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Jennifer A. Fulton  
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# Evidence Based Social Skills Interventions for Young Children with Asperger's Syndrome and the Montessori Educational Method: An Integrative Review

## **Abstract**

Asperger's Syndrome (AS) is a medically recognized disorder on the Autism Spectrum. One in 88 children age eight are diagnosed with AS (National Institute of Neurological Disorders and Stroke, 2014). A key feature of AS is a deficiency in social skills. In the past ten years five main types of social skills interventions have been researched for their impact on young children with AS. Data suggest these treatments help children with AS acquire social skills. More research is needed on the types of learning environments that incorporate or lend themselves to utilizing these types of social skills interventions. One potential model, the Montessori Method of education was initially designed to teach children with significant developmental, social, and educational disabilities, with an intentional focus on individualized learning and socialization. To date, the potential overlap between empirically supported interventions to teach social skills to children with AS and the Montessori Method of education has not been researched. A comprehensive literature review was conducted to compare five researched interventions for social skill acquisition in children with AS with the Montessori Method of education. Findings suggest that of these five interventions, three bear significant resemblance to the Montessori Method of education while the other two do not. Implications and recommendations for parents, teachers, educational administrators, and social workers and other mental health practitioners who assist children with AS are provided.

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# EVIDENCE BASED SOCIAL SKILLS INTERVENTIONS

Evidence Based Social Skills Interventions for Young Children with Asperger's Syndrome and  
the Montessori Educational Method: An Integrative Review

Jennifer Aiken Fulton

University of Pennsylvania

Dedicated to my mentors;

Marie M. Dugan, my Montessori mentor,

Toba Kerson, my social work mentor,

And

Howard D. Fulton, my mentor in life.

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### **Abstract**

Asperger's Syndrome (AS) is a medically recognized disorder on the Autism Spectrum. One in 88 children age eight are diagnosed with AS (National Institute of Neurological Disorders and Stroke, 2014). A key feature of AS is a deficiency in social skills. In the past ten years five main types of social skills interventions have been researched for their impact on young children with AS. Data suggest these treatments help children with AS acquire social skills. More research is needed on the types of learning environments that incorporate or lend themselves to utilizing these types of social skills interventions. One potential model, the Montessori Method of education was initially designed to teach children with significant developmental, social, and educational disabilities, with an intentional focus on individualized learning and socialization. To date, the potential overlap between empirically supported interventions to teach social skills to children with AS and the Montessori Method of education has not been researched. A comprehensive literature review was conducted to compare five researched interventions for social skill acquisition in children with AS with the Montessori Method of education. Findings suggest that of these five interventions, three bear significant resemblance to the Montessori Method of education while the other two do not. Implications and recommendations for parents, teachers, educational administrators, and social workers and other mental health practitioners who assist children with AS are provided.



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## Chapter 1: Introduction

Asperger's Syndrome (AS) is on the rise with approximately two to six of every 1000 children annually receive a diagnosis of AS (Office of Communications and Public Liaison National Institute of Neurological Disorders and Stroke, 2012). Asperger's Syndrome is an Autism Spectrum Disorder and like children with Autism, children with AS exhibit a lack appropriate social skills, among other behavioral symptoms. Social skills are necessary for children and adults to function and interact in society and its acquisition begins in early childhood and is life-long. Therefore, for the child with AS it is imperative that teaching social skills begin with diagnosis.

Social workers are on the frontline in the delivery of mental health services for children and work with children with disabilities and their parents in clinics, children's hospitals, schools, treatment programs, and private practices. Social workers provide therapy, design treatment protocols, and advise parents and caregivers about best practices for children, including those with AS. Social workers serve as a link between children and families and the resources and settings needed to help children to better function. Those who uniquely understand the needs of the family and the child with AS, are best able to assist these families in understanding the child's needs and recommending most appropriate educational settings.

There has been a great deal of empirical research on interventions for educating children with Asperger's Syndrome in social skill acquisition; however the Montessori Educational Method has not been researched in terms of its potential fit for supporting the needs of students with AS as an intervention. To date, there are no findings regarding the possible overlap of what is known to be best practice in the treatment of social skills deficits in children with AS and the methodology used in a Montessori classroom setting. A thorough integrative review of the

empirical research on how to improve the social skills of children diagnosed with AS was conducted and the results compared to the Montessori Educational theory to see whether there may be some overlap which might be of benefit to children with AS.

This dissertation provides a thorough examination of empirical research on the current interventions for children with AS and looks at whether or not there is an intersection in that methodology with the Montessori Educational Model and its philosophy. This study begins with a comprehensive exploration of AS in children. Chapter 2 examines the historic origins of the discovery of AS, and Chapter 3 discusses recent definitions, understandings, and research of this disorder and how it impacts the social interactions of children. Next, Chapter 4 provides a description of how young children generally gain social skills and become competent in their use. This examines the most current research on social skills acquisition from infancy through early childhood and developmentally appropriate social skill milestones. Chapter 5 introduces and describes the methodology of this integrative study aimed at addressing the question: Is there an overlap between the researched and recommended interventions for social skill acquisition in children with ASD/ AS and the skills taught in the Montessori approach? Guidelines are described for the selection process of articles included in this study as well as the criteria used to evaluate the articles. Findings are presented in Chapter 6. Chapter 7 provides an outline of many interventions that are used to teach young children with Asperger's Syndrome social skills and the reason for choosing to research the Montessori Method of education as a possible educational setting for teaching social skills. Additionally, a full definition and explanation of what Montessori education involves is provided including the tenets used to foster skill acquisition in students; current practice guidelines; and theories about how this model seeks to develop children. Chapter 8 explores to what extent there may be an overlap with current empirical

literature on social skills training and the Montessori Method of education. Finally in Chapter 9, implications are raised for how parents, educators, and clinicians can better understand how to help children with AS along with recommendations for further research.

## Chapter 2: Asperger's: Diagnosis and Research

Asperger's Syndrome (AS) is a disorder impacting approximately two to six of every 1000 children annually, with boys being three to four times more likely to have the disorder (Office of Communications and Public Liaison National Institute of Neurological Disorders and Stroke, 2012). Asperger Syndrome (AS), Asperger's Disorder, or Higher Functioning Autism (HFA) are all vernacular for what is now known as an Autism Spectrum Disorder (ASD) as of the newly published *Diagnostic and Statistical Manual, Fifth Edition (DSM- V)* (American Psychiatric Association, 2013). Since most of the current research on this disorder references it as Asperger Syndrome, this phenomenon which was formerly known as Asperger Syndrome, will be referred to as the same for the purpose of this paper.

Asperger Syndrome has always been regarded as a form of an Autism Spectrum Disorder (ASD) and the criterion that must be met for a child or adult to be diagnosed with Asperger Syndrome was found in the *Diagnostic and Statistical Manual, Fourth Edition (DSM- IV-TR)* (American Psychiatric Association, 1994; Attwood, 2002; Bishop, 2008; Frith, 1991).

### The DSM-IV-TR

In the DSM-IV-TR there were four criteria that needed to be met which were coupled with two areas of development, which must present in the normal range. The most significant feature and the primary criteria that must be met to diagnose AS is a marked deficit in social interactions, namely lacking appropriate eye contact with others, lacking the ability to have a back and forth conversation with others, difficulty understanding nonverbal communication like body language and facial expressions, taking literally what others say, lacking understanding of another's point of view or perspective, and being socially inappropriate by not intrinsically learning social mores. Additionally, the person with Asperger's Syndrome may not have friends

that are considered peers, they may lack empathy, and they may not share their enjoyment of life with others. Other symptoms include: odd or unusual behaviors such as flapping of one's arms, an interest in one subject to the exclusion of others, rigidity in routines, and poor motor skills (American Psychiatric Association, 1994).

The criteria that must be met to have the diagnosis of AS from the DSM IV-TR (1994) include this first criterion:

A. Qualitative impairment in social interaction, as manifested by at least two of the following: (1) marked impairment in the use of multiple nonverbal behaviors such as eye-to-eye gaze, facial expression, body postures, and gestures to regulate social interaction (2) failure to develop peer relationships appropriate to developmental level (3) a lack of spontaneous seeking to share enjoyment, interests or achievements with other people (e.g. By a lack of showing bringing, or pointing out objects of interest to other people) (4) lack of social or emotional reciprocity (p. 84.)

The second criterion that needs to be met is:

B. Restrictive repetitive and stereotyped patterns of behavior, interests, and activities, as manifested by at least one of the following: (1) encompassing preoccupation with one or more stereotyped and restricted patterns of interest that is abnormal in either intensity or focus (2) apparently inflexible adherence to specific, nonfunctional routines or rituals (3) stereotyped and repetitive motor mannerisms (e.g., Hand or finger flapping or twisting, or complex whole-body movements) (4) persistent preoccupation with parts of objects (p. 84.)



And finally, this criterion must additionally be met:

C. The disturbance causes clinically significant impairment in social, occupational, or other important areas of functioning.

D. There is no clinically significant general delay in language (e.g., Single words used by age two, communicative phrases used by age 3 years).

E. There is no clinically significant delay in cognitive development or in the development of age appropriate self-help skills, adaptive behavior (other than in social interaction), and curiosity about the environment in childhood. F. Criteria are not met for another specific pervasive developmental disorder or schizophrenia (p. 84.)

While there are several hallmarks of the disorder, such as having a specific interest to the exclusion of other interests, one of the most concerning characteristics of AS is the lack of social skills and social reciprocity. Social skills are distinct behaviors acquired from interacting with others and determine one's relationship with others. Social reciprocity is the ability to have back-and-forth social interactions, such as gestures, sounds, play, attention, and conversation. An example of social reciprocity in a conversation would be when a child is asked a question and he/she responds in a predictable manner. Children with AS may not respond predictably or may respond with non-standard prosody, meaning their voices might sound odd or the response might sound like a sing-song. Visual focus during conversation for children with AS is often misplaced and they may look past the questioner when responding, focusing their gaze behind that person. Another example of social reciprocity is comprehension of gestures and understanding a "shrug" or knowing how to responding to another's facial expression. These basic social reactions are not natural for the child with AS and must often be taught.

A further distinguishing characteristic of AS is a concept known as Theory of Mind (ToM). ToM has been studied by researchers in an attempt to better understand the deficits in social skill acquisition and empathic behaviors of those with AS. An explanation of ToM broadens the understanding of AS as a disorder.

### **Theory of Mind**

Theory of Mind (ToM) is the concept that a person can understand and comprehend that other people may not hold the same beliefs or values, view events in the same way, or have the same likes, dislikes, needs and desires. ToM is also known as “mentalizing” and it indicates that a person would have the capacity to imagine how another might respond to any given situation, based upon the factors and circumstances, as well as the ability to pretend play (Baron-Cohen, Leslie, & Frith, 1985; Frith & Happé, 1994). This theory was first tested by David Premack and Guy Woodruff with chimpanzees in 1978 at the University of Pennsylvania and it was the first time that the wording “Theory of Mind” was used (Baron-Cohen, Leslie, & Frith, 1985; Bishop, 2008; Frith & Happé, 1994). What Premack and Woodruff researched was whether chimpanzees would be able to understand the problems presented to them on film by actors and whether the chimpanzees would then be able to help the actors solve their dilemmas by selecting the correct solution from a series of picture cards (Premack & Woodruff, 1978). The ability to successfully select the solution card would indicate that the chimpanzees had ToM. An example of this is the actor portrays hunger and the chimpanzee chooses a card with a piece of fruit on it. Premack and Woodruff’s conclusion was that “assigning mental states to another individual is not a sophisticated or advanced act, but a primitive one” (Premack & Woodruff, 1978, p. 525). This research inspired doctoral student Simon Baron-Cohen who was studying autism with Uta Frith to research ToM with autistic children (Bishop, 2008; Frith & Happé, 1994). His findings

indicated that the group of high functioning autistic children participating in the study failed in the ability to have ToM. For example, the children did not realize that the hungry actor would want the fruit on the card. Baron-Cohen states "...the autistic subjects are unable to impute beliefs to others and are thus at a grave disadvantage when having to predict the behavior of other people" (Baron-Cohen, Leslie & Frith, 1985, p.43). Baron-Cohen's work was seminal in the field of autism research, cited 4,106 times in other published articles (Google Scholar). Additionally, this research helped to conceptualize what was occurring socially for children with high functioning autism and provided a theory to help develop interventions for those children (Bishop, 2008).

Uta Frith and Francesca Happé continued the research on ToM and looked at central coherence as a contributing factor for the lack of social skills found in high functioning autistic children (Frith & Happé, 1994). The premise of their research was that there may be more than ToM occurring for the high functioning autistic child, specifically executive functioning may not be occurring. Executive functioning is the ability to think ahead and to anticipate what may happen. In social skills this is important because it is necessary for people to be able to anticipate what will happen next in conversations, anticipate physical contact, or know that it is time to disengage from others. Frith used the words "central coherence" to suggest an "ability to integrate information at different levels" (Frith & Happé, 1994, p.121). What Frith and Happé found in their review of the research on AS and Autism was that there were both strengths and deficits with the autistic children studied and that "there is...preliminary evidence to suggest that the central coherence hypothesis is a good candidate for explaining the persisting handicaps of the talented minority" Frith & Happé, 1994, p.126).

Currently, exploration on how AS is acquired is moving in a different direction from past research. Once thought to be a disorder of thought or behavior, scientists are now looking at the brain to see if circuitry within it may help with the understanding of the disorder.

### **Asperger's and the Brain-Current Research**

Asperger's syndrome and its multiple presenting characteristics have those in medical research looking for possible causes as well as prevention. Among those attributes being researched is the lack of ability to appropriately respond to social and emotional cues. If the human brain has a neurological process by which social attachments, interactions and responses are integrated, stored, learned, and imitated, what is the explanation for the lack of reciprocity for those individuals who have been diagnosed with Asperger's Syndrome? Some of the answers appear to be coming from the composition of the brain and the characteristics that it has within this group of people. One theory is that neurocognitive deficits in social responsiveness are caused by a malfunction of the posterior part of the superior temporal lobe which functions to help humans to mentalize, or use the brain to imagine mental states (Frith, 2012). Another thought is that a higher presence of a particular neuron, the von Economo neuron, in the front insular cortex of the brain may contribute to Autism (Santos, Uppal, Butti, Wicinski, Schmeidler, Giannakopoulos, & Hoff, 2011). The brain is one of the factors being scrutinized in search for answers to the cause of Autism.

An alternative theory related to how the brain acquires social skills is that for those with AS, the Mirror Neuron Systems (MNS) fails to properly integrate what is visually experienced in interactions with other people (Hauswald, Weisz, Bentin, & Kissler, 2013; Oberman & Ramachandran, 2007). Since 2002, researchers beginning with Giacomo Rizzolatti and his colleagues have identified several areas of the brain that generate the ability to mirror and

simulate the actions of others (Oberman & Ramachandran, 2007, p.313). It is thought that this ability to replicate what is seen when observing others may function in multiple areas of the brain and not just one area. This brain activity has been detected using neuroimaging measuring a movement called a mu wave (Hauswald et al, 2013). Typically, when humans watch other humans socialize or perform physical tasks, the mu waves decrease but for the AS individual the mu wave remains the same. Indeed it has been hypothesized that “a developmental impairment of functional simulators, especially the MNS, may be the unifying mechanism that underlies the deficits in imitation, TOM, empathy, and pragmatic language” (Oberman & Ramachandran, 2007, p. 322). Understanding MNS and how it functions relates to both the lack of imitation of social skills and to the repetitive and stereotypical motor issues in children with AS since both involve observing, mentally processing the action, and reproducing what is seen. At this time the cause of the imitation impairment is unknown but there is interest in learning about how MNS initially develops in humans with the expectation of one day understanding how to prevent AS (Oberman & Ramachandran, 2007).

The understanding of AS or high functioning autism as a recognized disorder has developed and become more refined since Dr. Hans Asperger’s first observations in the 1940’s. Although the DSM-V no longer has AS classified as a psychiatric diagnosis, AS has been researched under that name for over 30 years and it will take some time for there to be an adjustment to the change in the classification of the disorder. Over the years there have been many researchers who have contributed to the knowledge base on AS. Theories and research such as ToM and brain neuroimaging continue to provide insight on the disorder and illuminate prospects for answers to the disorder’s origins as well as to the treatment of AS. The history of AS as a medical disorder is short. The next chapter looks at the origins of the disorder as well as

the researchers who have been dedicated to understanding the disorder. Their work has helped illuminate what social skills interventions are needed for those with AS.

### Chapter 3: The History of Asperger's Syndrome

#### The First Clinical Documentation

AS was first written about in 1944 when Dr. Hans Asperger, a German pediatrician wrote his doctoral thesis about his observations of a group of boys having similar affect and behavior with whom he had come into contact in his work with children (Asperger & Frith, 1991). These boys had come to see Dr. Asperger for various reasons but they had one thing in common; they were “shutting off [of] relations between self and the outside world.” (Asperger & Frith, 1991, p.39). Dr. Asperger's work was briefly summarized by Lorna Wing in 1981 and ten years later in 1991, it was translated by Uta Frith, herself a researcher on Autism (Bishop, 2008). By the mid 1990's Asperger's Syndrome was a clearly defined and recognized as a diagnosable disorder.

