeting pragmatic/social language, school environments are also appropriate as they are the main social

environment for children and adolescents to be able to put new skills into practice. Though a fitting environment for child and adolescent research, it is also commendable that the researchers were able to implement the interventions in schools as there are often barriers including administration and logistics to accessing that population. Furthermore, two of the interventions not only were able to be presented in the school environment, but involved teachers in providing the interventions, while a third provided training to support teachers, signaling a higher level of partnership of the schools with the researchers. In contrast to a number of studies in the literature review including community samples, no studies that met inclusion criteria for this systematic review reflected environments outside of the schools.

Another commonality shared across the interventions was that all included structured didactics and all but one were completely structured or manualized, while the fifth was a combination of structured and adapted during individual sessions. Three of the interventions also included role-plays or modeling, while another was computer-based with experiential gameplay. As the culture of intervention research generally weighs manualized interventions as having greater value and ease for quality research, it is not surprising that the majority of these studies included published interventions. Given the nature of pragmatic skills acquisition as both including knowledge of skills and ability to apply them in context, it is appropriate that the structure of most of the interventions included both didactics and role-plays/gameplay or modeling.

A third commonality across the included studies was the apparent responsiveness of the researchers in implementing the interventions to the context of the various school

environments and their typical service delivery with regard to the number of times the intervention occurred during the school week. Three of the interventions occurred twice a week, with a fourth occurring one to two times a week. Within school systems, those receiving special education services such as counseling or speech-language services typically are met with one to two times a week as outlined in their individualized education programs (IEP). Thus, a dosage of twice a week for more intense focused interventions mirrors the convention of usual interventions/disruptions for treatment within the school context. The frequency of intervention sessions for the fifth study also took into account the specific school context, with five sessions a week replacing the school-wide social skills curriculum for participants in the intervention.

Remarkably, the four of the five studies which reported racial/ethnic backgrounds of participants reported diversity among the participants with at least three different backgrounds represented in each study. However, only one of those studies included any discussion or consideration of these backgrounds, including cultural advisors in the creation of the intervention for one particular background, an indigenous population. As pragmatic language is social and thus impacted by culture, it is important to consider culture in determining appropriate targeted skills, design of the intervention, and implementation.

Although the design and intention of this systematic review was to gather evidence across the broad range of diagnostic presentations included in the literature review with demonstrated evidence of weaknesses in pragmatic language skills, the results consisted of a more limited representation including ASD, EBD, and behaviorally and emotionally at-risk populations. As ASD is characterized by pragmatic difficulties, it

is not surprising that two of the interventions, both with positive outcomes, targeted that population.

Though there is evidence of a relationship between emotional and behavioral disorders and pragmatic deficits, only one intervention formally targeted this classified group, with the other two targeting behaviorally at-risk groups, one of which also presented with depressive symptoms. The one study exclusively targeting those with an EBD classification occurred in the United States almost twenty years ago. This lack of more, and more recent, studies in the United States may reflect a weakness in the culture of viewing behavioral issues as the primary difficulty for students without employing broader and interprofessional assessments of students exhibiting difficulties in schools to determine other potential factors in the child's presentation, despite substantial evidence as discussed in the literature that language deficits and behavioral and emotional difficulties frequently co-occur. This weakness may also be a factor in the glaring absence of interventions included in the results of this review for those with specific language impairment (SLI) and attention deficit-hyperactivity disorder (ADHD), despite the prevalence of these populations in the research connecting lower pragmatic skills and deficits in emotional and behavioral functioning. Interventions for these populations usually target the other areas of language impairment for the former and behavioral or executive functioning difficulties for the latter.

Interestingly, the two interventions targeting behaviorally at-risk students were conducted in New Zealand and the UK with high school-age populations. Both interventions were aimed at students either with a history of school exclusion or at-risk for school exclusions. These were the only two studies, both abroad and found to be

targeting that age group or presentation, potentially reflecting culturally different concerns and openness to intervention with adolescents.

Though the review did find interventions that targeted pragmatic language across grade levels, there were some differences in the types of skills targeted by level. These differences reflected an attention to the participants' level of social-emotional and cognitive development as well as to what pragmatic skills developmentally are needed as discussed in the literature review. For instance, the two studies at the elementary school level included skills such as making a complaint and expressing personal opinions. The study at the middle school level included a focus on 2-way conversation and resolving arguments. The two studies at the high school level specifically targeted assertive communication.

Despite each of the studies including some pragmatic language skills instruction and practice, only one of the five studies exclusively targeted pragmatic language skills as the focus of the intervention, while in the other four interventions, pragmatic language skills were taught within a broader intervention framework. This may speak to the larger issues as discussed in the literature review, first that there are multiple definitions for pragmatic language or social language and second that there is no clear agreement on the definition or terms used across disciplines. While ASHA defines pragmatic language as "functional and socially appropriate communication," it can also be thought of as language used to engage with others and to get needs met, emphasizing both relationship with others and context of the interaction. Thus, while pragmatic language skills include ability to take turns, offer descriptions, and provide step-by-step directions, there are also

higher level pragmatic language skills such as being able to express needs and emotions within a relational context.

This lack of clarity can impact discussion about pragmatic language among different fields as well as the design of interventions targeting this ability. The one study with a focus on pragmatic language was also the only study that included a speech-language pathologist. The lack of focus of interventions specifically targeting pragmatic language skills in other disciplines may also be a result of a lack of familiarity with pragmatic language as a relevant concern across particular diagnoses and developmental levels, highlighting the need for interprofessional collaboration at the training level and in practice.

Interprofessionalism in the Studies

Overall, there was not great evidence of interprofessionalism in the studies that met inclusion criteria, though there was some collaboration found in development, training, and delivery of various interventions. The five studies represented three disciplines of study, psychology (three studies, two of which had positive outcomes), special education (positive outcome), and speech-language pathology. The three interventions with positive results were developed by psychologists, one of which included collaboration with other professionals, cultural advisors and computer games experts for the development of the computer-based intervention. For implementation of these three interventions, one was provided and researched by someone in the field of special education, one was provided by special education classroom teachers trained by the researchers (psychologists), and the third was completed independently on the computer. It is not surprising that the interventions with positive emotional and

behavioral outcomes were developed by psychologists as these types of outcomes represent major areas of interest in the field of psychology. As these interventions were all school-based, it also follows that special educators would be likely service providers.

Examining the other two interventions, one was developed by speech-language pathologists (SLP) and the other by a nonprofit organization in conjunction with communication specialists. Delivery of the former intervention was by an SLP and special education classroom teacher working together, while the latter was delivered by trained interventionists with support from communication specialists. Aside from the special education teacher, who likely received some training in behavior management, neither of these interventions, either in development or implementation, appear to include someone trained in intervening specifically with emotional and behavioral issues, the outcomes of interest in this systematic review. This absence of expertise in these interventions likely is an important factor related to these interventions not significantly impacting emotional and behavioral outcomes.