Most of Dr. Asperger's insights and observations of the behaviors and affect of children with AS from 1944 hold true to the definition of the presentation of the disorder today (Frith, 1991). Dr. Asperger noted the absence of direct eye contact, sing-song speech, repetitious movements, a special and specific interest, a lack of forming close relationships, clumsiness, and a lack of spontaneity. Where his original work differs from what is currently associated with AS is in its classification and the causes of its manifestation in the children he was studying (Frith, 1991). In his paper entitled *Autistic Psychopathy in Childhood* (Frith, 1991) Dr. Asperger provided case studies which discuss the various boys that he worked with and examined. He offers no explanation for the cause of the disorder but he does point out similarities in facial affect of some boys with one of their parental pair. Qualities such as avoiding eye contact, awkward social interactions, and a thorough knowledge in a particular area of study were all noted in these parents as well (Bishop, 2008; Frith, 1991; Wing, 1981).

### **Naming the Disorder Asperger's**

Lorna Wing is a psychologist who was drawn to researching Autism and AS in the early 1960's when her daughter was diagnosed with Autism (Rhodes, 2011). Her work with autistic children led her to Hans Asperger's dissertation, which she read and summarized in an article for *Psychological Medicine* in 1981 (Wing, 1981). This description of Asperger's work ultimately credits Wing with the naming of the diagnosis as Asperger's Syndrome (Rhodes, 2011). In her 1981 journal article Wing scrutinized other diagnoses that could be mistaken for AS and provided a detailed differential diagnosis for the disorder. She also argued for why this form of autism deserved its own category within a diagnostic manual;

... (T) he term is helpful when explaining the problems of children and adults who have autistic features, but who talk grammatically and who are not socially aloof. Such people are perplexing to parents teachers, and work supervisors, who often cannot believe in a diagnosis of autism, which they equate with muteness and total social withdrawal. The use of a diagnostic term and reference to Asperger's clinical descriptions help to convince the people concerned that there is a real problem involving subtle, but important, intellectual impairments, and needed careful management and education (p.124).

Wing has since prevaricated regarding AS having a distinct category in a diagnostic manual and has stated that she believes that it is a part of autism and its spectrum of presentations and has been instrumental in getting AS moved into the category of autism in the new DSM-V (Rhodes, 2011). In Wing's interview with The Guardian in 2011 she stated;

It is not possible to draw neat lines between sub-groups...I feel it is safer using the autistic spectrum which is based on the one consistent thing-problems with the



social instinct. We should keep the descriptions of different groups but be less rigid. We need to see each child as an individual; to help them we need to understand all their particular skills, difficulties, behaviors and emotions (Rhodes, 2011, para.8).

### **Asperger's- Common Vernacular**

While working on his PhD. at University of London, Tony Attwood was supervised by Uta Frith. There he developed his interest in Asperger's during his clinical work with children who did not meet the criteria for autism but still had unusual presentations, who were socially awkward, and who had a specific interest in one subject (Atwood, 2013). Atwood continued his research on Asperger's Syndrome after leaving the university, by opening a clinic for children and adults with Asperger's Syndrome in 1992. In 1998 he wrote the first book on Asperger's Syndrome designed to be read by parents, professionals and lay people. Using his notes from workshops that he gave to parents and professionals he wrote "*Asperger's Syndrome: A Guide for Parents and Professionals*" (2002) which became a bestselling book reprinted twelve times in a four year period and translated into twenty languages (Atwood, 2002, 2013).

Understanding AS is one necessary element in developing social skills interventions for those with the disorder. Another significant aspect of developing social skills interventions is understanding how these skills develop in typical children. The next chapter analyzes one theory of typical socialization in humans, known as interpersonal neurobiology.

## **Chapter 4: Social Skills Through the Interpersonal Neurobiology Lens**

### **What are Social Skills?**

Social skills are a discrete set of behaviors learned both from caregivers as well as peers which guides children's interpersonal interactions (Lamont & Van Horn, 2013; Warnes, Sheridan, Geske, & Warnes, 2005). "Definitionally, 'social skills' is an umbrella term used to describe a constellation of interpersonal skills that increase an individual's effectiveness in social situations" (Lamont & Van Horn, 2013). Social skills directly affect social interactions and determine whether or not these interactions are successful and when they are successful, it is called "social competence" (Rubin & Rose-Krasnor, 1992). Rubin and Rose-Kransor (1992) looked at many different definitions of social competence gathered from various research articles on the subject and created a list of shared variables that all researchers have identified as indispensable for being socially competent. Social skills that are needed to be socially competent include: being effective; being able to interact in a way that gets one's needs met; being able to use judgment to determine whether one's actions are appropriate in attempting to get one's needs met; and being able to meet one's social goals while maintaining positive relationships with others (p. 3-4).

Acquisition of normal social skills in children begins in the first years of life and steadily grows from the age of two through second grade, with a spurt of growth between first and second grade years (Aksoy & Baran, 2010; Gillis & Butler, 2007; Lamont & Van Horn, 2013). For very young children, social interactions are first found in the form of play. Play begins with individual play and progresses to parallel play, which is playing in the vicinity of another but not interacting. Neither of these forms of play requires children to have social skills (Gillis & Butler, 2007). Around the years of three to four, children begin to play and interact with others and the need for

social skills increases (Gillis & Butler, 2007). At this age children need to be able to self-regulate, take turns, help others, follow rules, thank others, wait a turn, initiate conversation, ask and answer questions to name a few of the myriad of skills considered social skills (Aksoy & Baran, 2010; Gillis & Butler, 2007). There are many theories of how children develop the necessary social skills to become socially competent. For the purposes of this paper, interpersonal neurobiology will be used to gain an understanding of how social skills are acquired in neurotypical children.

### **Social Skills and the Brain**

Current scientific research on the brain and human emotions is yielding important information about what occurs in human psychosocial development. Both psychosocial development and the child's relationships with others promote social skills development. Based on varied studies of the brain and of the development of a "social brain" it is becoming evident that there is a relationship between the brain and the development of human attachment, bonding, and the development of interpersonal relationships (Applegate & Shapiro, 2005). By studying interpersonal neurobiology, we gain an understanding of the significance of the brain in developing social skills and the relational dependence of the infant's brain on the caregiver's brain (Siegel, 1999). Through reciprocal interactions, both the infant's brain and the caregiver's brain impact each other and create changes within the structure of each other's brains. Interpersonal relationships, from infancy to adulthood have a neurobiological impact on social skill development in neurotypicals.

### **Relational Development in Infants**

According to interpersonal neurobiology theory, neurologically the brain is developing ways of emotionally connecting with others through the system of bonding that is first found in

the infants' primary relationship with the mother (Panksepp & Biven, 2012). As mothers' care for their infants, the mothers' brains become aroused and cannot be subdued until the infant's needs are met. It is thought that this neurological response causes the brain to release dopamine, opioids, oxytocin, prolactin, and other chemicals, yet to be identified (Panksepp & Biven, 2012). In particular, the release of opioids and oxytocin in the brain create pleasant feelings in mothers, thus motivating them to quickly bond with their infants, although we know that the bond for infants develops at a slower rate and the bond with the mother or primary caregiver is not fully formed till about one year of age (Panksepp & Biven, 2012). This is not to say that there is no neuro-chemical reaction for infants. In fact, the infant/ mother interface creates new neurons, the growth of existing neurons, and protein synthesis in the infant's brain (Cozolino, 2006). Thus, this dyadic relationship creates both learning about attachment as well as brain development and growth (Tronick, 2007).

The ability of the brain to grow and change is known as neural plasticity, it happens through a process called gene transcription and it is how the brain grows new neurons and expands existing neurons. This growth and change in the human's brains takes place in environments which offer sensory and mental stimulation as well as intellectual challenges (Cozolino, 2002). In infants and young children, this environment is most often found when spending time with nurturing caregivers. For older children the environment could be time spent with caring adults or any other enriched environment such as an educational setting. These environments and opportunities create more neurons and neural connections, thus improving the brain's ability to develop (Cozolino, 2002). In neurotypical children, the growth in the brain enables social skills acquisition.

Additionally, stress and trauma seem to negatively impact infant brains' performance. Moderate stress appears to help the brain to perform better while high stress causes the brain to stop storing memories all together (Applegate and Shapiro, 2005). The impact of stress on infants' and young children's brains has been well documented, most notably with René Spitz's research and documentation of orphanages and the impact of deprivation of human touch and nurturing (Cozolino, 2006; Panksepp & Biven, 2012; Tronick, 2007). What Spitz found was that merely feeding and bathing orphan children was not sufficient to provide for their healthy development. Without emotional, nurturing, loving connections with caregivers, the children's mental abilities and cognitive development are thwarted and they failed to thrive (Panksepp & Biven, 2012).

Looking at the daily care giving of infants and the development of social and emotional development, it is important to note that human brains comprehend both verbal and nonverbal stress and that human communication is 60% nonverbal. Therefore when considering the neurobiological impact of stress on infants, having nonverbal as well as verbal interactions that are nurturing and not stressful is one of the ways infants innately attach to their caregivers (Schore and Schore, 2010).

### **Social Skills Development in Young Children**

Based upon what has been discussed thus far, social skills development in children is dependent upon early relationships with nurturing caregivers during infancy. Between the first and second year the infants' social relationships are typically with their caregivers and at the end of the second year they begin to look outward for other social interactions. How does the infant brain transition from one-on-one social interactions with significant caregivers to social interactions with others and in groups?

One thought is that at the end of the second year of life, young children have now developed past the point where their brains are responding to physical stimuli and they begin to think about others and their internal thoughts (Legerstee, Hailey, & Bornstein, 2013). This understanding of what others might be thinking or feeling is referred to as Theory of Mind (ToM) which was discussed earlier. Another theory is that the infant brain is innately a social brain from birth and that it allows them to connect with others by either learning about certain experiences exclusively or allows them to learn and to think about these experiences, thereby adding to their knowledge base (Legerstee, Hailey, & Bornstein, 2013).

According to relational theorists, as infants mature into toddlers and then into preschoolers, the experience of those early relationships with their first caregivers is what children rely on to build new relationships with others (Hartup, 1979). The first indication that toddlers are developing pro-social relationships with peers is when they show the ability to cooperate with them (Lamont & Van Horn, 2013). Research on the emergence of pro-social behavior shows that as children get older and their pro-social behavior develops, they increase in their use of empathic skills. Initial pro-social behaviors appear to be instrumental and imitative (Svetlova, Nichols, & Brownell, 2010). In a study of how pro-social behavior changes as children develop, 32(N) 18 month olds were provided opportunities to help adults. The study found that the 18 month olds were able to understand task or goal related helping but if the goal was for them to understand how the adult was feeling and to help that adult, they were not able to do so unless the adult specifically communicated their needs to the toddlers (Svetlova, Nichols, & Brownell, 2010). Thirty month olds, given the same opportunity to help the adult accomplish a task that had a clearly understood outcome, were not only able to assist in that situation but also were able to anticipate the emotional needs of the adult and provide comforting and empathy.

The final element of this research was to look at the pro-social behavior of altruism. The 18 month olds and the 30 month olds needed to offer something of their own in order to assist the adult. Both age groups had difficulty with this task but for different reasons. The 18 month olds were confused by the complexity of the social demands but the 30 month olds were hesitant and reluctant to give up their possessions (Svetlova, Nichols, & Brownell, 2010). This research helps to illustrate how social skills evolve and what the child's mental comprehension of relationship demands may be as the child grows older and matures.

As children enter their preschool years they begin to look at their peers for social interaction in the form of friendships. Children's friendships initially begin with reciprocity and develop depth of construct as children age (Larsen & Hartup, 2002). At the early stage of children's peer relationships "the child's notions about the reciprocities involved in friendship change from an emphasis on self-interest, to the matched exchange of emotional and psychological resources, and finally to a need-based exchange that emphasizes mutuality and collective concern" (Larsen & Hartup, 2002, p. 31). As children grow and develop there is a clear path that their social development follows with conclusive growth as children age. Additionally there are spurts of social growth, with the first of three spurts occurring between kindergarten and first grade (Lamont & Van Horn, 2013).

### **Evaluating Social Skills**

Social skill development from birth through six years of age is therefore a time of growth and progress that follows a course from the initial relationship with primary caregivers to the expansion of relationships that includes peers. The ability to anticipate the needs of others progresses from understanding how to help with task completion to understanding that others may need what one possesses. Peer relationships are based upon mutual reciprocity and shared

interests, and this ability to positively socialize with their contemporaries continues to develop in the maturing child. Social skills were identified by Gresham and Elliot in 1990 as a four part model of social behavior (Lamont & Van Horn, 2013). These skills include assertion skills, cooperation skills, self-control skills, and responsibility skills. Recently, Angela Duckworth (University of Pennsylvania, 2014) has explored social constructs such as the regulation of emotions, thoughts, and feelings as well as perseverance. Her research has led to the understanding that “self-control is the voluntary regulation of behavioral, emotional, and attentional impulses in the presence of momentarily gratifying temptations or diversions” (The Duckworth Lab, para.1, 2014). Duckworth’s research has informed protocols for working with children in classrooms, as well as teacher effectiveness. Her studies of self-control, conscientiousness, and personality help those working with children to understand their behavior and choices (Eisenberg, N., Duckworth, A. L., Spinrad, T. L., & Valiente, C. 2012). While she does not directly call these constructs "social skills," these concepts clearly interplay with the acquisition of necessary and important skills for child development. Nonetheless, the empirical study of social skills is in its beginning stages and more research is needed to understand this essential social construct (Lamont & Van Horn, 2013).



## Chapter 5: Research Methods

### Research Design: Integrative Literature Review

A systematic integrative literature review was selected for the research design for this study to explore evidence based interventions for social skills acquisition in children with AS. When there is little known about a particular subject, or research on a subject has not been synthesized, a literature review may initiate the understanding of the subject; piecing together research to culminate in a novel way to look at the unknown or previously unsynthesized area of interest (Boote & Beile, 2005; Cooper, 1988; LeCompte, Klinger, Campbell, & Menk, 2003; Russell, 2005; Torraco, 2005; Whitemore & Knafl, 2005; “Why do a literature review in health and social care?” n.d.). In 2003, the editors of “Review of Educational Research” (RER) spoke to researchers, attempting to “...convince emerging scholars that state-of-the-art literature reviews are legitimate and publishable scholarly documents.” (LeCompte et al, 2003, p.124.)

Additionally, they state,

“Too many of our new scholars believe that empirical research is the only “real” research; they avoid the deep levels of investigation needed to create the kinds of manuscripts sought by RER. This leaves educational research without an integrative and critical grounding in prior investigation and weakens subsequent work.” (LeCompte et al, 2003, p.124.)

As there is no known research on the topic of children with AS attending Montessori Schools and the acquisition of social skills for these children in this specific educational setting, an integrative review of the literature was undertaken. By using this comprehensive review format, the researcher is able to combine various types of data such as theoretical literature and empirical literature (Russell, 2005; Whitemore and Knafl, 2005.) Other methodological reviews

of literature such as the meta-analysis literature review and the systematic literature review are more restrictive in the type of literature that can be reviewed together (Russell, 2005; Whitemore and Knafl, 2005). Due to the diverse differences between empirical studies of treatments for social skill acquisition in children with AS, the theory of interpersonal neurobiology, and the Montessori educational method, an integrative review was conducted to provide the initial evaluation and interpretation of data for further research. This chapter describes the methods and procedures used in the execution of this integrative literature review.

### **Inclusion Criteria**

The format for research methodology developed by The Campbell Collaboration was used as a reference to assist in outlining the search criteria (“What is a systematic review,” n.d.). As is stated on The Campbell Collaboration website, “The Campbell Collaboration (C2) helps people make well-informed decisions by preparing, maintaining and disseminating systematic reviews in education, crime and justice, social welfare and international development” (“About us,” n. d.) Sponsors of The Campbell Collaboration include but are not limited to: The Robert Wood Johnson Foundation, The University of Pennsylvania, The U.S. Department of Education, The Rockefeller Foundation, The U.K. Home Office, and the American Institutes for Research (“Our sponsors,” n.d.).

Inclusion criteria for the research on treatment programs for children with AS were selected and included: research studies in the past ten years, from 2004 through 2014, research studies that were empirical and evidence based, and studies on children. Exclusion criterion included all other studies on AS which did not meet the inclusion criterion. It is often suggested that setting a five year limit is a prudent idea for subjects that are widely studied, however there

is a paucity of research on the Montessori Method; therefore the inclusion criterion was set at ten years, increasing the sampling frame (Thomas & Hodges, 2010).

### **Search Strategies**

The search strategies used included a search of reference databases available through the University of Pennsylvania library system including, EBSCO Mega FILE, Google Scholar, and Franklin: Penn Libraries Catalog. The variety of databases used was an attempt to discover all of the relevant research on empirical research on treatments of AS. Keyword searches included; *Asperger's Syndrome, evidenced based treatment, Autism Spectrum Disorder, children, child, empirical research, Montessori Method, education, efficacy, treatment, observation, classroom, method, technique, impact, learning, socialization, outcome, benefit, and effectiveness.*

Research articles and studies were evaluated to see if they met the inclusion criteria. Articles from international sources received the same consideration as articles published in the United States. Any potential cultural factors which might impact generalizability are discussed.

### **Critical Evaluation of Sources**

When the existing literature on a topic is very disparate, a systematic approach to examining the information can be used. In this study, sources were evaluated for their rigor and their relevance using Whittemore and Knafl's (2005) framework. The methodology introduced by Whittemore and Knafl (2005) for evaluating literature came out of a need for more rigor in all types of literature reviews as a demand for more empirical research has intensified. In searching "Google Scholar" for Whittemore and Knafl's journal article "The Integrative Review: Updated Methodology" it was found to have been cited 900 times since 2005.