Strengths and Limitations

One of the biggest strengths of this research is the use of the systematic review methodology, a predefined, explicit and rigorous search of the literature. While systematic reviews are more common in the medical field, the same methodology is useful to allied health professionals as well as to the field of education. This study demonstrates how systematic reviews can be utilized in the fields of psychology, speech-language pathology, and education to comprehensively evaluate research literature to support evidence-based practice.

A second strength of this study is the intentional design to cross discipline barriers as well as to attend to the presence of interprofessionalism in the interventions. This intentionality was carried through the entire study from seeking out research for the literature review that represented various applicable fields to choosing search terms that reflected different disciplines to seeking out a range of discipline-specific databases. This design allowed for not only a broader awareness of understanding of the research field, but also highlighted specific areas where interprofessional education and practice could be utilized.

The current study was limited by a small number of studies meeting inclusion/exclusion criteria. A larger data pool would likely allow for further understanding of what pragmatic interventions currently look like and their effectiveness. One reason for this small number was the *a priori* decision to exclude studies with participants with an IQ score of less than 85, which led to the exclusion of a number of studies from this review. A greater range of IQ would likely expand the evidence base from which to draw conclusions.

Another area of limitation is the lack of representation of diagnostic presentations and study environments in the included studies, affecting the ability to generalize the findings across other diagnoses and environments. Though there was this lack of representation in the studies, there was great diversity to the measures used with almost no overlap among the studies. This great diversity, particularly across a small number of studies, limited the ability to compare results across studies as well as to meaningfully combine the information or perform a meta-analysis. Additionally, as mentioned previously, as the majority of the interventions included the pragmatic language skills as

part of a larger intervention, it is difficult to interpret the results of these interventions as a consequence of the pragmatic skills targeted.

The process of completing the systematic review was also impacted by the large number of extraneous results gathered at level 1 of the screening process. This was complicated by the search term "pragmatic," which while having one definition for this review, describing a type of language, is also used in the literature as an adjective modifying types of studies. Were this review to be repeated in the future, additional search terms to help narrow down the initial results would be beneficial in decreasing the investment of time. Additionally, the coders for this study all represented mental and behavioral health fields, having less familiarity with the construct of pragmatic language. It would be beneficial for coders to reflect the diversity of disciplines represented in the study, including both speech-language pathologists and educators.

Implications

While there is some evidence presented in this systematic review of the positive impact of targeting pragmatic language skills on emotional and behavioral outcomes, a number of areas still need more clarification through research. As evidenced by only one study primarily targeting pragmatic language, more studies need to be done to clarify whether this area of intervention does reliably result in improvements in internalizing and externalizing behaviors. With pragmatic language skill and behaviors both of importance and within the expertise across a number of disciplines including psychology, speech-language pathology, and education, interprofessional research teams should be used in the creation and implementation of these types of interventions, allowing for collaboration of knowledge and skill. This collaboration is also recommended to better

clarify a working definition of pragmatic language skills that can be shared across disciplines.

With regard to study populations, it would be beneficial to implement this research with populations including those diagnosed with ADHD, conduct disorder, anxiety, and depression, as well as further research of those classified with EBD, as these presentations are most in need of intervention with positive emotional and behavioral outcomes. Interventions should also be researched across the developmental levels as all are impacted by deficits in pragmatic language. These studies should utilize norm-referenced measures for these outcomes for clearer understanding of which constructs are being impacted as well as valid and reliable results. Studies with a large enough participant size to reach statistical significance are also recommended for clarity of outcomes. Additionally, as children and adolescents are seen for treatment in other environments in addition to school, studies in those environments are also important for understanding the effectiveness of this type of intervention. Lastly, it will be important for this type of systematic review to be updated in the future after more interventions following these recommendations are implemented.

While interprofessional collaboration is essential for research of this type of intervention, interprofessionalism is also critical for the training and practice of professionals working with children and adolescents in general, but also specifically for this topic. Prior to working in the field, students in psychology/counseling/social work, speech-language pathology, and education need to be aware not only of their own specialty content, but also what knowledge and skills the other disciplines have, learning what is shared and aligned and what can be learned from the other. Furthermore, they

need to have practical pre-service experience as part of their education, learning to work collaboratively with each other. These pre-services experiences have been shown to be beneficial for both undergraduate and graduate level students in increasing competencies in interprofessional collaboration (Coiro & Preis, 2018; McGuire et al., 2020). Through awareness and practice of interprofessional collaboration, students will be more prepared to engage in this type of collaboration once they are out in the field.

In implementation and practice, interprofessional collaboration is also essential with each discipline bringing expertise about assessment, development, language development, language intervention, relational contexts, and emotional and behavioral functioning to better understand the current functioning and needs of each child or adolescent, leading to the likelihood of a more effective intervention. To support this type of collaboration, professionals need access to in-service interprofessional training. This can be difficult to achieve as each discipline often has discipline-specific trainings as a result of continuing education requirements for their fields. It would benefit both professionals and children and adolescents if interprofessional training was accepted as continuing education.

Given the results of this systematic review and these recommendations, a high quality study exploring the impact of a pragmatic language intervention would incorporate an interprofessional team to create, implement, and assess the intervention. This team would include members from speech-language pathology, psychology, and education, as well as collaborating with parents and children/adolescents to better determine perceived areas of weakness and areas of interest for targeting pragmatic intervention, while also reflecting on cultural considerations. The curriculum of the

intervention would be grounded in a shared conceptualization of pragmatic language reflecting the functional aspects including getting physical and social/emotional needs met as well as the relational context of this type of communication. Similar to the studies in this review, the intervention would include both didactic and experiential/role-play pieces to practice learned skills.

Ideally, there would be a sufficiently large number of participants without intellectual disability, divided into three age groups: 2nd-4th grade, 6th-8th grade, and 10th-12th grade. The intervention would be designed to be adapted for developmental level of the participants and would meet twice a week for eight weeks, about the length of a typical academic quarter. Each of those grade level groups would be further divided into five groups based on diagnostic presentation including ASD, ADHD, anxiety, depression, and EBD or conduct disorder. Each of those groups would then be divided into two groups of 8-10, such that a complete set of groups could participate in a school-based intervention and the other complete set could be conducted at an outpatient clinic. Outcomes would be measured using norm-referenced measures. In order to gain data not only about the desired areas of outcomes, but also to determine whether pragmatic language skill had improved through intervention, those measures would include social-emotional, behavioral, and pragmatic language assessments. The choice of which measures to best use for these outcomes should be decided by the interprofessional team members collaboratively.

This systematic review has highlighted an area of limited research in the field, exploring the impact of pragmatic language interventions on emotional and behavioral outcomes. The results of this study suggest that these types of interventions may result in

positive outcomes across a number of diagnostic presentations and age groups and that

further research will help clarify this relationship. This review also calls attention to a

lack of interprofessional practice in the creation and implementation of these

interventions and recommendations are made for interprofessional education and

practice. Finally, though systematic reviews are not as prevalent in the fields of

psychology, education, and speech-language pathology, this study demonstrates the

importance of this methodology for reviewing research about a particular topic to better

assess evidence-based practice and should be introduced to students during their training.

Appendix A

Table 1:

Database Search Results

Database	Date of Search	Number of Records Retrieved
PsycINFO	11/12/19	1750
PsycExtra	11/11/19	23
ERIC	11/7/19	305
Education Research Complete	11/13/19	346
ComDisDome	11/9/19	968
Linguistics and Language Behavior Abstracts	11/9/19	3705
Scopus	11/10/19	1488
PubMed	11/10/19	1987
Social Work Abstracts	11/13/19	5
Child Development and Adolescent Studies	11/13/19	168
Soc Index	11/10/19	107
Hand Search of: Journal of Research in Interprofessional Practice and Education Journal of Interprofessional Education and Practice	11/14/19, 11/18/19	1

Appendix B

Pragmatic Intervention Screening Form:

Level 1: Title and Abstract Review
Level 2: Methods Section Review
Level 3: Full-text Review

Inclusion/Exclusion Criteria:	Comments:

1. Is it research? (non-research includes grant applications, book reviews, study protocols, chapter reviews)
  a. Yes
  b. No [exclude]
  c. Can't tell	

2. Is it a journal article or dissertation/thesis?
  a. Yes
  b. No [exclude]
  c. Can't tell	

3. Is it an intervention?
  a. Yes
  b. No [exclude]
  c. Can't tell	

4. Is there a pragmatic language component to the intervention?
  a. Yes
  b. No [exclude]
  c. Can't tell	

5. Is the only intervention pharmaceutical?
  a. Yes [exclude]
  b. No
  c. Can't tell	

6. Is the only intervention used the Picture Exchange Communication System (PECS)?
  a. Yes [exclude]
  b. No
  c. Can't tell	

7. Does the study include either a behavioral or emotional outcome measure?
    a. Yes
    b. No [exclude]
    c. Can't tell	

8. Is this a case study?
    a. Yes [exclude]
    b. No
    c. Can't tell	

9. Are participants within the age range of 4-19?
    a. Yes
    b. No (all participants <4 or >19) [exclude]
    c. Can't tell	

10. Is the intervention provided to the child/adolescent?
    a. Yes
    b. No [exclude]
    c. Can't tell	

11. Is the study published in English?
    a. Yes
    b. No [exclude]
    c. Can't tell	

12. Do **all** participants have an IQ <85?
    a. Yes [exclude]
    b. No
    c. Can't tell	

13. Are **all** participants diagnosed with other medical conditions or developmental disabilities (ex. TBI, Noonan's disease, neurofibromatosis type 1, fragile x, Down syndrome, epilepsy)?
    a. Yes [exclude]
    b. No
    c. Can't tell	

14. Are **all** participants diagnosed with a learning disability?
    a. Yes [exclude]
    b. No
    c. Can't tell	

15. Do **all** participants present with nonverbal or minimally verbal ASD?
  a. Yes [exclude]
  b. No
  c. Can't tell	

16. Is the study clear about what diagnostic presentations are included (may include at-risk if identified as at-risk)?
  a. Yes
  b. No [exclude]
  c. Can't tell	

17. Does the study have either a control or comparison group or pre-post measures?
  a. Yes
  b. No [exclude]
  c. Can't tell	

18. Are all interventions provided in the participant's first language?
  a. Yes
  b. No [exclude]
  c. Can't tell	

19. Are only qualitative measures used?
  a. Yes [exclude]
  b. No
  c. Can't tell	

20. Other (Results presented individually)
  a. Yes [exclude]
  b. No
  c. Can't tell	

Decision:

Include

Exclude @Title and Abstract (Level 1)

Exclude @Methods Section (Level 2)

Exclude @Full-Text (Level 3)

Appendix C

Table 2:

Full-text Review: Reasons for Exclusion

Reason for Exclusion	Number of Records Excluded
No pragmatic language component in the intervention	9
No behavioral or emotional outcome measure	11
Intervention provided to someone other than the child/adolescent	1
Included those with IQ<85	20
Included those with learning disabilities	1
Qualitative only measures	1
Included participants <4 or >19	11
No control/comparison group or pre-post measures	1
Other: results presented individually	2

Appendix D

Pragmatic Intervention Data Form:

Level 4: Data Extraction

Study Characteristics

Search Source
  a. Journal-Psychology/Counseling/Social Work
  b. Journal-Communication, Speech, Language
  c. Journal-Education
  d. Journal-Interprofessional
  e. Doctoral Dissertation
  f. Master Thesis
  g. Other: Please Specify
	search specify:

Location of Study
  a. USA: Specify State
  b. Outside of USA: Specify Location
	location specify:

Objective/Aim of Study	
Study Design	

Participant Characteristics

Recruitment Pool a. Community Sample b. Clinical Sample c. School-based d. Referral e. Combination: Please Specify f. Other: Please Specify	*recruitment specify:*
Race/Ethnicity a. Not Reported b. White/Caucasian c. Hispanic/Latino d. African American e. Asian f. American Indian g. Multiple: Please Specify h. Other: Please Specify	*race/ethnicity specify:*
Grade Level a. Preschool b. Elementary c. Middle d. High School	*grade specify:*

Tx Group Mean Age	Tx Group Male Mean Age	Tx Group Female Mean Age	Tx Group Percent Male	*Comments:*
Comparison/ Control Group Mean Age	Comparison /Control Group Male Mean Age	Comparison/ Control Group Female Mean Age	Comparison/ Control Group Percent Male	*Comparison/ Control Comments:*

Tx Group Pre n	Tx Group Post n	P-P Attrition %	Follow-up n	Follow-up Attrition %	*Comments:*
Comparison/ Control Group Pre n	Comparison/ Control Group Post n	Comparison/ Control P-P Attrition %	Comparison /Control Follow-up n	Comparison/ Control Follow-up Attrition %	*Comparison/ Control Comments:*

Diagnosis/SPED Classification	*dx specify:*
a. ED/EBD/EB/D b. Oppositional Defiant Disorder (ODD) c. Conduct Disorder (CD) d. Attention Deficit Hyperactivity Disorder (ADHD) e. Generalized Anxiety Disorder f. Major Depressive Disorder/Persistent Depressive Disorder (Dysthymia) g. Disruptive Mood Dysregulation Disorder (DMDD) h. Autism Spectrum Disorder (ASD)/ Pervasive Developmental Disorders (PDD) i. At-Risk j. Multiple: Please Specify k. Other: Please Specify	

Intervention Characteristics

Focus of Intervention a. Behavioral Difficulties b. Speech Difficulties c. Emotional Difficulties d. Social Interactions e. Multiple: Please Specify f. Other: Please Specify	*Focus Specify:*
Targeted Skills a. Pragmatic b. Language (not pragmatic) c. Social d. Emotion Regulation e. Other: Please Specify	*Skills Specify/ Comments:*
Type of Intervention a. Manualized/Structured b. Adaptive/Personalized c. Combination of structured and adapted d. Other: Please Specify	*Intervention Comments:*
Brief Description of Intervention (ex. Role-play, peer modeling, instruction)	