Relevance was defined as how closely related the literature is to the research question. A point system was used to denote literature that was more rigorous and relevant and that which

was less. Methodological rigor received one point and data relevance received one point for a total of two possible points. This point system was used to identify which articles received consideration in the final analysis of the literature (Whittemore & Knafl, 2005.)

### **Summarizing the Data**

In preparation for analysis, the data were summarized and articulated in a similar way for comparison purposes. Articles were formatted on a spread sheet, with similar information looked at in each article. This spread sheet grouped together interventions with analogous themes (see Table 1.) Theme groups included whether the study examined treatment involving interpersonal interactions with adults, whether the treatment modality is through a combination of verbal and/or non-verbal modeling, whether there is a didactic, hands-on approach to the therapy, and whether the study's protocol involves developing an understanding of others and empathic skills. Additionally, the ages of the intervention group studied, the type of empirical study conducted, and the setting for the delivery of the intervention were coded. Empirical studies that met the inclusion criteria to be part of this integrative literature review but do not belong in the themes named in Table 1 were categorized as "other." These articles were examined to see if there was any further theme that could be derived from their conclusions and discussed in the findings. As with a qualitative research study, the use of groupings and spread sheets helped reduce researcher bias (Russell, 2005; Whittemore & Knafl, 2005.)

### **Scoring Rubric**

Finally, to ensure a high standard and to meet the criterion of a well written literature review, a twelve item scoring rubric was used to evaluate the justification of the research, its synthesis, the methodology, the significance of the research, and the coherence of the research (Boote & Beile, 2005) (See Appendix A- Table 2.). This scoring rubric was specifically

developed by Boote and Beile (2005) to evaluate the quality of doctoral dissertation reviews of literature. They took a previously recognized rubric developed by Christopher Hart in 1999 and modified it to pertain expressly to doctoral literature reviews (Boote & Beile, 2005).

### **Sampling Frame**

The initial search of the literature resulted in over 204 possible citations and 13 studies met inclusion criteria regarding evidence based social skills interventions for preschool age children with high functioning Autism (HFA) or Asperger's Syndrome (AS) between 2004 and 2014. There were four key issues that caused research articles to be eliminated from this study. First, journal articles were not selected if the targeted population of children in the studies were not speaking which is required for a diagnosis of HFA or AS (Wilkinson, 2013). Secondly if those who were studied were low functioning, the studies were discarded. Another exclusion factor was if the studies found were not of the targeted age group. Finally, some journal articles targeted other behaviors specific to Autism, but not social skills interventions.

Researchers studying Autism, HFA, and/ or AS will notice that some well-known interventions and researchers are not included in the 13 articles that were selected for this study. In some cases the intervention was designed for children older than six or younger than three, in other instances there has not been research since 2004. Many of the articles selected for this extensive literature review reference Lovaas's seminal 1987 work on his model called an Early Intensive Behavioral Interventions (EIBI) for Autism and several authors cited in this paper sought to replicate parts of his research. Similarly, relevant to and referenced in the articles selected but not included in this research, is the work of Geraldine Dawson, who with Sally J. Rogers developed the *Early Start Denver Model for Young Children with Autism* in 2010. This is also an intensive intervention for children more severely impacted by Autism. It targets children

starting in the program as early as one year old and is designed for a treatment length of at least three years (Rogers & Dawson, 2010). Of the original 204 articles found, Dawson had authored several that all pertained to interventions with toddlers and were thus excluded from this study.

Eight of the initial 204 articles were reviews of research for social skills interventions of preschool age children with HFA or AS. From these article's some of the 13 studies selected were found (Bellini, Peters, Benner, and Hopf, 2007; Dawson, 2008; Dawson and Burner, 2011; Holloway, Healy, Dwyer, and Lydon, 2014; Howlin, Magiati, and Charman, 2009; Paul, 2008; White, Keonig, and Scahill, 2007; Volkmar, Siegel, Woodbury-Smith, King, McCracken, and State, 2014). The 13 studies selected are displayed in Chart 1. A discussion of the literature found will now follow.

**TABLE 1. Organizing Themes in the Literature**

CATEGORY	CODE	DEFINITION
	<b>Structured Code From Framework</b>	
<b>Interpersonal Neurobiology</b>	Relational	Study examines interactive practices used by adult professions
	Non-verbal/ verbal	Study practices are delivered through modeling or dialogue
<b>Montessori Theory</b>	Sensory activity	Study involves “hands on” intervention/ or stimulates senses
	Social Focus	Study entails increased understanding of people or developing empathic skills
	ADDITIONAL STRUCTURED CODES	
	Age	Age range of child/children
	Type of Empirical Study	Case Study, cross-sectional, grounded theory, phenomenology, instrument development designs
	Setting	Research lab, classroom, office, home, hospital

### **Chapter 6: Research Findings**

Thirteen studies met the criteria for this extensive literature review (See Chart 1). The measurement instruments used in the studies are listed in Appendix B. Each study selected met the two point system designed by Whitemore & Knafl (2005) to ensure that the research was methodologically rigorous and that the data were relevant. Articles were summarized on a datasheet to look for analogous themes. From these studies, five distinct social skills interventions emerged with demonstrated efficacy. These five include; intensive interventions, low-intensity interventions, script-fading, group teaching, and joint attention. They are summarized and presented in detail here.



**Chart 1**

	<b><u>Setting</u></b>	<b><u>Type of Study</u></b>
<b><u>Intensive</u></b> Cohen, Amerine-Dickens, Smith (2006)	Home and school or school	Quasi-experimental design
Magiati, et al (2007)	Home or Autism specific school	Prospective outcome study
Remington, Hastings, Kovshoff, degli Espinosa, Jahr, Brown, et al (2007)	Home or school	Two year controlled comparison
Sallows & Graupner, (2005)	Home and/or clinic	Two year controlled comparison
<b><u>Low Intensity</u></b> Eldevik, Eikeseth, Jahr, & Smith (2006)	School with treatment room	Outcome data analysis
<b><u>Script-Fading</u></b> Wichnick, Vener, Pyrtex, & Poulson (2010)	School based at a table	Single subject multiple base line
<b><u>Group Teaching</u></b> Banda, Hart, & Liu-Gitz (2010)	Classroom	Single subject multiple base line
Leaf, Dotson, Oppeneheim, Sheldon, & Sherman (2010)	After school program	Single subject design
<b><u>Joint Attention</u></b> Aldred, Green, Ensley, & McConachie (2012)	Clinic and home	Mediation analysis
Isaksen & Holth (2009)	School	Single subject experimental design
Kaale, Smith, & Sponheim (2012)	School	Randomized control trial
Kasari, Freeman, & Paparella (2006)	Early intervention program	Randomized control intervention study
Lawton & Kasari (2012)	School	Randomized control study

**Intensive Interventions**

Intensive interventions also known as Early Intensive Behavioral Interventions (EIBI) originated in work developed in the 1960's and 1970's at UCLA by Dr. O. Ivar Lovaas (Cohen et al, 2006; Remington et al, 2007; Sallows and Graupner, 2005). In 1987, Lovaas's outcome study demonstrated that when children with Autism were identified at an early age and provided 40 hours a week of therapy for two years or longer, almost half of the children studied were prepared to be integrated into a general education setting and had significant gains in their intellectual intelligence (Cohen et al, 2006). A follow up study showed that of the nine children who had been positively impacted by the early and intensive intervention, eight continued to be mainstreamed with their same age peers and had no significant differences as observed by assessors blind to Lovaas's research (Remington et al, 2007). Since the 1980's, there has been additional research using Lovaas's methodology. The replication of his research has not always been executed as Lovaas designed due to some concerns about the tactics used. Aversives, or negative behavior reinforcers were part of Lovaas's protocol but most researchers were hesitant to use them due to disapproving public response (Sallows and Graupner, 2005). Another concern regarding reproducing Lovaas's study has been the ability to reproduce his research without funding from a major institution like UCLA; additionally there has been apprehension that reproducing Lovaas's method in a community setting as opposed to a university setting could lose the method's effectiveness due to the rigor in which universities conduct research (Cohen et al, 2006; Sallows and Graupner, 2005). Finally, there have been questions about the intensiveness of the intervention and whether the same or similar results can be achieved with less than 40 hours a week of treatment (Sallows and Graupner, 2005).

In the first study on intensive interventions between 2004 and 2014, Sallows and Graupner (2005) designed a study to look at several questions regarding Lovaas's previous research, specifically, "Can a community-based program operating without resources, support, or supervision of a university center, implement the UCLA program with a similar population of children and achieve similar results without using aversives?" (p. 419). Specifically, could these children acquire the social and behavioral skills needed to be educated with the general education population and could their intelligence quotient (IQ) be increased. Additionally, Sallows and Graupner were curious about whether there would be the residual positive effect of sustained gains in skills post-treatment similar to Lovaas's findings, whether pre-treatment outcomes could be accurately predicted, and finally the authors questioned whether a parent-directed treatment model that cost less could be as effective as Lovaas's model (Sallows and Graupner, 2005).

This study utilized a longitudinal four year, two group comparison design. All children (N= 23) were matched for similar pre-treatment IQ and then randomly assigned to either a clinic group with a therapist or to a parent group where the parent provided the intervention. Both groups used Lovaas's interventions minus aversives. The group with the therapists, or the clinic group (N=13) utilized an intensive intervention designed after Lovaas's method while the parent group (N=10) utilized a less intensive intervention. Parents in both groups received training and were encouraged to attend weekly meetings and integrate interventions into the home environment. Participants in the parent group were allowed to choose the number of hours of treatment that they provided. However, because parent participants chose to deliver hours of treatment that closely resembled the intensive group hours it was difficult to discern whether treatment effectiveness was impacted by the number of hours of treatment. Treatment began for children close to their third birthdays. The clinic group of children received six to ten hours of in

home supervision each week from a therapist and a weekly consultation with a senior researcher. The parent group received six hours per month of in home supervision and a consultation with a senior researcher every two months. For the four years of treatment children were evaluated annually using age appropriate scales to test cognitive functioning and non-verbal cognitive functioning. At the end of the study social functioning was assessed as well as the children's behaviors using the *Child Behavior Checklist* given to both the children's parents and the children's teachers. Additionally teachers were given the *Personality Inventory for Children* and the *Classroom Edition of the Vineland Communication Scale*. Finally, every three weeks for three months before treatment began the children were assessed to measure their acquisition of skills such as verbal imitation, non-verbal imitation, following verbal instructions, and expressive object labeling. This assessment schedule continued until the children had been in treatment for six months.

Treatment and curriculum were similar to those used by Lovaas without one component, aversives. All interactions were designed to be positive by choosing activities the child liked and by responding to the child's attempts to communicate his or her wants and requests. In the treatment phase, simple activities were chosen and appropriate behaviors emphasized "immediately with powerful reinforcers (e.g., edibles, physical play, or enthusiastic proclamations of success such as 'fantastic!'" (Sallows and Graupner, 2005, p. 422). Play was integrated into all learning activities and interspersed between each planned activity. Receptive language was encouraged before expressive language and requesting was begun as early as possible in the planned activities to promote communication. As the child progressed, the curriculum progressed with the child. For the children who were in the parent group, social skills were taught by first playing with staff, then playing with a sibling and finally having peers come

to the home to play with the child. When the children acquired social skills they were integrated into a pre-school program with neurotypical peers beginning with one or two half-days per week. When the children were initially entered into the pre-school program a trained staff member from the treatment program accompanied the children to assist in the transition. As children progressed they were provided with more challenging social skills interventions including understanding inferential thought and empathy.

Using an ANOVA with least squares solution for unequal group size the effects of the treatment were examined and all N=23 children in both groups had an increase of their average Full Scale IQ equaling 25 points; from 51 to 76. Additionally, eight children scored an 85 or higher on the IQ assessment after one year of treatment, the highest IQ to be considered as having mild Mental retardation was a 70 in the DSM IV. After three to four years of treatment an additional three children reached this IQ distinction making a total of 11 of the children or 48% of the study groups who reached an 85 on the IQ testing. These 11 participants were considered the rapid learners. Due to the fact that there were rapid learners and moderate learners, further investigation was done and it was found that the children who were in the clinic group had higher mean IQs as opposed to the children in the parent group. "Because these pretreatment differences would interfere with clear interpretation of post treatment differences between the subgroups (e.g., clinic- directed vs. parent- directed rapid learners), these comparisons were omitted" (Sallows and Graupner, 2005). Instead linear and logistic regressions were used to develop the predictions of the children's outcomes in the two groups.

Sallows and Graupner (2005) found that their outcomes with the clinical group were similar to Lovaas's without using aversives and without having the funding and resources of a large university. Additionally, the subgroup referred to as the rapid learners were able to enter a

general education setting at age 7. The children in the parent group progressed almost as well as the clinical group of children, despite having less supervision from the researchers. When examining the treatment goal of acquiring social skills specifically, several comments of the researchers are of particular interest. First, although not clinically significant, about one third of the children who were rapid learners still had some mild social skill delays after receiving treatment for four years. Second, there was a positive relationship between social skills acquisition and the frequency and length of time that children spent playing with peers while being supervised by parents.

In 2006, another study was published using the UCLA model developed by Lovaas by researchers who implemented a model in a community setting with a comparison group of treatment as usual in a school setting (Cohen et al, 2006). Lovaas's research in 1987 lacked a comparison group, therefore Cohen and colleagues (2006) chose to add a comparison group to both strengthen and perhaps validate Lovaas's findings. Moreover, Cohen's research team wanted to see if the UCLA model could be reproduced in a community setting. In this study, there were initially the same number of children in each of the two groups (N=21 in each). There were five dropouts who were removed from the final reporting; three from the intensive group and two from the comparison group. Modeled after Lovaas's UCLA intervention, as well as modified Sallows and Graupner (2005), Cohen et al (2006) chose not to use aversives and defined intensive as 35-40 hours per week. The comparison model for this quasi-experimental design study was a group of children who would have qualified for the intensive treatment but their parents had chosen services through their local school district. This involved parents choosing from the Matrix of Educational Options. "This matrix delineates the service agencies in the child's area of residence and their eligibility criteria, along with the roles and responsibilities

of parents, service providers, and funding agencies in implementing interventions” (Cohen et al, 2006, p. S147). The matrix was a combination of Early Start Autism Intervention Program in the home till age three, when they were enrolled in a typical public school Special Day Class where they received speech, occupational, and behavioral therapy, and mainstreamed with other children in regular education. No monitoring on the treatment of this group was executed. Three of the 21 children had received some early interventions prior to the treatment as usual. Seventeen of the children had been enrolled in the public school program at age three. There was no information about prior interventions for one child. All children were attending the public school program at the time of the study and the intervention was eclectic and included speech, occupational, and behavioral therapy, with the children attending five hours a day for either three or five days a week. Teacher/child ratios were from 1:1 to 3:1. The children in both groups were under the age of four at the beginning of treatment. Children were assessed pre and post treatment using a variety of standardized scales; however IQ was the prominent measure (Cohen et al, 2006, p.149). To test the comparison of the two groups, intensive and school based treatment as usual, an ANCOVA was utilized with the pretreatment score used as the covariate and each year for three years serving as repeated dependent measures with 95% confidence intervals at each stage of analysis. At the time of pretreatment, 20 of the 21 intensive group children were diagnosed with ASD as were 15 of the 21 comparison group children. The rest of the children were diagnosed with Pervasive Developmental Disorder, Not Otherwise Specified (PDDNOS) a form of Autism that lacks certain characteristics that qualify for an Autism diagnosis.

Findings suggest the intensive group were more advanced than the control group in adaptive behavioral skills post-treatment and significant differences between the two groups

were found in Communication and Daily Living Skills indicating that this group entered the study with more adaptive skills than the control group; however the control group also made gains. The intensive group increased in IQ from 62 at pretreatment to 87 at the end of the study in comparison to the comparison group whose IQ change went from 59 to a 73. Another intelligence test, the *Merrill-Palmer* was administered both pretreatment and post treatment and there was not a significant difference between the two groups, however, a post-hoc analysis indicated that the two groups might not have been matched at pre-treatment. The *Vineland Adaptive behavior Scale* was used to measure changes in social skills acquisition. The EIBT and comparison groups differed significantly in both Daily Living Skills and Socialization with the intensive group in a composite of the two scores increasing nine mean points with a 95% confidence interval over three years and the comparison group decreasing by four mean points with a 95% confidence interval. Of the intensive group of 21 children, 17 went on to traditional classroom settings, whereas the comparison group of 21 children had one child enter that setting. Finally, it was shown that the intensive model could be implemented successfully without the backing of a university; in fact the outcomes of this study were similar to Lovaas's work.

Cohen and colleagues readily recognized the limitations of the study and discussed them thoroughly. For the purposes of this extensive literature review on social skills interventions for children with AS specifically, it is important to note that the distribution of the children who had Autism and the children who had PDDNOS were not evenly dispersed between the two comparison groups. As PDDNOS is considered a milder form of Autism and may be more similar to AS than to Autism, and since there were more children with Autism in the intensive group and more children with PDDNOS in the treatment as usual group, the uneven distribution bias favors the comparison group and clouds the information regarding AS and intensive



treatments. Additionally, when the students showed advancement in behaviors, other skills, such as social skills were taught that were not a part of the Lovaas method. Although the methods used had empirical support, the skills learned in addition to the Lovaas method skills were not studied and the authors suggest that this should be more carefully examined in future research.