Study Environment
  a. School-based
  b. Outpatient Clinic
  c. University-based Clinic
  d. Community-based
  e. Combination: Please Specify
  f. Home
  g. Hospital
  h. Other: Please Specify
	Environment Specify:

Structure of Session
  a. Individual (in the classroom)
  b. Individual (out of the classroom)
  c. Small group (in the classroom)
  d. Small group (out of the classroom)
  e. Classroom (Special Education)
  f. Classroom (General Education)
  g. Other: Please Specify
	Structure Specify:

Total Length of Intervention	Total # of Intervention Sessions

Frequency of Intervention
  a. 1x a week
  b. 2x a week
  c. Other: Please Specify
	Frequency Specify:

Length of Intervention Session
  a. 30 min
  b. 45 min
  c. 1 hour
  d. 1.5 hour
  e. Other: Please Specify
	Length Specify:

<u>Who Delivered the Intervention?</u> a. Speech-Language Pathologist (SLP)/SLP trainee b. Mental Health Professional (Counselor/Psychologist/Social Worker/trainee) c. Parent d. Teacher e. Researcher f. Multiple: Please Specify g. Other: Please Specify	*Interventionist Specify:*
<u>Did all Service Providers Deliver the Same Intervention?</u> a. Yes b. No: Please Specify/Describe	*Provider Specify:*
<u>What Model of Teamwork across Disciplines was Used?</u> * a. None Present b. Interprofessional c. Interdisciplinary d. Multidisciplinary e. Transdisciplinary f. Other/Unclear: Please Specify	*Teamwork Specify:*
<u>Fidelity</u> (Intervention implemented as described): a. Yes b. No	*Fidelity Specify:* (attempt to assess fidelity)

*b. Interprofessional-practitioners from different professional backgrounds sharing knowledge, skills, and responsibilities on an ongoing basis in order to provide comprehensive services, working with clients, their families, and communities to deliver treatment

c. Interdisciplinary- coordination of services, practitioners from different backgrounds perform assessments and interventions independently, though develop goals together and frequently communicate

d. Multidisciplinary-no intentional coordination of services, practitioners independently use professional background to address clients' needs

e. Transdisciplinary- practitioners from different professional backgrounds work together throughout to assess and provide services to the client

Measures

PRE: Pragmatic Language Measures:	POST: Pragmatic Language Measures:
PRE: Emotional/Behavioral Measures:	POST: Emotional/Behavioral Measures:
PRE: Social Measures:	POST: Social Measures:
Follow-up Measures: Specify When Given and What Measures	

Types of Measures Used
  a. Norm-referenced
  b. Observations
  c. Researcher created
  d. Classroom-based
  e. Multiple: Please specify
  f. Other: Please specify
	Types Specify:

Who Administered the Measures?
  a. SLP
  b. Mental Health Professional
  c. Researcher
  d. Multiple: Please Specify
  e. Other: Please Specify
	Administered specify:

Who Completed the Measures?
  a. Parent
  b. Teacher
  c. SLP
  d. Mental Health Professional
  e. Self-reported
  f. Multiple: Please Specify
  g. Other: Please Specify
	Completed specify:

Was the Person Completing the Measures Blinded?
  a. Yes
  b. No	

Results

Method of Analysis
Emotional/Behavioral Outcomes
Pragmatic Language Outcomes
Social Outcomes

Appendix E

Coder Training Materials

   I.   Overview of Systematic Review and Dissertation Topic, Defining Pragmatic
         Language
  II.   Overview of Inclusion/Exclusion Criteria and Coding Categories
 III.   Title and Abstract Review Coding (Level 1)
 IV.   Methods Section Review (Level 2)
  V.   Full-Text Review (Level 3)
 VI.   ICROMS Quality Screening
VII.   Data Extraction (Level 4)

   I.   Overview of Systematic Review and Dissertation Topic

A systematic review is a predefined, explicit, and rigorous search of the literature to identify, select, and critically evaluate research and to gather and analyze data in response to a specific research question.

- Predefined databases and search criteria chosen based on research question.
- Predefined inclusion and exclusion criteria chosen to specify the boundaries of the research including types of study designs, participants, interventions, outcomes, and data.
- Predefined areas of interest for coding in response to research question.

PRISMA Flow Diagram
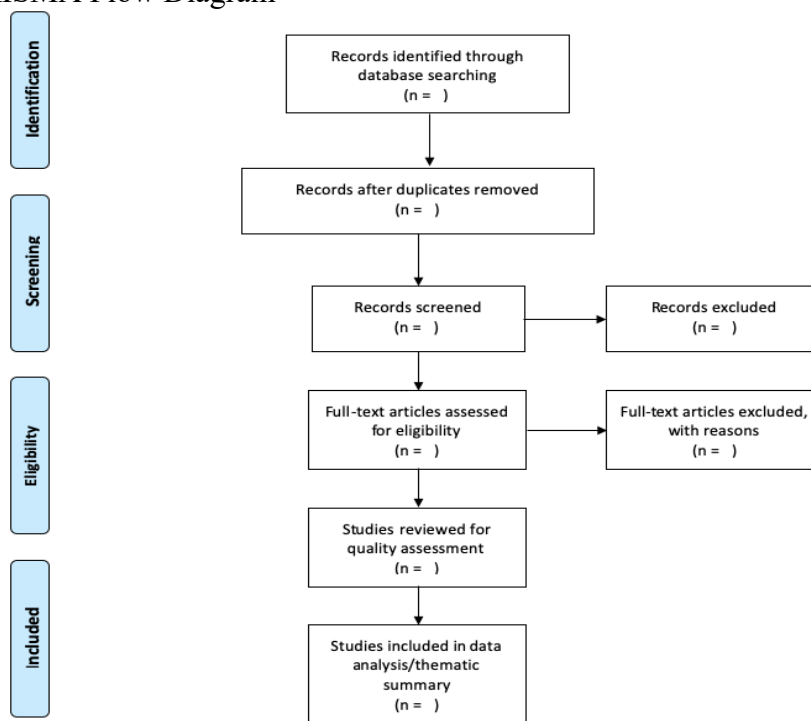
Dissertation Topic/Research Question(s):
- Do interventions that target pragmatic language positively impact emotional and behavioral outcomes in children and adolescents?
    - If effective, what characteristics make them effective?
    - Are there any commonalities of interventions across diagnostic presentations?
    - Is there presence of interprofessional practice in the creation or implementation of interventions?

Defining Pragmatic Language/Competence:
- ASHA definition of pragmatic language: "functional and socially appropriate communication" (American Speech-Language-Hearing Association, 1993)
- Pragmatic competence: "the ability to appropriately and effectively use language in social contexts" (Russell & Grizzle, 2008)
- Pragmatic Language Skills include:
    - Using language for different reasons:
        - Greeting
        - Informing
        - Demanding
        - Promising
        - Requesting
    - Changing language for the listener or situation
    - Conversation skills such as:
        - Initiating/ending conversations
        - Letting others know the topic of conversation
        - Repairing misunderstandings
        (https://www.asha.org/public/speech/development/Pragmatics.htm)

II.   Overview of Inclusion/Exclusion Criteria and Coding Categories

Inclusion/Exclusion Criteria
- <u>Must</u> include pragmatic language component to intervention
    - Cannot be pharmaceutical only
    - Cannot be Picture Exchange Communication Systems (PECS) only
- <u>Must</u> include either a behavioral or emotional functioning outcome measure
- <u>Must</u> include participants within the age range of 4-19
- <u>Must</u> include control/comparison group or pre-post measures
- Intervention <u>must</u> be provided to child/adolescent
- Intervention <u>must</u> be provided in participants' first language
- <u>Must</u> include clear diagnostic presentations (may include at-risk)
- <u>Must</u> be published in English

- <u>Cannot</u> be case study/single subject
- <u>Cannot</u> be only qualitative measures
- <u>Cannot</u> only include participants with an IQ <85
- <u>Cannot</u> only include participants diagnosed with learning disabilities
- <u>Cannot</u> only include participants diagnosed with other medical conditions or developmental disabilities (e.g. TBI, Noonan's disease, neurofibromatosis type 1, fragile x, Down syndrome, epilepsy)
- <u>Cannot</u> only include participants presenting with nonverbal/minimally verbal ASD

Coding Categories:
- Study Characteristics
- Participant Characteristics
- Intervention Characteristics
  - Including presence of interprofessional practice
- Measures
- Results

Pragmatic Language Interventions Considerations:
- Including a focus on language use in social interactions
- Not just social skills training, unless there is some focus on utilizing language for social skills (i.e. not just a focus on teaching sharing, but would be pragmatic language if teaching skills of using language to negotiate sharing)
- Not just increasing awareness of own and others' thoughts and feelings, but ability to communicate about these.

III. Title and abstract review coding (Level 1)

Using the inclusion and exclusion criteria, titles and abstracts identified through the database search are reviewed. Any that clearly do not meet criteria are excluded. Any records where it is not clear just by reading the title and abstract are moved on to the next level of review.

IV. Methods Section (Level 2)

Records that were unclear during level 1 review are reviewed by reading the methods section and using the same inclusion and exclusion criteria. Any records that clearly do not meet criteria are excluded. Any records where it is not clear just by reading the methods section are moved on to the next level of review.

V. Full-Text Review (Level 3)

Records that were unclear during level 2 review are reviewed by reading the full-text and using the same inclusion and exclusion criteria. Any records that do not

meet criteria are excluded. All other records are included and move on to quality review.

VI.   ICROMS Quality Screening

Records that are judged to be included in the study are reviewed for quality using the ICROMS tool. Seven dimensions are used for this assessment including clear aims and justification, managing bias in sampling or between groups, managing bias in outcome measurements and blinding, managing bias in follow-up, managing bias in other study aspects, analytical rigor, and managing bias in reporting/ethical considerations.

VII.   Data Extraction (Level 4)

Relevant data from included studies are extracted to prepare for analysis. Clear guidelines as to the specific data to be extracted are outlined in the Pragmatic Intervention Data Form. Data includes study characteristics, participant characteristics, intervention characteristics, measures used, and results.

Appendix F

Coding Consensus Process

I.   Level 1: Title and Abstract Screening
Coders were trained individually or in a group of two. Training included reviewing 3-5 titles and abstracts together with inclusion/exclusion criteria. The trainer and coders checked in periodically throughout this level to discuss questions and any needed clarifications. Guidance to coders included determining if the abstract was research and if it was an intervention. Other additional guidance included a glossary of terms about second language research to help coders understand some abstracts.

Level 1 Consensus:
Of 7,368 records, coders agreed on 7,165, achieving 97% consensus. Coders were provided a list of titles and abstracts where consensus was not reached and asked to review their decisions. Double-coders met in pairs to discuss those records in order to reach consensus. Coders were able to reach consensus on 202 records and a third coder was used to make a decision on 1 record.

II.   Level 2: Method Section Screening
Coders were trained both individually and in a group. Training included reviewing 2 method sections individually with the trainer and 4 together as a group. Each coder then completed 2 rounds of 10 method sections. Each round was reviewed by the trainer with additional feedback and clarification. If after two rounds the coder reached 80% agreement, the coder then completed level 2 coding independently. Any coder not reaching 80% agreement after the second round of 10 completed a third round of 10 records to review with the trainer. No coders needed a third round of 10.

Level 2 Consensus:
Of the 317 records at level 2, excluding those used for training, coders achieved 88% consensus. Coders were provided a list of records where consensus was not reached based on reviewing the method sections and asked to review their decisions. Double-coders met in pairs to discuss those records in order to reach consensus. Consensus was reached without the need for a third coder.

III.   Level 3: Full-text Review
No full-text training was provided unless by request of a coder as coders were more familiar with the nature and topic of the study. One coder requested to review one full-text record with the trainer.

Level 3 Consensus:
Of the 62 records reviewed at the full-text level, coders achieved 87% consensus. Double-coders met in pairs to discuss the 8 records where consensus was not

reached. Consensus was reached without the need for a third coder, resulting in 5 studies which met inclusion/exclusion criteria.

IV. Level 4: Data Extraction and ICROMS Quality Assessment
Coders were trained as a group in data extraction and utilizing the ICROMS tool. The trainer provided and reviewed the Pragmatic Intervention Data Form (Appendix D) as well as the excel spreadsheet to record the data. The ICROMS assessment tool was also reviewed.

Level 4 Consensus:
Double-coders met in pairs to review scores on the ICROMS assessment. Any discrepancies in scoring were discussed, reaching agreement on final scores. Extracted data from each study were reviewed to ensure that accurate data was reported from the included studies.

The study design of one study (Hyter et al., 2001) did not completely reflect those available in the ICROMS tool, which included randomized controlled trial, controlled before-after, controlled interrupted time series, cohort study, non-controlled interrupted time series, non-controlled before-after, and qualitative. As Hyter et al. (2001), a pretest-posttest correlated design not including a comparison group, most closely met the criteria for non-controlled before-after, the two coders agreed to adapt the non-controlled before-after criteria to assess the quality of study, with one adaptation needed.