The third study was conducted by Magiati and researchers and the purpose was to collect independent outcome data on preschool children who received an intensive intervention or EIBI in the community and preschool children who attended an Autism specific preschool program (Magiati et al, 2007). The research questions explored were “(A)t follow up, were EIBI children functioning at a significantly higher level than Nursery children with respect to IQ/MA (mental age), language, play, adaptive behaviour and severity of autism?” and “What specific child, family or treatment characteristics were related to outcome?”(p. 803-804).

Students were identified through professional sources that work with autistic children and the inclusion criteria relevant to this study included: the child must be between the ages of 2.10 years and 4.6 years; enrolled in either an EIBI home program or an autistic- specific nursery school for at least 15 hours a week; and the child could not be receiving any other intensive interventions. For the study there were 28 children assigned to the EIBI group and 16 children in 10 different Autism-specific nursery schools. The EIBI children received one on one teaching in their home by their families while the average one on one time with a teacher in the preschool program was six hours per week. The EIBI group used Lovaas’s method of intensive interventions, and the nursery school programs used an eclectic methodology, also discussed earlier. At some time during the study, many of the families used other interventions with their child. More of the EIBI parents chose dietary changes, alternative treatments, and other “biological interventions” (p. 806). More nursery school parents chose extra-curricular

educational interventions for their children. The students were evaluated twice, once at the beginning of the study and a second time 23-27 months after the study began. Evaluation instruments used at both times were for the most part the same and included: the *Merrill-Palmer Scale of Mental Tests*; the *Bayley Scales of Infant Development*; the *Weschler Pre-school and Primary School Intelligence Scales-Revised*; the *Vineland Adaptive Behavior Scales*; the *British Picture Vocabulary Scale- II*; the *Expressive One-Word Picture Vocabulary Test—Revised*; the *Symbolic Play Test- Second Edition*; the *Test of Pretend Play*; and the *Autism Diagnostic Interview-Revised*. These scales measured mental ability, adaptive behavior, receptive and expressive language, and play. The scores collected at the end of the two year study were then categorized based upon the change of the assessed age within three domains: cognitive, play, and adaptive domains; the *Autism Diagnostic Interview- Revised (ADI-R)*; and Receptive and expressive language changes. For the initial comparison of the two groups of children, T-tests or *Mann- Whitney* non-parametric tests for independent samples were used due to the fact that play and language scores were significantly negatively skewed. The second comparison used ANCOVAs to look at the two groups and the IQ from the first comparison was used as the covariate.

Results of raw data indicate that there was positive change in the areas of mental age and age equivalence as measured by both study groups. Once the data were analyzed and change over time was taken into consideration, there was little statistically significant change in either group. In just one assessment of daily living skills, the EIBI group performed marginally higher on standard scores. These outcomes in evaluating an intensive intervention are not typical of most other studies conducted in a university setting, however the authors contend that they are similar to other community-based intensive interventions based upon the research of Bibby,

Eikeseth, Martin, Mudford & Reeves, (2002) and Gabriels, Hill, Pierce, & Rogers, (2001) as cited in Magiati et al,( 2007). This study lacked the rigor of the previous two intensive interventions in several regards. The two groups studied were not matched for IQ in pre-treatment scores, only that they met the diagnosis of ASD by assessment using the ADI-R. Additionally, they were not randomized to the intervention groups. Although additional intensive interventions was supposed to disqualify a participant from the study, many of the participants received additional interventions and it is impossible to control for the affect that these interventions may have had on this study, either positively or negatively. Although the individual outcomes showed improvement in both groups, once the ANCOVAs were performed, the statistical outcomes were not found to be significant. It may have been that the two years between assessments negated the outcomes because of developmental changes that occur with children or it could be that there were flaws in the methodology. Additionally, with the exception of the qualifications of the children for the research study being a diagnosis of ASD using the ADI-R, there were no other descriptions of the children's skills or lack of skills. The authors concluded that the variations in results in this study as opposed to other studies replicating Lovaas's research are due to the heterogeneity of the Autism population.

The final intensive research study that met the inclusion criterion for this literature review was one published in 2007 using intensive behavioral interventions with a group of preschool children with Autism (N=23) and compared that group to a group of preschool children with Autism receiving treatment as usual (N=21) (Remington et al, 2007). Remington and colleagues wanted to see if an early intensive behavioral intervention (EIBI) could have a positive impact on children with Autism if implemented on a consistent basis with integrity, using outcome measures to determine the interventions success. It was anticipated that like other intensive

intervention studies, this research would also show that the EIBI group would have better results than the treatment as usual group. The researchers were also interested in the parental well-being and their outcomes at the end of the study as well. As with all of the other intensive intervention research studies, the model used for the intensive intervention was derived from Lovaas's model. For this study, the treatment as usual group received the publicly funded education program offered to all children in the United Kingdom who have Autism.

Children were recruited from agencies: their local education authorities, support groups, or the United Kingdom National Autistic Society, which serves children with Autism and their families. Advertisements for the study were also placed with the National Autism Society and its service chapters. Children were assessed using the *Autism Diagnostic Interview-Revised* for baseline data on their disorder as well as to see if they met the inclusion criteria for the study. Participants also needed to be previously diagnosed with Autism by an independent evaluator who was not affiliated with the study. The children needed to be 2.6 years old to 3.6 years old at the time that they were accepted into the study. The children could not have any other health diagnosis and were required to be living in their homes.

Once selected, the groups differed slightly in age with the treatment as usual group being about three months older than the EIBI group of children. The parent groups that were created from each of the comparison groups were for the most part similar. Where there were differences in the parents, those differences were not statistically significant. The children were then assessed using norm-referenced instruments to examine their cognitive, language, and behavioral functioning for baseline data. Assessment tools included: the *Bayley Scales*; the *Stanford Binet Intelligence Scale*; the *Reynell Developmental Language Scales*; the *Vineland Adaptive Behavior Scale- Survey*; the *Positive Social Subscale of the Nisonger Child Behavior Rating Form*; the

parent report version of the *Developmental Behavior Checklist*; and the *Early Social Communication Scales*. This researcher was primarily interested in the outcome measures for the scales that measured social skill acquisition, which was *The Early Social Communication Scales*. This scale consists of a semi-structured observational instrument that was videotaped so that inter-rater reliability could assess the validity of the observer's interpretation. Two important variables were targeted for recording by the evaluator: initiating and responding to joint attention. Initiating joint attention is when the child engages the adult in sharing an experience, either with a toy or with something that the child sees by vocalizing, pointing, gesturing, or using eye contact. Responding to joint attention is when the child changes their attention to focus on what an adult is gesturing to or pointing out. During the evaluation the number of times that the initiating and responding to joint attention are recorded over eight separate sessions and the authors anticipated that the number of initiations and responses would increase over the time the intervention was delivered. Twenty five percent of the videotapes of the children studied were analyzed using an independent rater who was blind to the study and intraclass correlations between the two raters were calculated with a reliability of .95 to .99 for initiating joint attention and .96 to .97 for responding to joint attention.

Parents completed the *Hospital Anxiety and Depression Scale for parents* a self-report rating scale to measure their mental health (Remington et al, 2007, p. 424). Based on past research on the impact on parents of a child with Autism, these researchers selected the categories of anxiety and depression to measure. Two additional scales the *Parent and Family Problems Subscale of the Questionnaire on Resources and Stress-Friedrich short form* was used to measure parental stress and the *Kansas Inventory of Parental Perceptions Positive*

*Contributions subscale* was administered, which looked at the parent's perception of their child and whether their child had a positive impact on the family.

The home-based intensive intervention took place over a two-year period. Parents and tutors were trained to provide one-on-one instruction using Applied Behavioral Analysis for approximately 25.6 hours per week. There were a varied group of service providers who trained parents and provided tutors but they were all consistent in how they implemented the intervention.

At the beginning of the study, all children were receiving their intervention in the home. At first year's assessment, 57% of the children had been moved to a conventional school for an average of 5.8 hours per week. At the second assessment, 74% of the children were attending conventional school; 22% were attending a school for children with special needs, and only one child remained in the at home-intervention setting. Because the children were receiving an intervention, their time in a school setting was shorter than what children typically spend in school. In addition to the intensive intervention and school, some children received vitamins, some were on restricted diets such as gluten free or casein free diets, some were receiving speech therapy, some were taking prescription medication, and some were taking homeopathic remedies.

The children in the comparison group did not attend school at baseline but at the time of either their one-year or two year assessments they were all attending their local public school and receiving the typical interventions for children with Autism. The children were in various classrooms depending upon the manifestation of their Autism. Some were in traditional classrooms, some were in special education classrooms, and some were in a mixture of the two classroom environments. Of the interventions received in the public school setting, none were one-on-one and none were intensive. The therapy that the children most frequently received was

speech therapy, followed by a method used in the school setting, referred to as the Treatment and Education of Autistic and Related Handicapped Children or TEACCH method (Remington et al, 2007, p. 427). Other interventions utilized were: the Picture Exchange Communication System and sign language or the Makaton communication systems (Remington et al, 2007, p. 427). Like the intensive intervention group, many of these children also were on special diets, were taking vitamins, medications, and homeopathic treatments.

Outcomes for this two year controlled comparison of an intensive intervention with a typical intervention for children with Autism indicate that the intensive intervention was more effective than typical interventions found in a public education system in the United Kingdom. Once again, the outcome that this researcher was most interested in was the acquisition of social skills. In the *Responding to Joint Attention* in the *Early Social Communication Scale*, although the findings were not robust, the authors state that there was a significant change and that it was not evidenced in the ANCOVA methods used to measure increased social interactions, thus making the results not statistically significant. The improvement clearly observed was in parents' perception of their child's social behaviors, but parents did not also identify a reduction in problem behavior which the researchers contribute to the focus of their study, which was primarily on the improvement in educational goals.

The component of the research that examined parental well-being indicated that there was no additional social or emotional cost to parents who had their children in the intensive intervention, although fathers of children who received the intensive intervention showed more signs of depression as the study progressed. The researchers theorized that it was because they had fewer symptoms at baseline than their counterparts in the comparison group of fathers.

Comprehensively, the intensive intervention had a measurable impact on the group of children who were partaking in this study. With a Cohen's  $d$  of .80 the difference between the two groups: the intensive intervention and treatment as usual is significant: 78.81% ( $d = .80$ ) of the treatment group was above the mean of the control group.

Remington et al cited Cohen et al and Sallows and Graupner in the discussion of their results and it is evident that they attempted to replicate Cohen et al and Sallows and Graupner's findings as well as add the new variable, parental wellbeing to their research as well as shortening the intervention duration with less hours of intervention per week.



### **Low-Intensity Interventions**

Low-intensity interventions are a less time demanding version of intensive interventions. For example, if one was to implement an intensive intervention for 40 hours a week a low-intensity intervention would typically be 20 hours or less. There has been some thought that children with Autism benefit from less one-on-one time with adults and more time spent with their same aged peers (Eldevik et al, 2006).

Eldevik et al conducted a study published in 2006 that looked at two groups of children with Autism, one group (N=13) received a low-intensity behavioral intervention while the other group of children (N=15) received an eclectic intervention. Eclectic interventions typically include a variety of interventions thought to be beneficial to children on the Autism spectrum, including speech therapy, occupational therapy, and/or social skills training. These researchers wanted to see what the results would be if children with Autism had more time to play with peers and 20 hours or less time of one-on-one interventions. This research took place in Norway and the children participating needed to meet the following criterion: a diagnosis of Autism from a medical doctor or psychologist using the World Health Organization's definition in 1993; the children needed to be under six years old at the beginning of the intervention; they needed to have been absent of other medical conditions; there needed to be evidence that in the past the children had received one-on-one treatment for 10 to 20 hours per week; and the children needed to be available both at pre-treatment and after two years for assessment on their intellectual functioning, adaptive behavior, and language skills. All children were assessed during the research selection process using the *Autism Diagnostic Interview-Revised*, and the assessments were performed by either independent assessors or and by one of the research team members (Eldevik et al, 2006, p. 212).

All children attended either traditional kindergarten or elementary classes depending on their age at the start of the study. Parents were allowed to choose which of the two intervention groups their child would be included in for the study. Kindergarten classrooms were comprised of around 18 children ages three to six years old with a ratio of one staff member per six children. Elementary classrooms had up to 28 children and a ratio of around one staff member per 14 children. All children were in school at least 20 hours per week. The school was a typical Norwegian school, which additionally had a treatment room separate from the classroom dedicated to the one-on-one interventions, although these interventions sometimes took place in the classroom or in other public areas of the school such as the coatroom or bathroom. Peers might also be included in sessions in the treatment room with the student and there was never more than one child in the study per classroom. The remainder of the class time the students in the study were with their peer group.

The low-intensity intervention model was taught to all staff and to the parents of the children. Weekly sessions were provided for staff and at that time plans were developed for new interventions to be introduced based upon the child's progress. Parents were trained so that they could provide consistency by using the same approach at home and in the community. Classrooms had a second adult in addition to the teacher. This second adult was the therapist who provided the learning sessions in the treatment room. During classroom time, there were no behavioral interventions; the second adult/therapist solely provided one-on-one assistance with self-help skills. The one-on-one treatment was based on behavioral manuals including Lovaas's method as well as *Behavioral Interventions for Young Children with Autism: A Manual for Parents and Professionals*.

At the beginning, the treatment goal was for the children to be able to play and to acquire social skills and this concept was initiated at once. The one-on-one intervention with the therapist in the treatment room began with asking the child to do simple tasks like following one step directions or accomplishing an easy activity like matching objects. With mastery, the activities became more complex with more difficult fine motor and oral motor repetition. Naming objects, learning the words for colors, shapes, and parts of speech came next along with the questioning words “who”, “what”, “when”, “where”, and “how.” Once there was comprehension of this nomenclature, play with others was encouraged to move from parallel play to a more interactive play. This was executed by using operant conditioning techniques. As a child participant gained social skills, the focus moved from one-on-one with either the therapist or the therapist and another neurotypical child to small groups of children in a typical classroom setting.

The eclectic intervention group applied various methods of treatment and chose these treatments based on the needs of the child with Autism. Types of treatment included: alternative communication, applied behavioral analysis (ABA), total communication sensory motor therapies, programs based on TEACCH, along with the personal expertise of each teacher. Each was implemented as designed with the exception of the ABA. The traditional methods of ABA involve one or two therapists teaching the skills and using a very specific format that includes: spatial fading or physical manipulation fading to extinction to encourage the correct response, an exchange system of symbols for preferred objects moving on to less preferred objects, and hand shaping for symbols of sign language. The eclectic approach to implementing ABA in this study was less formulated and less rigid than traditional ABA; it integrated the ABA concepts but without the second adult or the linear progression. The methodology for the eclectic group was

the same as with the low-intensity group in that the child had one-on-one time with the therapist and that the therapist also worked in the classroom. There were also weekly meetings for staff supervision and discussion regarding the child's progress. In this meeting researchers recorded the type of interventions used, whether it was alternative communication, applied behavioral analysis, total communication sensory motor therapies, or programs based on TEACCH.

Unfortunately, the one piece of data not recorded was the amount of time that was spent on each of the treatment components with each child in the eclectic group. Additional data were collected from supervisors or teachers on the total hours spent in one-on-one interventions, where that one-on-one took place, classroom or treatment room, how much time did the child require in self-help skills within the classroom, and what the current goals were in the child's education plan. Therapist's years of experience were recorded as well as their training and educational background.

Children were assessed at the beginning of the research study and two years afterwards, at the end of the study. There were four different possible scales used to measure IQ or mental development: the *Baley Scales of Infant Development*; the *Stanford-Binet Intelligence Scales*; the *Wechsler Preschool and Primary Scale Intelligence-Revised*; and the *Wechsler Intelligence Scale for Children –Revised*. Additionally, a language functioning assessment: the *Reynell Developmental Language Scales*; and adaptive behavior assessment, the *Vineland Adaptive Behavior Scales*; and a non-verbal intelligence assessment, the *Merrill-Palmer Scale of Mental Tests* were used to evaluate each child. Pathology data for each child was also collected. Scores for pathology were gathered on the following traits of Autism; no words, not affectionate, no toy play, no peer play, stereotypical behaviors, severe tantrums, and not toilet trained. Pearson correlations were used to measure the relationship between the intake data and the outcome data

and IQ, language comprehension, and expressive language were correlated pre-treatment and post-treatment while nonverbal intelligence and adaptive behavior was less reliable in their associations.

In analyzing the results of the outcome data, the low-intensity intervention group fared better than the eclectic intervention group by achieving greater positive changes in IQ; improving their mean score 8.2 points as opposed to the eclectic group whose mean score decreased 2.9 points. Expressive language also improved for the low-intensity group with an increase of 11 points post-treatment, whereas the eclectic group lost 6.4 points. Communication skills improved by 4.4 points for the intervention group while the eclectic group's score decreased by 4.5 points. Yet the gains were not of clinical significance. The authors speculated that there could be two reasons for this. One is that the children in this study started with a lower IQ score than children in other studies. Because the children in the other studies were already close to an average range of intelligence, making a little advancement could move them into that range. Secondly, the authors considered the amount of time delivering one-on-one interventions and conjectured that may have kept the children from achieving a more robust IQ. Interestingly, the eclectic comparison group had a decrease in their IQ, language, and adaptive scores although it was thought that the eclectic delivery might have been a more individualized approach than the low-intensity intervention group. Indeed, all the interventions used with the eclectic intervention group were recognized as best practice treatment for children with Autism. The authors point out though they gathered data on the types of interventions used with the eclectic intervention group; they did not assess the quality of the delivery of those interventions. Although the outcome was not clinically significant, the data do indicate that in this study an intervention like Lovaas's method and/or the *Behavioral Interventions for Young Children with Autism: A Manual for*

*Parents and Professionals*, (1996) was more successful in creating positive growth for children with Autism in the areas of language functioning, adaptive behavior, non-verbal intelligence and pathological behaviors. Additionally, having the children with Autism grouped with their neurotypical peers in the classroom did not appear to be significant in the amelioration of their autistic specific deficits.