Criteria	Criterion Question
	1B. Did the authors conduct a baseline measurement to protect against selection bias?
Yes	• Baseline assessment conducted prior to intervention and no substantial differences between pre- and post-intervention group measures; OR • Baseline assessment of outcome measures conducted prior to intervention and any differences between intervention groups unlikely to undermine intervention effect and/or adequately addressed in analysis and/or conclusions; OR • Baseline assessment conducted prior to intervention and attempts made to control for differences between intervention groups or addressed in analysis and/or conclusions
No	• No baseline assessment conducted; OR • Baseline assessment conducted prior to intervention and substantial differences between pre-intervention and post-intervention group, which were likely to undermine intervention effect with inadequate attempts to address these issues in analysis/ conclusions
Unclear	• Baseline measures not reported; OR • Unclear whether baseline measures are substantially different across study groups
Unclear Adaptation	• Baseline assessment conducted prior to intervention with a single intervention group design (no comparison group)

Appendix G

ICROMS Quality Assessment Data

Table 3:

Summary of ICROMS Data of Included Studies

Study	Study Design*	Score	Meets Quality Criteria
Fleming et al. (2012)	RCT	30	Yes
Hayman (2014)	NCBA	23	Yes
Hyter et al. (2001)	NCBA**	18	No
Laugeson et al. (2014)	NCBA	21	No
Obsuth et al. (2017)	RCT	23	Yes

* RCT=Randomized controlled trial, NCBA=Non-controlled before-after
**Adapted NCBA criteria

Table 4:

Individual ICROMS Data for Included Studies

Study:	Met Quality Criteria*			Did Not Meet Quality Criteria*	
	Fleming et al. (2012)	Hayman (2014)	Obsuth et al. (2017)	Hyter et al. (2001)	Laugeson et al. (2014)
Study Design**	RCT	NCBA	RCT	NCBA***	NCBA
Specific Criteria	1. Clear Aims and Justification				
A. Clear Statement of the aims of the research?	2	2	2	1	2
B. Rationale for number of pre-and post-intervention points or adequate baseline measurement	N/A	2	N/A	1	1
C. Explanation for lack of control group	N/A	0	N/A	0	2
	2. Managing bias in sampling or between groups				
A. Sequence Generation	2	N/A	2	N/A	N/A
B. Allocation Concealment	2	N/A	2	N/A	N/A
C. Justification for sample choice	N/A	2	N/A	0	2
	3. Managing bias in outcome measurements and blinding				
A. Blinding	2	N/A	0	N/A	N/A
E. Protection against detection bias: Blinded assessment of primary outcome measures	2	1	0	0	2
F. Reliable primary outcome measures	1	2	1	2	2
	4. Managing bias in follow-up				
A. Follow-up of subjects (protection against exclusion bias)	2	N/A	1	N/A	N/A
B. Follow-up of patients or episodes of care	2	N/A	1	N/A	N/A
C. Incomplete outcome data addressed	2	2	2	2	1

Study:	Met Quality Criteria*			Did Not Meet Quality Criteria*	
	Fleming et al. (2012)	Hayman (2014)	Obsuth et al. (2017)	Hyter et al. (2001)	Laugeson et al. (2014)
Study Design**	RCT	NCBA	RCT	NCBA***	NCBA
Specific Criteria	5. Managing bias in other study aspects				
A. Protection against detection bias: Intervention unlikely to affect data	1	2	1	2	2
D. Attempts to mitigate effects of no control	N/A	0	N/A	1	1
	6. Analytical rigor				
C. Analysis sufficiently rigorous/free from bias	2	2	2	2	1
	7. Managing bias in reporting/Ethical Considerations				
A. Free of selective outcome reporting	2	1	2	2	0
B. Limitations addressed	2	2	2	2	2
C. Conclusions clear and justified	2	2	2	2	1
D. Free of other bias	2	1	1	1	0
E. Ethics issues addressed	2	2	2	0	2
Total Score:	30	23	23	18	21
Minimum Score Needed:	22	22	22	22	22

*Scores applicable to each criterion: Yes (criterion met) = 2 points, Unclear (unclear whether or not the criterion was met) = 1 point, No (criterion not met) = 0 points.

** RCT=Randomized controlled trial, NCBA=Non-controlled before-after

***Adapted criteria for NCBA

Appendix H

Study Data

Table 5:

Study Characteristics

	Met Quality Criteria			Did Not Meet Quality Criteria	
	Fleming et al. (2012)	Hayman (2014)	Obsuth et al. (2017)	Hyter et al. (2001)	Laugeson et al. (2014)
Search Source	Behavioural and Cognitive Psychotherapy	Dissertation: The University of Toledo	Journal of Youth & Adolescence	Communication Disorders Quarterly	Journal of Autism and Developmental Disorders
Location of Study	New Zealand	USA: Ohio	London, UK	USA: Midwestern state	USA: California
Aim of Study	To investigate whether SPARX reduced symptoms of depression, anxiety, and hopelessness and improved quality of life and locus of control scores	To study the effectiveness of ART as an appropriate intervention in decreasing aggression in elementary students with ASD	To evaluate an intervention aimed at reducing fixed-period school exclusion	To investigate the findings of a pragmatic, classroom-based intervention for children with E/BD	To test the effectiveness of PEERS, a manualized, school-based, teacher-facilitated, social skills intervention for adolescents with ASD without intellectual disabilities
Study Design	Immediate vs. delayed intervention randomized controlled trial	Pretest-Posttest multiple baseline design across groups of subjects	Cluster-randomized controlled trial	Pretest-posttest correlated design	Pretest-Posttest assessment with active control receiving a different treatment

Table 6:

Participant Characteristics

	Met Quality Criteria			Did Not Meet Quality Criteria	
	Fleming et al. (2012)	Hayman (2014)	Obsuth et al. (2017)	Hyter et al. (2001)	Laugeson et al. (2014)
Recruitment Pool	Three alternative education schools, an educational program for students at risk of exclusion, and a transition program for those who have aged out of alt ed	School-based, school for children with autism	School-based, Secondary schools with a free school meal eligibility rate ≥28%	School-based, a specialized education facility for children with E/BD	School-based, nonpublic middle school for students with ASD without intellectual disabilities
Race/ Ethnicity	38% Pacific Islander, 34% Maori, 25% New Zealand European, 1 other	6 Caucasian, 2 African American, 1 Hispanic	30% British European, 5.7% Other European, 36% Black, 2% Asian, 10.3% South Asian, 1.3% Latin American, 9.7% Mixed race, 5% Missing	Not Reported	64% Caucasian, 14% Hispanic/ Latino, 5% African American, 4 % Asian American, 4 % Middle Eastern, 4% unknown
Grade Level	High School	Elementary	High School	Elementary	Middle
Treatment Group Mean Age	14.9	Not Reported, Range = 7-11	14.05 (male) 13.98 (female)	Not Reported, Range = 8:6-12:11	12.68
Treatment % Male	56%	100%	65.3%	100%	92.1%
Treatment N	20	9	300	6	40
Diagnosis/ SPED Classification	At-risk for major behavioral difficulties, history of school exclusions and scoring over 70th percentile of depressive symptoms	ASD diagnosis and ≥ 2 documented incidents of verbal or physical aggression per month	At-risk for exclusions	Classified E/BD	Autistic disorder, Asperger's disorder or Pervasive Disorder-NOS

Table 7:

Intervention Characteristics: Focus and Description

	Met Quality Criteria			Did Not Meet Quality Criteria	
	Fleming et al. (2012)	Hayman (2014)	Obsuth et al. (2017)	Hyter et al. (2001)	Laugeson et al. (2014)
Focus of Intervention	Symptoms of depression	Social, behavioral, and emotional difficulties	Behaviors leading to school exclusions	Developing communicative competence	Social Interactions
Targeted Skills	Emotion regulation: psycho-education, relaxation, problem solving, activity scheduling, challenging and replacing negative thinking, and social skills	Social skills, anger control	Communication skills: awareness and understanding of different styles, adjusting speech to partner and location, asking when comprehension difficulty, assertiveness, and non-verbal skills; anger management, handling conflicts, understanding alternatives, setting goals, strategies for self-improvement	Pragmatic skills of: 1. Describing 2. Giving directions 3. Providing personal opinions 4. Negotiating	Conversational skills, electronic forms of communication, appropriate use of humor, peer entry and exit strategies, resolving arguments, developing friendships, good host/guest behavior, good sportsmanship, strategies for handling: teasing, physical bullying, managing rumors and gossip, changing reputations
Brief Description of Intervention	Computer-based CBT program with direct instruction and experiential gameplay. Character in game world uses skills from a "shield against depression."	Modeling and role-play of scenarios with feedback to identify triggers, recognize anger patterns, replace aggressive and negative behaviors with positive communication and social skills.	Combination of group sessions with structured curriculum and individual sessions with greater flexibility focusing on interpersonal skills. Support for teaching staff through training sessions.	Four pragmatic skill topics were covered with 4 lessons for each area. Lessons included an introduction of the activity to the participants, oral and written step-by-step instructions of the activity, and a role-played model of the desired communication.	Didactic instruction, role-play demonstrations of targeted skills, skill rehearsal with feedback, socialization homework for generalization of skills, parent psychoeducation about skills

Table 8:

Intervention Characteristics: Structure

	Met Quality Criteria			Did Not Meet Quality Criteria	
	Fleming et al. (2012)	Hayman (2014)	Obsuth et al. (2017)	Hyter et al. (2001)	Laugeson et al. (2014)
Type of Intervention	Manualized/ Structured	Manualized/ Structured	Combination of structured and adapted	Manualized/ Structured	Manualized/ Structured
Study Environment	School-based, modules completed with minimal supervision	School-based	School-based	School-based	School-based
Structure of Session	Individual (in the classroom)	Small group (out of the classroom), groups of 3	Small group and individual	Classroom (special education), small and whole group	Classroom (special education)
Length of Intervention	5 weeks	10 weeks	12 weeks	8 weeks	14 weeks
Total # of Intervention Sessions	7-modules	20	24 (12 group and 12 individual)	16	70
Frequency of Intervention	1-2x/week	2x/week	2x/week (1 group, 1 individual)	2x/week	5x/week
Length of Intervention Session	30 minutes	30 minutes	1 hour for group, individual not reported	30 minutes	30 minutes
Intervention Delivered By:	Computer-based intervention	Researcher (Special education Ph.D. student)	Trained interventionists with support from trained communication specialists	SLP with support by special education teacher	Teacher, trained by researchers

Table 9:

Intervention Characteristics: Model of Teamwork

Study	Model of Teamwork
Included Studies that Met ICROMS Quality Criteria	
Fleming et al. (2012)	Unclear Model: Some interdisciplinary work for development of intervention content, with clinical and academic experts, computer games company, and advice from cultural advisors.
Hayman (2014)	None present
Obsuth et al. (2017)	Interdisciplinary: Material for group sessions developed by interventionists with communication specialists. Communication specialists also provided support to teachers delivering training sessions, conducting observations, and follow-up.
Included Studies that Did Not Meet ICROMS Quality Criteria	
Hyter et al. (2001)	Transdisciplinary: SLP and special education classroom teacher worked together to deliver the intervention
Laugeson et al. (2014)	Unclear: Curriculum created by researchers, who trained classroom teachers who provided the intervention

Table 10:

Pragmatic Language Components Targeted in Interventions

Study	Pragmatic Language Components
Included Studies that Met ICROMS Quality Criteria	
Fleming et al. (2012)	Social skills and problem solving including: • Module 2: Basic communication and interpersonal skills • Module 3: Interpersonal skills: assertiveness, listening and negotiation skills • Module 6: Interpersonal skills continued: negotiation skills (listen, explain what you need, give a little, take a little, and aim for a compromise) (SPARX Resources, n.d.)
Hayman (2014)	Social skills: (Aggression Replacement Training Program: Skillstreaming Skills) • Week 1: Making a complaint • Week 9: Expressing affection
Obsuth et al. (2017)	Communication and social skills: • Session 5: Positive skills and attitudes to ask for extra explanations (e.g., interrupting appropriately) • Session 6: To learn to adjust the way of talking depending on one's conversation partner and location. Develop an understanding of the difference between formal and informal communication exchanges • Session 8: To learn assertive communication skills in-group situations. • Session 9: To learn to understand and be aware of different styles of communication (aggressive, assertive, passive)
Included Studies that Did Not Meet ICROMS Quality Criteria	
Hyter et al. (2001)	Communication skills: • Weeks 1, 5: Negotiations • Weeks 2, 6: Step by step instructions • Weeks 3, 7: Describing • Weeks 4, 8: Expressing personal opinions
Laugeson et al. (2014)	Social and communication skills (PEERS Program): • Week 2: Conversational skills, elements of having a 2-way conversation • Week 6: Peer entry strategies, including how to join conversations with other adolescents • Week 7: Peer exiting strategies, including how to assess receptiveness during peer entry and what to do when these attempts fail • Week 12: Resolving arguments with friends, including specific steps for problem solving disagreements

Table 11:

Measures

	Met Quality Criteria			Did Not Meet Quality Criteria	
	Fleming et al. (2012)	Hayman (2014)	Obsuth et al. (2017)	Hyter et al. (2001)	Laugeson et al. (2014)
Pragmatic Language Measures					
Test of Pragmatic Language (TOPL)				X	
Informal Measure: interactive communication task				X	
Emotional/Behavioral Measures					
Children's Depression Rating Scale -Revised (CDRS-R)	X				
Reynolds Adolescent Depression Scale (RADS-2)	X				
Pediatric Quality of Life Enjoyment and Satisfaction Questionnaire (PQ-LES-Q)	X				
Spence Anxiety Scale	X				
Kazdin Hopelessness Scale (HPLS)	X				
Children's Nowicki-Strickland Internal-External Cohort Scale Short (CNSIE)	X				
Behavior Assessment System for Children -Teacher (BASC-TRS) (Social Skills subscale, Anger Control and Emotional Self-Control content scale)		X			
Daily Aggression Data Collection Forms		X			
Young Person Questionnaires (YPQ)			X		
Teacher Questionnaire (TQ)			X		
Misbehavior in School (MISQ)			X		
Behavior Evaluation Scale-2 (BES-2)				X	
Social Anxiety Scale (SAS)					X
Piers-Harris Self-Concept Scale- 2nd Edition (PHS-2)					X
Social Measures					
Social Skills Rating System (SSRS)		X			X
Social Responsiveness Scale (SRS)					X
Quality of Play Questionnaire (QPQ)					X
Friendship Qualities Scale (FQS)					X
Test of Adolescent Social Skills Knowledge (TASSK)					X
Other Measures					
Academic Aptitude Measure			X		
Communication Skills Measure			X		
What's Happening In this School Questionnaire (WHSQ) (student-teacher relationship measure)			X		
Reports of disciplinary measures (student and teacher)			X		
Number of arrests (follow-up 4 months post treatment)			X		
Test of Language Development-Intermediate, 2nd Edition (TOLD: I-2)				X	