The authors of this study recognized the limitations of the research and of their method and design. There was no random assignment to the groups studied, no control of the quality of the treatments delivered in the eclectic intervention group, the assessment of the two study groups was pre and post interventions with no evaluation within the two years that the study was in place, and the study size was relatively small, although its size matches the majority of studies this researcher has examined. The authors also point out that allowing parents to choose the intervention group that their child was in may have impacted the outcomes and that moreover the parents level of education may have influenced their choice of intervention groups with the assumption being that the more highly educated parents would have chosen the more structured intervention as opposed to the eclectic intervention. These variables were not measured or accounted for in this study.

### **Script-fading**

Script-fading is one way to teach children with Autism the nuances of responding in conversations as well as initiating conversations and maintaining conversations (Wichnick et al, 2010). In script-fading the goal is to give the child a concrete example of how a conversation is developed and maintained via pre-prepared text with the goal being that after some use of scripted text, the text is slowly removed, word by word, until the child is able to initiate and maintain an impromptu conversation.

A study conducted by Wichnick et al (2010) looked at three children, two boys and one girl. There is some discrepancy about the ages of the children. Wichnick et al state in their study that the boys were ages seven and five, and that the girl was seven years old, however in a commentary on said journal article in “Evidence-based Communication Assessment and Intervention” in 2010, author Howard Goldstein from the Department of Human Development and Family Science at Ohio State University states that the boys are four and six years old and that the girl is six years old. The parameters for this researcher’s study were three to six year olds and with there being a dearth of information on social skills interventions for children with Autism at this age, this researcher elected to include this study.

In the research study conducted by Wichnick et al, the goal was to assess the success of the children with Autism in unscripted responds to peers. Although script-fading had been studied previously using adults for the child to respond to, it had not been studied with peers. The participants of this study were the three children described above, who attended a day school for children with Autism for two to four years. The authors do not state the location of this study or provide any information about the families of the three children. The children were already familiar to three of the four researchers from a previous study in which they had participated.

The children's social interactions were limited to only responding to adult initiated conversation. The older boy and girl did not respond to a peer initiated conversation while the younger boy did respond to peers at times but his response was inconsistent. The three children were able to read directions and had previously been instructed in initiating conversation with each other but had not been successful in conversational responding to each other. The study took place in the classroom of the day school for children with Autism during a 45 minute time period that was used for table-top activities. During the table-top activity, the children sat at two adjoining tables and were each given their own plastic bin that held 10 clear zipper plastic bags that contained a pair of toy animals and a small recording device that had a pre-recorded response on it. Examples of pre-recorded responses included "sounds cool," "awesome," or "thank you." In the middle of the two tables was a bin that collected the used bags. A baseline was collected for each of the children where they were given the toys in the bags without the device to see if the child receiving the toys responded verbally.

The study began with teaching the children responses for receiving one of the animals in the bag. Each child received the ten bags with the two toy animals and the recorded response. Ten bags guaranteed that there would be ten exchanges. They initially were taught to take one of the bags labeled with their peer's name, take out one of the toys, to use language to initiate an interaction with the peer, hand the bag to the peer, and initiate an exchange. If the child did not initiate, the adult prompted the child. The peer was to push the recorded device which played an appropriate response like "that's cool." If the child did not push the pre-recorded device, then the adult instructed the child to do so. The children then set a timer, played with the toys for ten seconds, and then put toys, bag, and recorded device in the bin at the center of the table.



When the children started vocalizing part of the script on the pre-recorded device the script was modified to encourage the child to say more of the response. For instance, if the first pre-recorded response was “I like animals” and the child emitted a scripted response, after eight or more times of the child doing this in two consecutive sessions, the prerecorded device would be adjusted to respond with “I like.” The second fade would change the pre-recorded device to say “I” and finally the device would be removed. Fading was individualized for each child and the children were rewarded with tokens for responding. Tokens could be exchanged for an activity, a snack, or a toy. At first both prompted and unprompted responses were rewarded. After four unprompted responses were vocalized by the child, then only the unprompted responses from the child were rewarded with tokens. As the children became more successful at unprompted responses, the adult moved further away from a proximal place at the table.

When collecting the data, two independent raters were used; both stood across from each other at the table and each collected their own data, which was then compared. The observation was scored as “agreement” if both raters were in 100% agreement. It was scored as “disagreement” if the raters did not hear the same thing. “Mismatch” was recorded if they heard something similar but disagreed on a word being pluralized, the use of prepositions, and /or conjunctions. “Mismatch” was considered an agreement for scoring purposes. The independent raters observed and rated the baseline intervention, the instructional part of the research design, and the scripted and unscripted responses of each child.

The independent raters’ final evaluation of the unscripted responses the two six year olds was that they each had a mean score of 99% while the four year old had a mean score of 98%.

In evaluating the outcome of this study on script-fading, the data indicates that providing script-fading as a tool to teach young children how to respond to conversations initiated by peers

may increase the number of unscripted responses and may also produce novel responses. During baseline, all three of the children had few to no novel responses. The interrater agreement on verbatim recordings of responses to peer initiations was 92%, 88%, and 85% for each of the children. During teaching, the rater agreements were 49%, 44%, and 43% for each child and at the end of the teaching period using script-fading, the children's novel responses to peer initiated conversation was close to 100%; 99%, 99%, and 98%.

The size of the study (N=3), makes generalizing this data to a larger population of children with Autism difficult. It is also unknown how long the study took to execute. The authors point out that the study was not conducted in another setting besides the classroom setting and that further research is needed to see if the skills promulgated by script-fading are transferable to other settings. There was no indication that script-fading was taught to other adults, i.e.: parents, caregivers, or teachers, with who the children interacted. Finally, it was only when the children were instructed that it was time to engage in the activity of sharing toys that the peer engagement took place. The authors suggest another study where that incentive to engage is also faded, like the script-fading.

## **Group Teaching**

Group teaching is when teaching interaction skills in a group setting with peers as opposed to one-on-one with an adult. The intervention model used may differ but the goal is to increase interactions, initiations, and appropriate responses. The group of children may all have a social skills deficit or the group may be a combination of children with social skills deficits and neurotypical peers. Two studies that examined group teaching as an intervention for social skills remediation met the inclusion criterion for this extensive literature review. Both studies use neurotypical peers for assisting in modeling appropriate social skills for the others in the group who have an Autism disorder diagnosis.

Published in 2009, Banda et al reported findings utilizing group teaching to instruct children with Autism spectrum disorders along with neurotypical peers in group social skills instruction time. This study explored the acquisition of cooperative language as measured by the number of conversations initiated and responded to by the participants. The intervention was comprised of adult modeling, prompting, and reinforcement. The composition of the group included two six year old boys (N=2) both of whom had a diagnosis of PPD-NOS and two to three typically developing peers. There was no information regarding the boys' families or the location of the research. The boys were in two separate typical kindergarten classrooms of 15-20 students in a traditional school setting. The group teaching intervention took place at the center time when all children were placed in groups of three to five students and they rotated through a series of five to ten activity tables in 15 minute increments with different cooperative academic tasks at each table. The children were observed by the researchers during this time for their initiation and response to conversation and only the activities that were cooperative playing or sharing materials were recorded.

The intervention began with a training session which lasted approximately five minutes where the children had the social skill modeled by the adult. They were then instructed by the adult in inquiry and response to others. If a child was unable to ask a peer a question, the adult would model the skill again and have the child repeat after her/him. When the child was successful at asking a question the adult would recognize that skill verbally restating what they had just done, for instance “good job asking for the block.” Then the adult modeled how to respond to questions asked using the same method, modeling in instruction, prompting a response, modeling if the child was unable, and recognizing the specific skill when the child responded.

Once the instruction was completed and while the children were still seated as a group, data collection on initiation of conversation and responses to questions began. The adult encouraged the children to ask each other a question. When there was a prolonged lull in the conversation lasting longer than five seconds, the adult would verbally prompt one of the children to ask a question of the others. This pattern of interaction between peers and prompting by the adult lasted for approximately another five to ten minutes. Once the data on the frequency of conversational initiations and responses were recorded, a third independent rater analyzed agreement between the two observer/ raters. The integrity of the procedure at the table was also assessed by the third rater by following a checklist of the procedural method. The total number of sessions was 17 for one of the boys and 13 for the other boy.

Banda et al reported in their journal article that “results indicated that the social skills intervention provided immediate and robust improvements of social initiations and responses in both participants.” At the initial assessment, one boy’s average initiations were 1.0 in a range between 1 and 2 and during the interventions his average initiations were a 9.7 with a range of 4-

17 initiations. This boy's responses also improved from an initial assessment of 1.0 with all values being 1 to a response average of 9.3 with a range of 5-13 responses. The second boy's initial assessment of initiations was an average of .5 with a range of 0-2 and during interventions the second boy's average was 9.4 with a range of initiations of 7-15. When looking at the second boy's responses at baseline, before the intervention, his average response were .63 in a range from 0-3 and during the intervention his average response increased to an 8.2 with a range of responses from 5-12. The authors cite that they believe that the intervention achieved positive results because it integrated three well known and researched tactics: clear modeling, prompting, and reinforcement. This author also believes that having the peer element may have made the activity/intervention more enticing for the two boys with Autism. Clearly, the size of the study is problematic along with the fact that it was not studied after the intervention to see if the skills maintained over time.

A second study using the group teaching technique was published by Leaf et al in 2010. In this study four social skills were taught and then measured for acquisition and generalizability. Neurotypical peers were also included in the social skills instruction, five of the children in the group were diagnosed with an Autism Spectrum Disorder (N=5) and two were neurotypical peers. The children with Autism were between the ages of four to six years old and they had to meet three criteria; they needed to speak in full sentences, they could not currently have self-injurious behaviors, and they needed to have good receptive language. The setting of the research was a university's preschool program during the afterschool program and the research took place over a seven-month period and a sub-set of two children worked on the same social skills interventions for five of the seven months. Each intervention teaching discrete social skills occurred two times a week for one and a half hours. The skills introduced to the children were

based upon parental answers to the *Social Skills Rating Scale* and included: showing appreciation, giving a compliment, making an empathic statement, and changing the game when someone was disinterested (Leaf et al, 2010, p.188). These skills were measured during the study at baseline and then measured for acquisition, generalizability, and maintenance. All skills taught in group sessions were the same for each child and each session had two teaching components, a play component with both structured (ex. games) and unstructured play (ex. painting), and additional instruction on social skills not targeted in the research.

Sessions had a specific structure: introduction of the social skill by the instructor and why it was important, repetition from each child stating what the lesson was, projection from each child as to why that skill might be important, and speculation from each child about a time when the skill might be used. This is known as teaching interaction procedures. At this point the instructor discussed the skill and broke it into stages; at each stage a different child was asked to repeat what the instructor said and then the entire group repeated the stage of the skill until all the stages were named and named in the correct order by the children. Skills were then modeled for the children using the instructor and an adult assistant. Children were asked to evaluate the adult assistant's response and to name a change in the response if the skill was not appropriately reenacted. Lastly, the children role-played the social skill in front of their peers and if they were accurate in their portrayal they received praise and a token, in this case three tickets. If a child missed a step in the social skill portrayal, the child was given the correct response and given another opportunity to show the skill with the reward of praise and two tickets. If the child needed a third opportunity to model the skill, the adult used prompting to assist the child in achieving the appropriate responses. Verbal praise and one ticket were given for this final prompted response. For the research, only the first response was recorded. Maintenance sessions

were conducted after all skills were taught and were held using the same structure as the instruction and as with the instruction, only the first response was recorded for the study data.

Generalization was assessed throughout the study from the initial baseline through maintenance. Prompting and positive reinforcement were both used by the adult to encourage the appropriate responses. Generalization occurred prior to the session and involved using an adult who was not associated with the instruction. The adult began a social interaction that had not been specifically taught to the children. An interaction was initiated three times and if the child responded appropriately there was no reinforcement. If the child was not successful, a second form of the generalization inquiry was implemented that involved both positive reinforcement and re-direction if the child was inaccurate. For example, if the child had been offered a piece of candy and the appropriate response was not elicited, the second generalization probe might involve a small toy being offered instead. If the child was not successful with this level of generalization inquiry, a third and final generalization inquiry was used which included re-teaching the skill one to two minutes before beginning the social skills interaction. If the child was accurate, praise was given and if the child was inaccurate the child was corrected and practice of the skill was encouraged.

In gathering the data, inter-rater reliability was tested. The baseline, maintenance, and generalization data were all in the 92.8% -94.8% range of reliability between independent raters. In examining the degree of social skills acquisition for each of the study's five participants, the results were variable, with two of the children mastering acquisition of all four skills, two reaching mastery on two of the four skills, and one child reaching mastery on three of the four skills. When examining the generalizability of the skills over a three-day period of assessment,

only one child was not 100% successful, and this was one of the children who did not attend all 7 of the months of intervention.

Results from this study are very encouraging; social skills were acquired by all five of the children and generalization was achieved by four of the five of the children. The authors cite three significant contributions of this research to the study of social skills acquisition in young children with Autism spectrum disorders. First, they state that this research adds to previous empirical studies and substantiates that social skills can be successfully taught using an interaction method to children with Autism. Secondly, the results indicate a high degree of generalizability with the children adapting the skills learned to other social situations. This is the ultimate goal of teaching social skills. Finally, findings validate other studies that indicate that a group teaching method can be successful in teaching children with Autism.

Limitations include the size of the study and its generalizability to a larger group, the ability to generalize to different settings, and the fact that one child was unable to apply the skills without assistance from the instructor and prompts/reinforcements. The authors also suggest that because the children are so high functioning, the data are not applicable to the majority of children with Autism.



## **Joint Attention**

Between 2004 and 2014, joint attention skill training was the most studied intervention for teaching social skills to young children between the ages of three to six years old with Autism spectrum disorders: in fact there were five research articles written between 2006 and 2012 looking at joint attention as a method to help children with Autism. Joint attention skills are defined as “involve [ing] sharing attention with others through pointing, showing, and coordinated looks between objects and people” (Kasari et al, 2006, p. 611). Joint attention is usually examined by looking at two separate skills, initiating the shared experience of looking at an object or occurrence and responding to an initiation to look at a shared object or occurrence from another person (Isaksen et al, 2009). For instance, an adult observes that the child is looking at something like: a bird; a toy; food; or another person as examples. The adult, observing the focus of the child’s attention comments on what the child is watching. Conversation is based upon the child’s interests at that moment. Although this skill sounds very basic, it is important since it is an initial skill in the comprehension that others have mental representations or thoughts of their own (Kasari et al, 2006). It is also a skill that is typically lacking in children with Autism as well as HFA/AS (Kasari et al, 2006, Isaksen et al, 2009).

The first study selected was published in 2006; Kasari et al looked at not only joint attention but symbolic play in young children with Autism. For the purposes of this paper, joint attention will be the sole focus in examining the research outcomes because joint attention is the specific intervention in question. Twenty children with Autism in this study of 65 children were randomized into a group where joint attention was the focus of the intervention. The other two groups were symbolic play and a control group. The children were solicited from an intensive early intervention program that they were attending and the skills being studied were not being

taught in that program. The children were all either three or four years old with a formal diagnosis of Autism, they needed to be free of other medical conditions including seizures, they had to live in the area, and they needed to commit to four weeks in the intensive early intervention program. The children were independently assessed to confirm their Autism diagnosis using the ADOS, the ADI-R, and other child assessments by clinician who knew nothing about the research study (Kasari et al, 2006, p. 612). Of these assessments, the *Early Social-Communications Scale* is of particular interest since it looks at the frequency of initiations and responses of joint attention and is known for both its reliability and validity from its use in other studies (Kasari et al, 2006, p. 614). In addition, mothers and their children were video-recorded playing and parents were given a questionnaire regarding their child and their family. At the end of the intervention these same assessments were replicated. On average, each child receiving joint attention interventions received 28.6 sessions. Mothers' education, demographics, ethnicity, and gender were also taken into consideration and it was determined that none of these variables had an impact on the outcomes of the study.

In preparing the interventions and treatment goals, the outcomes of the initial assessments were used to establish the child's preliminary goal. Children worked with trained graduate students for approximately 30 minutes each day and the intervention lasted five to six weeks in duration. The approach used by the graduate student/ experimenter began with five to eight minutes of training at a table on the treatment goal that involved verbal prompts, modeling, and physical prompts with positive reinforcement. The experimenter and child then moved to the floor where they replicated the prior training with the experimenter using less structure. In fact, the experimenter was integrating the goals of the skill with what was occurring naturally within the environment and with the child.

Principles applied on the floor included following the child's lead and interest in activities, talking about what the child was doing, repeating back what the child said, expanding on what the child said, giving corrective feedback, sitting close to the child and making eye-contact, and making environmental adjustments to engage the child (p. 614).

This was a child-focused intervention that relied upon the child's interest in the environment and the experimenter being concentrated on responding to what captures the child's attention. The child successfully mastered the goal of the intervention when the child exhibited the goal three times at the table and three times on the floor without the experimenter prompting. On average, each child in the joint attention group received 28.6 sessions with their experimenter. The reliability of the experimenters to adhere to the preplanned intervention was also considered and at the table and on the floor the average range of fidelity was between 92% and 95%.

In evaluating the data for the group of children who were being evaluated for the joint attention intervention, means and standard deviations of both the ESCS and the video of the mother/child dyad at play were used. Independent coders, blind to the parameters of the study examined the mother/child dyad videos at both pre-treatment and post-treatment, counting the number of seconds that the dyad was mutually interested in the same object. The results indicate that there was an intra-class coefficient between the two raters of .78 in a range of .65-.95. Data outcomes examined included the following results. Initiation skills were examined and the joint attention group showed greater progress than the control group: .70 initiations as opposed to the control groups .17 initiations. Responding skills for the joint attention group had the most significant positive change over time with 16.55 joint attention responses compared to the control groups 9.35 joint attention responses. The number of joint attention responses for the

control group actually decreased from pre-treatment to post-treatment as the initial number of responses pre-treatment was 12.04. Additionally, the joint attention group had the most positive change compared with the control group studied when the children were evaluated by the independent raters with their mothers in regards to both giving and showing.

This study supports other research that children with Autism can learn discrete social skills such as attending to another person's interests and joining in that attention. Additionally, the children were able to use their newly acquired skills when interacting with their mothers, indicating generalizability. Finally, because joint attention was compared to a control group and showed improvements compared to the control group, it could be thought that the child centered method of the intervention was what helped create the clear, observable progress in gaining interactive social skills.

The second journal on joint attention interventions was published by Isaksen et al (2009). These authors addressed two research questions:

- (1) To what extent can children with Autism learn joint attention skills through ABA-based training that includes treatment components specifically designed to establish normal social reinforcers? and
- (2) Can maintenance of acquired joint attention skills be enhanced, compared to previous studies, by adding training components that explicitly target the establishment of typical social consequences as conditioned reinforcers (p. 220)?

The research design involved four children between the ages of three and five, two boys and two girls, who were all diagnosed with Autism and attending a full day traditional kindergarten program in Norway. Inclusion criterion for the children along with an Autism diagnosis was that they needed to be able to cooperate with adults and follow adult directions, and they needed to have language abilities of at least a 12-14 month old. The study and

evaluations of the children took place in their classrooms and training was executed by the school therapist and parents. The school therapist provided the intervention one hour a day and parents were considered an important part of the study because the researchers wanted the children to be exposed to the skills frequently and learn them in as many settings as possible.

Baselines were gathered individually for each child using a modified version of the Early Social Communication Scale (ESCS-m) and repeated as each of the four children entered the study. Three baseline tests were held in all and after the intervention post-tests were administered to the four children. Inter-rater reliability was used to randomly assess the baseline and post tests and for 25% of all of the tests, inter-rater agreement was calculated and their agreement level was in the range of 90%-95%.

The intervention method was the same for each of the four children and had three distinct segments: first the child was taught how to respond to another's initiation of joint attention; then the child was exposed to typical reinforcers like smiling and nodding; and finally the child was taught how to go back and forth between initiating and responding to others, especially when engaged in taking turns, like playing a game. In order to make the interventions as appealing as possible to the children, items and images were gathered to which each child was attracted based upon parent feedback. There were four staged activities within the three segments of responding, exposure to reinforcers, and back and forth interactions and each activity built upon the next in sequential order and attempted to gain and maintain the child's attention. The first four interventions activities in the category of responding to another's initiation of joint attention was executed using tapping, pointing, and gazing to get the child to join with the therapist in attending to one of the preferred objects. In the next segment of interventions, the child responding to common social reinforcers over four consecutive skills that built upon the other

with the adult's non-verbal positive facial response like a smile or the nod of the head indicating that the child could proceed with the toy. Lastly, the intervention of turn taking had two discrete social skills divided into two stages. The first of each of the two social skills involved the therapist's taking a turn and the second of the two social skills made use of the help of a second adult to assist the child in preparing a turn taking response for the therapist. All of the joint attention social skills interventions in this research were executed with no language or minimal language, using pointing, facial expressions, gazing, and touching. Minimal language consisted of concrete praise for a correctly accomplished task or to correct the child, such as the phrase "ah-ah." The purpose of minimum language was to direct the child to look at the adult for reinforcement, a skill that is often missing in children on the Autism spectrum.

The results of this study showed that the four children made significant progress in the 33-61 days that it took for each of them to complete the study from baseline to post-training. The authors note that as with other studies, the children initially were stronger at responding in joint attention as opposed to initiating joint attention. During the multiple baseline data collection, there was no improvement in either response or initiation of joint attention either which led the researchers to conclude that the improvement of both was due to their method of training joint attention. One month after the study, both skills of responding to joint attention and initiating joint attention had stayed constant. The researchers identified several variables in their analysis that are different from previous research that they believe contributed to the positive outcomes of their inquiries compared to past studies. Using materials that appealed to each child was one beneficial addition to their study as these materials gave the children reason to want to initiate interaction with the therapist. They also identified the value of training the parents to use the same procedures thus reinforcing their method when the child was not in school but in other

settings at home or in the community, thus encouraging generalizability to other settings. It is important to point out that there were no aversives or negative reinforcement in this study.

Additionally, the reinforcing responses that were provided by the therapist or by the parent were reinforcers that are typically found in social interactions. Finally, this study like many of the previous studies lacks a large sample size, thus making it difficult to generalize the outcomes to a larger population.

As a final point, a principal focus of this study involved promoting child-initiated, positively-reinforced sharing thus changing the typical conditioning reinforcers for children with Autism. This change in practice included: decreasing intensive control by adults; removal of aversives; and discontinuing practices like the removal of the desired object if the child does not respond.

In the year 2012 there were three research articles on joint attention interventions for young children with Autism. Lawton and Kasari (2012) studied teaching preschool age children with Autism how to initiate joint attention in a public school setting. Kaale et al (2012) also looked at using a public school setting but had two groups that they studied, one group that received an intervention for joint attention and joint engagement in addition to preschool and one group that only attended preschool. The final study published that year by Aldred et al, involved training parents to provide the intervention to improve joint attention.

Lawton and Kasari (2012) studied outcomes associated with having the children's teachers act as the interventionist using the Joint Attention and Symbolic Play/ Engagement and Regulation (JASP/ER) treatment plan: a researched intervention model that had demonstrated previous positive results.

In this study, researchers randomly assigned 16 children to 16 teachers in a full-day typical kindergarten classroom. There was no information regarding the children's families or the geographic setting. Nine pairs started initially; the immediate treatment group (IT) and 7 pairs started their part of the study six weeks later; the delayed treatment group (DT). Inclusion criterion for the children involved in this study included the following: the child must be identified by their school district as having an Autism spectrum disorder; must be considered as having Autism using the *Autism Diagnostic Observation System- Generic*; must be between the ages of three and five years old; must attend a public school for at least four hours a day for three days of the week; must have a teacher or paraprofessional who is currently paid by the school district and willing to be a part of the study; and must not have any other medical conditions, diseases, or disorders. Additionally, the teacher had four conditions that needed to be met if they were to be accepted in to the study. The teacher needed to be hired by the school district for the entirety of the hours that the child was in school; needed to stay the child's teacher for all of the study; needed to be able to attend meetings regarding the intervention; and only would get one child in the study to teach.

Baseline data were collected including the *Early Social Communication Scales*, a classroom observation of the child, and a video of the child at play and interacting. All data that involved an assessor's evaluation were reassessed for validity using a researcher blind to the study's hypothesis or methodology (Lawton & Kasari, 2012, p. 688).

The IT groups were taught joint attention by their teachers who used the JASP/ER strategies. These social skills strategies were taught to the teachers via several diverse trainings, including an initial one hour workshop, weekly meetings with one of the study's researchers, and twice weekly for 30 minutes when the same researcher went into the classroom to work with the



child/teacher pair. There were 11 JASPER/ER strategies implemented by the teachers and these strategies diverged from the original JASP/ER protocol for teaching joint attention due to the fact that all of the original JASP/ER strategies were not used; the strategies for this research were less intensive than the original; the strategies were not taught in order; and a new strategy was almost always introduced at each session. The JASP/ER strategies may be seen in Chart 2.

Chart 2.

<b><u>JASP/ER Strategies</u></b>	
<b><u>1. Setting up the Environment-</u></b>	The teacher chooses toys that will appeal to the child, ensures that the child can easily access the toys, removes distractions, and sits facing the child.
<b><u>2. Following the Child's Toy Choice-</u></b>	Play is initiated by the child's interest. If the child does not initiate, the teacher follows the child's gaze and assists the child in engaging with it.
<b><u>3. Imitating the Child's Play Actions-</u></b>	As the child appropriately uses the toy, the teacher repeats the child's actions within sight.
<b><u>4. Prompting for Play Actions-</u></b>	When the child does not use the toy appropriately, the teacher gently prompts, using modeling, moving the toy closer to the child, or directing verbally.
<b><u>5. Establishing Play Routines-</u></b>	Together, teacher and child create a pattern to their play that they repeat as created.
<b><u>6. Violations-</u></b>	When the pattern of play gets changed.
<b><u>7. Waiting for Communication-</u></b>	Giving the child the time needed to speak. Pausing between each section of the established play routine to allow for the child to respond verbally.
<b><u>8. Contingent Language-</u></b>	Teacher talks about what is occurring in the play and the item with which the child is playing.
<b><u>9. Prompting for Joint Attention-</u></b>	Targeting a joint attention skill and providing other opportunities to use that skill. Using a least-to-most hierarchy of language and intrusion to engage the child.
<b><u>10. Modeling Joint Attention-</u></b>	The teacher executes the skill being taught at that time in front of the child.
<b><u>11. Encouraging Eye Contact-</u></b>	The teacher is always at the child's eye level and holds toys close to the child without being intrusive.

(Adapted from Lawton and Kasari, 2012).

The DT group of children was randomly assigned to a teacher and the treatment protocol was the typical intervention for children with Autism in the Los Angeles public school setting.

Results from the data collection from the IT group were analyzed and compared to the DT group using analysis of covariance (ANCOVAs). A reliable change index (RCI) was used to look at any changes from the standard population when data findings were significant. The IT teachers' implementation of JASP/ER was analyzed to ensure that their use of the intervention was authentic to its designed purpose and that they were using it at both observed and unobserved times.

The outcome of this research on joint attention was significant in that the IT group of children improved in their total joint attention skills from a mean of 1.67 to a mean of 7.00 ( $p < .005$ .) compared with the DT group who began with a mean of 2.43 and concluded with a mean of 1.83. This study was also unique because it involved teachers being trained in providing joint attention training for children with Autism as opposed to researchers providing the designed intervention. As the authors point out, one of the successes of this intervention was that the teachers were trained to implement the JASP/ER methods and they used the methods throughout the school day. The study size of 9 children who received the intervention is again a limitation, like many if not most of the other empirical studies available to date that fit the inclusion criteria for this study.

Another research study on joint attention was published in 2012 by Kaale et al from Norway. This group of researchers was interested in a premise similar to Lawton and Kasari's (2012) namely, could teachers provide training in joint attention to preschool age children with Autism and would their social skills improve in comparison to a control group of same age peers

with Autism. In addition however, they also planned to train mothers in the joint attention method to help the intervention group of children to generalize the skills to other environments.

Inclusion criterion for the children was as follows: an age of two to five years; a confirmed diagnosis of Autism per Norway's standards; and attending a preschool. Children who had neurological disorders in addition to Autism and children whose families did not speak Norwegian were excluded from the study. There was no information about the families' socioeconomic status. Altogether there were 61 children included in the study. A baseline assessment of all 61 children was conducted by independent evaluators. Three different situations were evaluated for both joint attention and joint engagement: the child during semi-structured testing using the *Early Social Communication Scale* (ESCS); the child at play with the teacher; and the child at play with the mother. The ESCS was scored and interrater agreement was calculated for validity of the assessment. The two play segments were also scored based upon the degree of joint attention and joint engagement the child had with the teacher and the mother. After the baseline assessment, the children were randomized into two groups by one of the authors and all adults who were in contact with the research were blind to the randomization. Twenty seven children were in the control group and received treatment as usual per the Norwegian preschool model. Thirty four children also in the Norwegian preschool setting, received the joint attention intervention which was modeled after a joint attention manual written by Kasari, Freeman, & Paparella in 2006 (p.100). The goal of the intervention was to increase the children's frequency of showing, pointing, and giving and the teaching took place in a separate room from the preschool room, two times a day over an 8 week period with a goal of a total of 80 sessions. Five minutes were spent teaching the child the skill while at a table then the exercise moved to the floor for 15 minutes of play where the skill taught was interjected as often

as possible. The teaching style at the table was fun and engaging, using toys or objects, exaggerated interest by the teacher, and the modeling of joint attention. Sometimes a bag was used to hide the toys before presenting them. The floor play was instigated by the child with the adult modeling joint attention. The child set the play routine and the adult talked about what the child was doing, all the while both encouraging and responding to joint attention.

Eighteen counselors from Norway's Child and Adolescent Mental Health Clinics received a three day training and five rehearsal seminars in the joint attention method and these counselors gave the teachers weekly support and direction. The teachers had not been trained in joint attention prior to this study and they received a six hour hands-on training from the counselors. Parents of the children receiving the joint attention intervention were invited to attend the six hour training and 20 mothers chose to attend. Counselors were responsible for authenticating the fidelity of the teacher's interventions, evaluating both the table instruction as well as the floor play. Over the 8 week period the mean fidelity was 85% when instruction was given at the table and 83% when the teacher was playing on the floor with the child. Data on the fidelity of the mother's interventions with their children were not collected. Outcomes of the two variables, duration of the child's joint engagement with mother and duration of the child's joint engagement with teacher were measured using analysis of covariance (ANCOVA). By measuring joint engagement in addition to joint attention, the researchers were evaluating a higher level skill than being able to get another's attention around an object; the skill of two people interacting together over a common interest or object.

When comparing the control group of children with Autism to the intervention group, the data was statistically significant (pre mean = .7; post mean = 1.8) and indicated that the children who received joint attention skills training exhibited five times more joint attention behaviors

when interacting with their teachers. This skill then extended to the same group of children having greater joint attention (pre mean = 1.1; post mean = 2.4) and longer joint engagement (pre % = 45.1; post % = 57.3) with their mothers. The social skills training did not impact how the intervention group scored on the ESCS or the length of time that they had joint engagement with their teachers. Overall however, the authors felt that focusing on improving a social skill, such as joint attention brought about positive change regardless of who was delivering the intervention.

The last research article on joint attention included in this study and published in 2012, was a mediation analysis of a randomized control trial. Aldred et al looked at the research of Aldred, Green, & Adams (2004) to extrapolate additional data regarding the impact of training parents in synchrony, or “verbal non-directive communication act[s]: comments, statements or acknowledgement of the child’s focus of attention” (p. 452). This study from 2004 found that when parents were trained in verbally responding to their child with Autism, children’s social skills and communication improved in comparison to a control group whose parents did not receive any direct training in verbal responses. Of the 28 children researched, whose ages ranged from 2-5 years old, 14 of their parents received training and 14 were considered treatment as usual (TAU). In the 2004 study a measure of *Parent-Child Interaction (PCI)* was used which measured the communication between parent and child, which was considered a tool for improving the child’s expressive vocabulary as well as their ability to communicate with their parent(s) during parent/ child playtime (Aldred et al, 2012, p.448). By using the data collected from the PCI along with the *Autism Diagnostic Observation Schedule (ADOS)*, Aldred et al (2012) were able to measure the impact of the intervention of teaching synchrony to parents using a test of mediation, also known as Barry and Kenny’s (1986) test of mediation (Aldred et

al, 2010, p.448). This is used to determine the effect of a particular practice on the relationship between an independent variable and a dependent variable. The variable of synchronous parent communication as measured through the PCI was measured against the treatment outcome of the child using the ADOS. Because the sample size was small, the bootstrap method for analyzing the data was used thus confirming the mediation data indicating an improvement in parental communications. “The fact that the bootstrap CI [confidence interval] does not contain zero implies that the estimated indirect effect is significantly different from zero, and confirms the mediation finding” (Aldred et al, 2012, p.450). Findings supported the premise that changing the parents’ synchrony with their child did reduce the targeted autistic behaviors of lack of communication and deficiencies in language skills as found on the ADOS, specifically on the social communication algorithm score.

### **Outcomes of the Thirteen studies**

The thirteen studies which were conducted over a ten year period resulted in outcomes that were generally positive for the children with AS who were the subjects of the research. For the most part, the children who were between the ages of three and six years old, were able to join a general education population in elementary school, had increased their play time with their peers, had a positive change in their IQ, and had improved in both expressive language and communication skills. Additionally the children increased their novel responses, social initiations, and social responses. For the majority of the children, their newly acquired social skills became generalizable, they were able to attend to another person’s interests, and they improved in joint attention skills.

Next, the current educational options for parents with children who have AS is briefly outlined and the educational method compared to the outcomes of the integrative literature is introduced.