Table 12:

Measurement Administration

	Met Quality Criteria			Did Not Meet Quality Criteria	
	Fleming et al. (2012)	Hayman (2014)	Obsuth et al. (2017)	Hyter et al. (2001)	Laugeson et al. (2014)
Types of Measures Used	Observer-rated scale, self-report scales	Norm-referenced, researcher created	Likert and yes/no questions, frequency count, and standardized	Norm-referenced, formal observational checklist, informal measure	Norm-referenced, criterion-referenced
Who administered the measures/ discipline of researcher?	Researcher (psychology)	Researcher (special education), with trained research assistants performing observations	Research assistants (psychology)	SLP (research team included SLP and special education)	Researcher (psychology)
Who completed the measures/ discipline?	Students, Researcher (psychology)	Teachers (special education), trained observers (special education)	Students and teachers	Classroom teachers (special education), SLPs, and researchers (SLP)	Parents, teachers (special education), and adolescents
Was the person completing the measures blinded?	No	No	No	No	No

Table 13:

Method of Analysis

Study	Method of Analysis
Included Studies that Met ICROMS Quality Criteria	
Fleming et al. (2012)	• ANCOVA, with baseline level as the covariate • Fisher's Exact Test • Paired t-tests, • ANOVA for magnitude of change
Hayman (2014)	• Visual analysis • Paired t-tests
Obsuth et al. (2017)	• Intent-to-treat multilevel logistic regression models and multilevel linear regression models • Intent-to-treat logistic regression models and single level linear regression models
Included Studies that Did Not Meet ICROMS Quality Criteria	
Hyter et al. (2001)	• T-tests for dependent samples
Laugeson et al. (2014)	• Conversion to difference scores • Generalized Linear Model (GLM)

Table 14:

Results: Emotional/Behavioral Outcomes

Study	Emotional/Behavioral Outcomes
Included Studies that Met ICROMS Quality Criteria	

Fleming et al. (2012)	• Significantly greater reductions in depressive symptoms on both measures given for intervention group compared to waitlist
	    ○ CDRS (ES= 1.61, F value 18.11, p= .000)
	    ○ RADS (ES= .77, F value 4.13, p= .052)
	• No significant differences in the other self-report measures (including anxiety).
	• SPARX group was significantly more likely to have had a clinically significant reduction in symptoms than those in the wait group.
	    ○ Fishers Exact Test= .004
	• No significant changes in outcomes from post (5 weeks) to follow up (10 weeks).

Hayman (2014)	• All participants showed a decrease in levels of physical aggression from baseline to intervention (visual analysis) • Mean levels of verbal aggression for all intervention groups steadily decreased
Obsuth et al. (2017)	• Students in the treatment group were significantly more likely to self-report temporary exclusions from school than those in the control. ○ OR= 1.470, p=. 038 • No statistically significant differences between treatment and control groups on adolescent reported outcomes of interpersonal, behavioral, academic, or other disciplinary measures • No statistically significant differences between treatment and control groups on teacher reported interpersonal or disciplinary measures • No statistically significant effect on arrests four-months post-intervention
Included Studies that Did Not Meet ICROMS Quality Criteria	
Hyter et al. (2001)	• No statistically significant difference between pre- and post-test on the BES-2 ○ BES-2 (t= -2.00, p= 1.02)
Laugeson et al. (2014)	• Trend of parent-reported decreased social anxiety in treatment group compared to active control on the SAS, though only 23% of the sample responded at T1 and T2 ○ (mean DS= 3.17, control DS= -8.60)

Table 15:

Results: Pragmatic Language and Other Language Outcomes

Study	Language Outcomes
Included Studies that Met ICROMS Quality Criteria	
Fleming et al. (2012)	N/A
Hayman (2014)	N/A
Obsuth et al. (2017)	• Language Measure: ○ Nonsignificant teacher-reported increases in communication skills for treatment group over control group.
Included Studies that Did Not Meet ICROMS Quality Criteria	

Hyter et al. (2001)	• Pragmatic Language Measure:
	    ○ Significant difference between pre-and post-test scores TOPL
	        ▪ TOPL (t= -9.764, p= .000)
	    ○ Statistically significant differences between pre- and posttest scores on informal measure of pragmatic language with skills of describing and giving directions
	        ▪ Describing (t= -3.99, p= .010)
	        ▪ Directions (t= -3.87, p= .012)
	• Language Measure:
	    ○ Significant difference between pre- and post-test scores on TOLD: I-2
	        ▪ TOLD (t= -20.672, p= .000)

Laugeson et al. (2014)	N/A

Table 16:

Results: Social Outcomes

Study	Social Outcomes
Included Studies that Met ICROMS Quality Criteria	
Fleming et al. (2012)	N/A
Hayman (2014)	• Nonsignificant increases in social skills as measured by the BASC-2-TRS • Nonsignificant increases in prosocial skills as measured by the SSRS-T
Obsuth et al. (2017)	N/A
Included Studies that Did Not Meet ICROMS Quality Criteria	
Hyter et al. (2001)	N/A

Laugeson et al. (2014)	Compared to active treatment control group:
	• Greater improvement in knowledge of social skills on the TASSK
	  ○ (mean DS= 6.52, control DS= 0.00)
	• Greater improvements in hosted get-togethers of frequency of teen initiated social interaction and reciprocal social interaction on the QPQ
	  ○ Social (mean DS= 2.05, control DS= -1.82)
	  ○ Reciprocal (mean DS= .08, control DS= -1.42)
	• Greater improvements in invited guest get-togethers of frequency of reciprocal social interaction on the QPQ
	  ○ Reciprocal (mean DS= .08, control DS= -1.42)
	• Greater reduction in teacher-reported ASD symptoms related to social responsiveness on the SRS
	  ○ (mean DS= -4.28, control DS= .56)
	• Significant improvements in teacher-reported social awareness, social communication, social motivation and decreased autistic mannerisms on the SRS.
	  ○ Social awareness (d= -.52)
	  ○ Social communication (d= -.57)
	  ○ Social motivation (d= -.52)
	  ○ Decreased autistic mannerisms (d= -.59)
	• Trend of improvement on teacher-reported social cognition subscale on the SRS.

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* Denotes included study.

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