### **Chapter 7: What are the Educational Options?**

#### **Educational Settings that Promote Social Skills in Children with AS**

Currently, there are evidence-based educational settings equipped and prepared to meet the needs of children, including those with AS, through an emphasis on positive behaviors and the development of social skills. Instructional methods validated through organizations such as the Association for Positive Behavioral Support (APBS), the Frank Porter Graham Child Development Institute, and the National Head Start Association provide support and training for schools that aspire to include social skills and pro-social behaviors in their classrooms (Catlett, C., 2014; Knoster, Anderson, Carr, Dunlap & Horner, 2003; Reynolds, A.J., 1994).

In addition to these types of settings, there have been educators and psychologists who have developed curriculum for children with AS to be used in a variety of educational settings. Often these curriculums are packaged with teachers manuals and may also have materials that the child with AS uses to learn the social skills. Jed Baker PhD, Tony Attwood PhD, and Carol Gray have all developed curriculum to be used in general education classrooms, special education classrooms, and in therapeutic settings to help children on the Autism spectrum, including children with AS, to acquire social skills and positive behaviors ( Attwood, T. , 2004; Baker, J., 2006; Gray, C.A. & Garand, J. D., 1993).

Another educational method that could be considered for children with AS which also imparts social skills instruction in the classroom is known as the Montessori Method of Education. This educational method was originally designed to meet the specific needs of



children who had disabilities, therefore it warrants exploration as a possible means of delivering social skills interventions. To date, very little has been explored regarding the potential goodness of fit between Montessori social skills approaches and the needs of children with AS. Based on this author's professional experience as a Montessori teacher for over 17 years and observations about social skills teaching that goes on in these classrooms, this author set out to explore whether the Montessori Method was similar to evidence based social skills instruction recommended for children with AS. Using textual analysis, the seminal works of Dr. Maria Montessori, Dr. Nancy Rambusch, and Dr. Angeline Stoll Lillard, pivotal writers on the Montessori Method, were examined to see how the Montessori educational environment addresses social skills and social learning acquisition. The following chapters address how empirical interventions shown to help children with AS do and do not overlap with the Montessori Method. Implications for parents, teachers, social workers, and other providers, as well as policy makers are provided.

### **The Montessori Method of Education**

The Montessori educational method was developed by Dr. Maria Montessori in the early 1900s in response to her interest in teaching intellectually disabled and deaf-mute children. Her interest in children with learning differences led her to question teaching practices which in turn instigated Dr. Montessori's development of her educational method (Kramer, 1988; Standing, 1962). For more information regarding Dr. Montessori's personal credentials and her professional experience, see Appendix C.

Montessori's educational theory has several proposals which were novel in the early 1900s but have since been incorporated into contemporary understanding of child development (Lillard, 2007). For example, furniture is now made child sized rather than the child using

furniture that is too large. Many children's toys today bear similarity to Montessori designed educational materials. But to be clear, the Montessori educational method is both a way of teaching children as well as a way of interacting with children based upon a supposition about how they develop and learn (Lillard, 2007; Montessori, 1974; Rambusch, 1998).

Montessori believed that the most important time of learning in children's lives was the period between the ages of birth to six years of age. In her lifetime, a university education was highly valued, but she believed that the learning that takes place at the university level was not as important as the learning that occurs in the first six years of a child's life (Montessori, 1982). Montessori believed that these first six years were the years that would leave a lasting mark on the child and influence the child as an adult.

Classroom time in a Montessori classroom is spent with the children engaging in educational activities on their own, with a peer, or in a small group. Teachers initially show the students how an activity is performed but then they allow the students to explore the materials freely (Montessori, 1980; Rambusch, 1998). Montessori believed that teachers should carefully decide what educational activities are put out on the shelves for the children to take down to their work space and use to learn. Once an activity is designed and assembled by the teacher, the teacher's job is to observe the child in the classroom using the material. The teacher's observation would then inform her/him whether the material should be changed or adapted in any way to make it a better learning tool for the students. Montessori believed that the learning in a classroom works best when it is multidirectional with the classroom environment, the teacher, and the students all impacting and learning from each other (Montessori, 1980; Rambusch, 1998). This was contradictory to classrooms in the early 1900's as well as most traditional classrooms today (Lillard, 2007; Rambusch, 1998).

Repetition of a learning activity is encouraged and viewed positively (Lillard, 2007; Montessori, 1981; Rambusch, 1998). Learning materials begin as concrete objects that are manipulated to find out the learning objective. Through repetitive use of the educational material over days or weeks, the student learns the objective of the exercise. Montessori believed that the repetition and manual operation of activity is where the learning occurs for children and each material by design is self-correcting; therefore a teacher is not needed for the student to know whether or not they have mastered the learning objective. When mastery has occurred, the learning material naturally loses its appeal to the student and the student moves on to the next activity that teaches the subject matter.

Unlike traditional early childhood educational settings, children in a Montessori classroom are encouraged and taught a myriad of self-help skills which they are able to practice in the classroom environment, such as sewing, polishing, cutting, sweeping, transferring solids, and pouring liquids (Lillard, 2007; Montessori, 1980). These learning activities are called the “Practical Life” lessons and they are located in the area of the classroom that bears that name. Another activity for children which Montessori developed and that is found in the Practical Life curriculum is called “Lessons of Grace and Courtesy”. These lessons provide the modeling and direct instruction on social skills as well as direct instruction on interpreting social cues. All students practice appropriate greetings and responses; food serving skills that included “would you care for a snack” as well as “yes please” and “no thank you”; skills for welcoming a guest to the classroom; appropriate nose blowing and sneezing skills; and almost all other social skills one could imagine in a classroom setting (Lillard, 2007; Standing, 1962). Dr. Nancy Rambusch, the founder of the American Montessori Society said “[T]o the question ‘what provision is made

for socialization?’ one could reply that the very condition of learning in this Montessori environment depends on socialization as an atmospheric element” (Rambusch, 1998, p. 79).

One of the techniques that Dr. Montessori developed to teach new language, ideas, and properties was called a “Three Period Lesson” (Montessori, 1980; Rambusch, 1998). This method is used frequently in Montessori classrooms to teach many different curriculum areas. The three periods consisted of first teaching the name of an object or behavior. When the teacher observed that the child was familiar with the object or behavior, the teacher would ask the child to ‘show me \_\_\_\_\_’ (insert the name of the object or behavior). The third part of the lesson was given when the teacher was certain that the child knew the answer, therefore building confidence in the child by ensuring success. ‘What is this?’ is the final part of the three period lesson.

In a Montessori classroom, the teacher carefully considers the placement of each of the materials in the classroom, a practice which is known as “the prepared environment.” The work cycle of the day and the time dedicated to the children’s individual choice is also carefully monitored, allowing the teacher to orchestrate opportunities for children to make choices and adjust to transitions in the school day (Rambusch, 1998).

Montessori observed in her students’ behavior that given the opportunity, they could be as good, if not better teachers to each other than the classroom teacher. Montessori put great value in peers teaching peers and in children solving their own problems (Montessori, 1982). This aspect is considered so important that most Montessori classrooms have a peace table or problem solving area. With modeling, the children see from their peers as well as their teacher, the components to solving a problem. The teacher is available to directly model the steps of conflict resolution should the children have difficulty with finding an outcome that satisfies both parties.

All classroom activities, which Montessori teachers call the children's "work", are asserted to help children to not only be physically independent, but they also help to develop concentration, attention to detail, and motor skills (Montessori, 1980.) The Montessori classroom environment also differs from a traditional school environment. Curriculum is grouped according to subject on the shelves with learning activities progressively ordered on the shelves from the simplest lesson to the most difficult; from concrete concepts with didactic materials to abstract concepts that have few physical parts. The primary subject areas of a Montessori classroom include but are not limited to; the practical life area, sensorial area, math area, and language area and these subject matter sections of the room are partitioned with either low walls or shelves, providing smaller areas for children to learn. Learning may take place on the floor as well as at tables with chairs. Children are free to choose any activity on the shelves. Quiet spaces are provided to read, look at books and magazines, or listen to music using headphones (Montessori, 1982).

Dr. Montessori believed that the child needs to have as much power and control in the classroom environment as possible, therefore there is little put into the classroom that has not been carefully thought of with the express purpose of the students being able to execute its use. There is nothing that the children cannot touch. If there are things that children should be discouraged from using or picking up, they are removed from the classroom. The students execute all of the chores of the classroom, sometimes with the assistance of a peer or a teacher. Cleaning, sweeping, watering plants, caring for pets, preparing the classes snack, washing dishes, or cooking a meal are all done by the students and they receive the attention and the credit for their accomplishments. Rules of the classroom for the students are also the rules that teachers must follow. Regardless of one's age or abilities, every living thing in the classroom is treated

with care and respect as equals. It is the students' responsibility to share the events of their day with their family members when they are picked up from school. Conversations are held at the children's physical level so that they are included and they are encouraged by the teacher to answer their caregivers' questions.

### **Outcomes from Recent Research on Montessori**

Studies of the Montessori educational method have looked at such factors as how it effects student engagement, academic success, perceived happiness, children's temperament, as well as the method's ability to accommodate for learning differences (Biswas-Diener, 2011; Buck, Carr, & Robertson, 2008; Cossentino, 2010; Duckworth & Allred, 2012; Epstein, 1997; Lillard & Else-Quest, 2006; Yen & Ispa, 2000). While these outcomes are not the primary focus of this study, it is worth noting that studies have shown that the Montessori Method of education is positively linked with such outcomes as; greater perceived happiness based on the personal control within the educational method (Biswas-Diener, 2011); greater ability to self-regulate, thus improving one's temperament in the classroom and advancing academically (Duckworth & Allred, 2012); superior achievement on standardized testing (Lillard & Else-Quest, 2006); better ability to provide differentiated instruction for learning differenced students, which includes Montessori teachers' perceptions that they are able to meet these children's educational needs (Cossentino, 2010; Epstein, 1997); and an increase in student engagement as measured by academics, behavior, executive function, and positive relationships with teachers and peers (Buck, Carr, & Robertson, 2008). In one study of children's temperament and activity levels, it was suggested that very active preschool age boys might benefit from a more traditional preschool classroom as opposed to a Montessori classroom but that a Montessori classroom was a good fit for both normally active to highly active preschool age girls (Yen & Ispa, 2000).

While there is some evidence to support the impact of the Montessori Method on student engagement, academic success, perceived happiness, children's temperament, and the ability to accommodate for learning differences, to date, there have been no empirical studies exploring the impact of the Montessori Method on the social skills of children who have Asperger's Syndrome. Based on the individualization of Montessori education as well as the specific educational method that Montessori developed, the questions remaining to be addressed are "Which needs of AS children might be met by a Montessori style education" and more specifically, "Is the Montessori Method of education similar to evidence based practices for teaching social skills"? And if so, "In what ways are they similar"?

### **Chapter 8: Comparison with the Montessori Method**

Careful examination of the social skills interventions for pre-school age children with Asperger's syndrome or high functioning Autism in the identified articles from 2004 to 2014 illuminates that there are vastly divergent interventions for the acquisition of social skills for children with Autism. Considerations of the interventions when put side by side with the Montessori Method include: the requirements of the adult providing the intervention; the demands on the other children in the classroom; and the specific design of the classroom environment. Upon examination, it is clear that some of the interventions are not at all similar to the Montessori Method of education and that some interventions bear similarities. A thorough comparison of each intervention to the Montessori Method is provided to illustrate which are and which are not similar.

#### **Intensive Interventions and the Montessori Method**

Of all of the interventions for social skills acquisition researched, intensive interventions have the least teaching tenets in common with the Montessori Method of education. The Montessori classroom utilizes the environment to engage children who are free to interact with materials independently. One-on-one or small group lesson time is far less frequent than independent learning time. "The teachers are in the classroom as the guardians of that order that must prevail if the children are to be free to learn" (Rambusch, 1998, p. 78). As was cited in all four of the research article on intensive interventions for teaching social skills, intensive uses one-on-one teaching of the child by an adult for between 25.6 to 40 hours per week (Cohen et al, 2006; Magiati et al 2007; Remington et al, 2007; Sallows and Graupner, 2005). This is in clear



contrast to the Montessori education which promotes a child's self-directed freedom of movement and autonomy in choosing activities without interference from adults. On the other hand, some of the Montessori values that are taught in the classroom were incorporated in the intensive interventions, for instance teaching the skills of empathy which is a specific skill that was named for inclusion in the examination of articles in this research methodology. Two of the four intensive interventions researched incorporated teaching empathy in their manner of teaching social skills (Cohen et al, 2006; Sallows and Graupner, 2005) however; there is no similarity between the intensive method and the Montessori Method.

### **Low Intensity Interventions and the Montessori Method**

Low intensity interventions more closely resemble the Montessori Method of education in the description of the intervention and the use of a mainstream preschool classroom. In the research of Eldevik et al, (2006) a low-intensity intervention was defined as being less than 20 hours per week and the children were with their peers in a typical preschool classroom. Unlike the Montessori Method, the child had a one-on-one aide for the majority of the school day and the social skills interventions took place outside of the classroom in a separate setting. Additionally, 20 hours a week is roughly four hours a day in a five day school week. Aside from group time, which accounts for approximately three fifteen minute segments in a six to seven hour school day, individual or small group lessons do not account for an additional three hours and fifteen minutes. It is not typical for a preschool age child in a Montessori classroom to have an individualized lesson per day, let alone for three plus hours. Eldevik et al (2006) described the one-on-one intervention in their study as follows:

“...[T]he treatment began with establishing basic tasks, such as responding to simple requests made by an adult, imitation of gross motor behaviors, identity matching of

objects, and teaching of simple toy play such as completion of puzzles or putting shapes in a shape sorter. When these tasks were mastered, the treatment moved on to more complex skills such as imitation of fine motor and oral motor behaviors, imitation of sounds and words, and recognizing objects and actions upon request. After the child had acquired vocal imitation of words and basic receptive language, the child was taught to use the words functionally, for example by making wants known and naming objects and actions. Next more abstract concepts such as color, size, adjectives and prepositions were targeted. Subsequent treatment goals included discriminating Wh-questions, conversing and making friends with peers. From the start, the treatment also targeted play and social skills, progressing from functional toy play to symbolic play and cooperative play” (p. 213- 214).

Within that description of this low-intensity intervention, several strategies used in Montessori education are evident, for example: matching objects, shape sorting, and puzzle assembly to name a few, but these are also activities that one would find in a typical preschool classroom. Moving the learning process from concrete learning to more abstract learning is also a hallmark of the Montessori Method, as is learning nomenclature and following adult directions, which is called a “Three Period Lesson” in a Montessori classroom (Lillard, 2007; Rambusch, 1998). A significant difference between a low-intensity intervention which contains inclusion in a typical classroom and the Montessori Method of education is the focus on the adult as the center of the child’s learning. “In Montessori education, the materials and lessons, rather than the teacher, are intended to operate for the child as organizing structures” (Lillard, 2007, p. 148). Rambusch (1998) says of the balance between the Montessori teacher, the child, and the environment, “(T)he focus of the school life for the young child is not his relationship with the

teacher, but his relationship to himself, to his fellows, and to the environment which he is attempting to gradually master” (p.92). Therefore, it seems that a low-intensity social skill intervention is not aptly comparable to the majority of principles of Montessori Method of education.

### **Script-Fading Intervention and the Montessori Method**

Wichnick et al (2009) were the sole contributors from 2004 to 2014 to the research on acquisition of social skills using script-fading with young children who had an Autism spectrum disorder. The script-fading procedure took place at a table and involved the use of a pre-recorded device to help encourage the children with Autism to engage in novel conversation with each other. Wichnick et al (2009) indicated that their research on script-fading intervention did improve the unscripted interactions of the three children in the study. Comparing this intervention with the Montessori Method, there is some similarity between the two. There is no Montessori material or activity that resembles the script-fading intervention developed by Wichnick et al (2009). However, Montessori teachers create materials for the classroom and teachers often make their own activities. If teachers make a script-fading intervention it would bear similarity to a Three Period Lesson. In a Three Period Lesson, firstly, the teacher identifies the action that is to be learned; secondly, asks for identification or mimicry of the learned action; and thirdly, when the skill is fully acquired the child is asked to name the skill. Use of the recording device would replace the teacher conducting the lesson. This is known in the Montessori Educational Method as an “extension” in which “(T) he principles underlying the design of the present Montessori apparatus may be expanded into many new sorts of learning materials” (p. 138, Rambusch, 1998). The script-fading intervention would be placed on a shelf for all students to choose. “Children in Montessori classrooms freely choose their work. They

arrive in the morning, look around the classroom, and decide what to do. They work on it as long as they are inspired to, then they put it away and select something else. This cycle continues all day” (Lillard, 2007, p.80). Therefore, a Montessori teacher might decide to create a material that was like the script-fading intervention, thus providing an opportunity for script-fading to be a lesson in that Montessori classroom.

### **Group Teaching and the Montessori Method**

This sample included two studies that examined the social skills intervention referred to as Group Teaching. Both study designs used neurotypical peers to help the children with Autism with the acquisition of the social skills and both were in traditional child centered environments, one kindergartens and the other an after-school program. Banda et al (2009) developed a two part intervention that involved first teaching the skill in the classroom setting and then using the materials that are naturally found in the environment to prompt the children to ask each other questions. Leaf et al (2010) had a more formalized lesson for teaching the social skill that involves introduction of the social skill by the teacher, repetition of the lesson, projection of the importance, and speculation about the skills use, all from the child. After the teacher talked about the skill and broke it into parts; a child was asked to repeat what the teacher said and then all the children repeated the part of the skill. This was done until all the parts were named and in the correct order by the group. Skills were then modeled by the teacher and an adult assistant. Children were asked to evaluate the response and to name a change if the skill was incorrectly modeled. Finally, the children role played the social skill. Leaf et al used a token reward system with the children in the study.

Group teaching bears some similarities to the Montessori Method. First, there is the fact that this intervention relies on a pre-existing classroom schedule to occur, either during the

school day or afterschool time. Secondly, the intervention included both children with Autism as well as neurotypical children. Third, the lessons are very similar to Montessori's *Lessons of Grace and Courtesy* as well as the *Three-Period Lesson*. "Montessori education includes explicit instruction on social behavior in a part of the curriculum called the lessons of Grace and Courtesy, which are on a par with lessons in math, music, and language" (Lillard, 2007, p.198). Additionally Lillard states, "Unlike other lessons, the lessons of Grace and Courtesy are often shown to the entire class at once, perhaps because gracious social behavior is so clearly a community endeavor" (p.199). Finally Lillard points out, "At older ages, for the lessons of Grace and Courtesy, children might be asked to act out social scenarios for the class, demonstrating successful and unsuccessful ways to interact with others" (p. 199). This method is similar to the intervention designed for the research of both Banda et al (2009) and Leaf et al (2010).

*The Three Period Lesson* is another Montessori Method lesson that bears a resemblance to the intervention designed by Leaf et al (2010). Rambusch uses learning color names in an example of *The Three Period Lesson*:

First the child learns to associate the name of the color with the color; as the teacher shows the child two pairs of color tablets which look like paint chips, she says in touching the yellow one, "Yellow," in touching the blue, "Blue." She then says to the child, "Please give me the yellow. Please give me the blue." At this stage she is asking the child to associate the color with the learned word. The third phase of this exercise, which may or may not follow directly on the heels of the other two, is to ask the child, "Which is this? Which is this?"-anticipating the correct answer of blue or yellow, as the case may be. The child then indicates that he has made the connection between the color and its conventional name (p. 78).

This is akin to teaching probes, maintenance probes, and generalization probes in the group teach intervention designed by Leaf and colleagues when the skills is broken into parts and named and the children are asked to repeat the names of the skill parts and then finally asked to name them on their own.

Banda's research team described in their study the teacher introducing a social skill and then prompting conversation while the children are using typical classroom materials. This intervention resembles the Montessori teacher introducing the *Lessons of Grace and Courtesy* and then supporting the child within the Montessori classroom. According to Rambusch:

One of the principles of the Montessori environment is that much of what children learn is learned through incidental teaching and through observation. It is the job of the teacher to put the child in direct contact with what they are learning, the it is further her job to free them and let them alone once they begin to learn, and not to intrude herself constantly upon what they are doing. She is there to help the children. She is there to answer their questions, to stimulate them, to straighten out their mistakes when they are viewed by the young children as mistakes (Rambusch, 1998, p. 27).

This is similar to the second part of the intervention designed by Banda and colleagues.

### **Joint Attention and the Montessori Method**

Of the five journal articles that looked at joint attention as a mode of teaching social skills to young children with Autism, three articles addressed this intervention's implementation in a classroom setting, one article discussed teaching parents joint attention, and in one article the research took place in an early intervention program. In comparing the joint attention intervention to the techniques implemented in the Montessori Method, all of the researched intervention methods of applying joint attention skills share features with typical Montessori

strategies. One of the primary reasons is that joint attention and the Montessori Method derive from the child's intrinsic interests and use the child's fascination to develop social skills.

In the research of Isaksen and Holth (2009), Kaale et al (2012), and Kasari et al (2006), all three identified the importance of using toys and materials that had a specific appeal to the targeted child with Autism. This is similar to the Montessori Method and the use of special interests to attract the child to the activity or lesson. "One role of the teacher is to connect the child to various areas of the curriculum through the child's personal interests. Thus the teacher ensures that the child's education is broad despite personal interest being an important engine" (Lillard, 2007, p. 115). And Rambusch (1998) states of the Montessori teacher, "She works uniquely on the principle of capturing his [the child's] interest" (p. 59).

When looking at the work of Lawton and Kasari (2012), many of their JASP/ER strategies taught to teachers resemble strategies Montessorians typically use in their classrooms. Of the 11 JASP/ER strategies, 8 strategies can be found in the Montessori Method. The strategies that are not found are: imitating the child's play actions; violations; and modeling joint attention. Chart 3 shows the JASP/ER teacher strategy and its Montessori counterpart.

**Chart 3.**

<b><u>JASP/ER Strategy</u></b>	<b><u>Montessori Method</u></b>
Setting up the environment	The prepared environment (Rambusch, 1998, p. 71).
Following the child's choice	"These children have free choice all day long" (Lillard, 2007, p.80).
Prompting for play actions	"...she must be tireless in offering subjects again..." (Standing, 1962, p. 280).
Establishing play routines	Establishing the point of contact (Standing, 1962, p. 243).
Waiting for communication	"Too many teachers are inclined to be continually interrupting and teaching..." (Montessori, 1974, p.67).
Contingent language	"The uncultured teachers we had in our schools noted the children's hunger for words..." (Montessori, 1974, p.72).
Prompting for joint attention	"...if we showed them exactly how to do something, this precision itself seemed to hold their interest." (Montessori, 1982, p. 186).
Encouraging eye contact	"The role of watching is an important one in a Montessori class." (Rambusch, 1998, p. 95).



Aldred et al (2011) ran a test of mediation to look at previous research on joint attention and the effect of training parents to be in sync with their child with Autism by paying attention to the child's spontaneous conversation. The skills the parents were taught are similar to skills Montessori teachers are instructed to use in the classroom. These skills are as follows:

[P] arents observing the child's focus, inferring intentions; parents using timely, reciprocal comments, acknowledging the child's focus, avoiding asynchronous responses that re-direct, question or make demands on child responses; parent matching language use to child understanding, semantically contingent on child play; predictable sequences, routines, repetition, rehearsed play, imitation; communication teasers; language extensions/elaborations, (and) conversational reciprocity (Aldred et al, 2012, p.453).

The Montessori teacher is trained to be an observer and as such is continually observing the children and adapting lessons, the classroom environment, and his/her personal responses to the children based upon those observations. The Montessori teachers' work is to follow the children's interests and not to be the thrust for all things that happen in the classroom. Dr. Montessori said that teachers should be unplanned in their interactions with children, watching for what captivates the children's interests. In her words:

The driving force, that is, the spontaneous psychic activity, in our case arises from the education of the senses and is maintained by the intelligence of the observer....Our goal in the education of a young child should be to help him develop, and not to furnish him with a kind of culture. Therefore, after we have offered the child material suitable for

promoting the development of his senses, we should wait for his powers of observation to unfold. (Montessori, 1980, p.170).

It appears likely that of the research studies and the methods for teaching social skills to children with Autism, HFA, or AS identified between 2004 and 2014, at least three methods, script fading, group teaching, and joint attention, bear some similarities to the Montessori Method of education and are initiated daily in Montessori classrooms by virtue of the teaching practices and the ideals of the Montessori teachers. The limitations of the selected research as well as a discussion of how the research pertains to children with AS attending Montessori schools will be discussed next.

### **Limitations**

The research identified in this paper has been selected based upon the inclusion criterion laid out in the Methods chapter. A primary limitation of this research is that although every effort was made to be thorough and rigorous in the search for the studies, there is a possibility that a research study may have been missed that would have complimented the intervention results.

A second limitation is that as an initial investigation of empirically studied interventions for helping children with AS acquire social skills and comparing these interventions to the Montessori Method of education, this extensive literature review is not a definitive document regarding placement of children with AS in Montessori schools, in fact, it is the opposite. This research merely suggests that there are some similarities that exist between evidence based interventions for teaching social skills to children with AS and the Montessori Method of education. This extensive literature review is the beginning point in research on this topic and can serve other researchers in starting empirical studies on the placement of children with AS or

Autism in Montessori schools. More research is needed before it can definitively be said that a Montessori classroom is a preferred placement for these children.

The scope of this research is children between the ages of three to six years old. Although some Montessori schools have infant and toddler classrooms and other Montessori schools may have classrooms grouped with six to nine year olds and may have nine to twelve year olds in a classroom as well, the three to six classroom is the most represented type of Montessori classroom worldwide. In searching the databases for research articles on social skills interventions for children with AS, there was additional research for children younger than three as well as older than six years of age. Additional research is needed on these age groupings so that professionals have a better understanding of interventions for children who are diagnosed at an early age as well as interventions for children who may not get diagnosed with AS until they are older.

The research outcomes of this study suggested that of the five methods of interventions identified between 2004 and 2014, three of those methods, script fading, group teaching, and joint attention bear similarity to the Montessori Method. If expressed in a percentage, this is 53.33% of interventions over a ten year period. Although not a single digit percentage, the power to say that the Montessori Method is similar to the majority of empirically based social skills interventions for three to six year olds simply would not be accurate.

A limitation that would appear to be commonplace is the quality of the implementation of the Montessori Method by the Montessori teacher in the classroom. While the findings of this study suggest that there are similarities between the social skills interventions of group teach and joint attention and the Montessori Method of teaching, the execution of the method by individual teachers may or may not be consistent.

A final limitation of this extensive literature review is the varying nomenclature for identifying children with an Autism Spectrum Disorder in each of the research articles read. It was often unclear without reading the descriptions of the children, how they were impacted by the disorder. At times the children were classified as Autistic, but reading about their characteristics, the children were found to be verbal, in typical classrooms, and were functioning without any detrimental behaviors, descriptively appearing to be more HFA than Autistic. There were two research articles, both regarding the method of group teaching, where the children had other ASD diagnoses. The study by Leaf et al (2010) had one child with a diagnosis of AS and in the study by Banda et al (2010), the two subjects of the research were both identified as having PPD- NOS. Discerning the similarities of the children in the studies examined to the description of AS in the DSM-IV-TR was left to the discretion of the author, which then includes the possibility of human error with the decision to include or not include a study.

Implications and recommendations for social workers, mental health professionals, teachers, parents, and educational administrators follows. Concluding ideas will also be discussed.

## **Chapter 9: Implications and Recommendations**

### **Implications**

This extensive literature review has brought to the forefront the need for research on the effectiveness of a Montessori education on assisting children with AS in the acquisition of social skills. This paper is the first known examination of this topic and it is the preliminary research that is required before a scientific study can be conducted on the subject. This extensive literature review of evidence based practices for providing social skills interventions for young children with Asperger's syndrome was conducted to better understand how to improve the lives of children with AS. Findings can be used by social workers, mental health professionals, parents, and teachers who work and live with children with AS to better understand the types of social skills instruction these children need.

From reviewing the literature, five different efficacious interventions were identified and three of those interventions were analogous with the Montessori Method: script fading, joint attention, and group teaching. Script fading was analogous to an extension of a "three period lesson. Joint attention was similar to Montessori's technique of carefully observing children to teach them as the Montessori teacher watches the student carefully and designs materials for the student to use that will appeal to the student's interests and focus. Group teaching methods are comparable to Montessori's "Three Period Lesson." Group teaching involves breaking down the skill being learned with positive reinforcement at each stage, as does the "three period lesson." Therefore, it is suggested that teaching social skills is naturally embedded in Montessori curriculum, thus making it a "good fit" for at least some children on the Autism spectrum.

For children with AS, the lack of social skills is one of the biggest obstacles to establishing meaningful rapport with parents, peers, and other adults. Parents of three to six year old children with AS may find that a Montessori classroom meets the social skills needs of their children since both joint attention and group teaching interventions are found in the Montessori classroom. Parents should also be aware that the other interventions that are not similar to Montessori may also be needed for their child and that these social skills interventions would need to be found outside of that environment. Not only are the data in this literature review vital for parents but the results of this research can be useful to all teachers who want to provide social skills interventions to students with AS.

Social workers engage with vulnerable groups in child-serving agencies, hospitals, mental health clinics, and schools and therefore are in contact with children who have AS. As professionals, it is their duty to be educated and informed regarding the best evidence based practices for engaging and working with these children. This extensive literature review and comparison with the Montessori Method adds to current knowledge regarding interventions for social skill acquisition as well as the appropriateness of a Montessori classroom for children with AS. The information in this paper can be used by social workers in direct practice to deliver to clients interventions that use joint attention and group teaching.

In recommending a Montessori classroom, social workers must not misrepresent this method of education as a panacea for children on the Autism spectrum. There are many variables to be considered and questions to be asked by parents. Does the school have experience with students with AS? How does the school perceive its effectiveness with children on the Autism spectrum? What is the various teachers' level of comfort with having students with AS in their classroom? How does the school implement the Montessori Method and are "Three Period

Lessons” and teacher observation integral in the schools’ philosophy? These questions will help parents to assess whether the Montessori school in question might be a good fit for their children.

For social workers, the client may be the parent or guardian of a child with AS and knowledge of social skills interventions and educational options for children with AS is crucial in assisting parents. In 2011, Delmolino and Harris wrote an article in the *Journal on Autism Developmental Disorders* in which they discussed the importance of professionals being able to assist parents in finding appropriate school settings for children who are on the Autism spectrum. The authors also identified the fact that “There is very limited research trying to match children to specific treatments” (Delmolino & Harris, 2011, p. 1200). It behooves social workers to know about interventions and educational options for their clients and from this research, Montessori schools might be an option.

Another vital role of social workers in their work with the parents and guardians of children with AS is assisting the adults in creating continuity between school and home environments. All children benefit from stable, comparable environments; however, children with Autism Spectrum disorders particularly need stability. Oelklaus and Petr (2002) identified consistency between home and school as being one of the most important factors in the reduction symptoms of children with Autism. Understanding the methodology of the interventions and having knowledge of the Montessori Method of education will benefit social workers assisting clients whose children are provided social skills interventions or are in a Montessori school. The social worker may need to educate parents and guardians about the importance of consistency as well as model for them how to bring the interventions or the Montessori Method into the home environment. This could be accomplished through the social worker observing in the classroom and interviewing the teacher to learn which classroom skills should be reinforced at home.

Additionally, the teacher may have specific suggestions for the family that the social worker could help facilitate.

As mentioned above, social workers may find themselves consulting at a Montessori school that their client or their client's child attends. Understanding the similarities between the social skills interventions and the Montessori Method will be essential in facilitating confidence in Montessori teachers that they are able to teach and support the child with AS in the classroom. Teachers comfortable teaching a child with AS may be more committed to having an inclusive classroom and to welcoming children with AS. By showing Montessori teachers the similarities between the methods they employ and social skills interventions that have been researched and found effective, the teachers' understanding can be enhanced and they may feel more efficacious. Discussing the role of a teacher as observer of the child, the benefit of using observations to create joint attention, and the advantages of a "Three Period Lesson" for children with AS, may show teachers these similarities concretely.

Montessori schools need to be aware that the Montessori lessons may meet the social skill needs of some children with AS and that parents may be pursuing a Montessori Education for their children with AS. The AS population is not decreasing and there is a need for specialized social skills instruction, therefore individual Montessori schools may want to reinforce their schools commitment to a diverse student population by establishing a school policy regarding the inclusion of children with special needs.

Traditional early childhood public schools as well as intervention programs designed for AS students may want to choose to look more closely at the Montessori Method and philosophy, perhaps hiring a Montessori expert to consult and make recommendations for putting into effect some of the Montessori practices. Additionally, parents of children enrolled in public education



often must act as their children's only advocates, and as such, they need to be asking providers and teachers for joint attention and group settings for social skills interventions.

Finally, as social workers, the policy implications of any research should be considered to advocate properly on behalf of our clients. Social workers are "change agents" and as such, must be willing to advocate for changes in federal, state, and local policies if that change would benefit our clients. In this research, there is evidence that children with AS need access to evidence based social skills to develop in healthy ways. Over 50% of the social skills interventions researched between 2004 and 2014 are similar to the Montessori Method of education. Federal policy changes in laws regarding the delivery of services to young children with disabilities such as AS need to be encouraged and should not only mandate evidence based practices but should identify those practices and provide federal dollars to subsidize schools that utilize evidence practices recognized by the Department of Education. By implementing a reward based subsidy, children with AS will receive appropriate social skills interventions for their unique developmental challenges.

### **Implications for Further Research**

Research is needed to look at the acquisition of social skills in children with AS within the Montessori classroom and other settings using Montessori methodology. A preliminary idea would be to conduct additional research around the three interventions of script fading, joint attention, and group teaching. A comparison study of two interventions implemented in a typical classroom and in a Montessori classroom might provide further information regarding the fit of AS children in a Montessori environment. Another beneficial study would be to measure if the children's social skills improve after a fixed period of time in a Montessori classroom. If it was

found that the children's social skills improved, an additional longitudinal study could be implemented to see if the skills remained constant, diminished, or stayed the same.

Other needed research would involve parents as the social skills teacher in an alternative setting but implementing a Montessori approach. This would involve the parents of the children with AS learning how to use interactions modeled after Montessori lessons to facilitate joint attention between the parents and their children and then measuring the effectiveness of that intervention over a specific period.

Teacher training is an important component of Montessori education; one type of valuable research would be embedding a study within a Montessori teacher training program by training Montessori teachers in script fading, joint attention, or group teach and then measuring changes in social skills in children with AS when those specially trained teachers are in the classroom. It would also be interesting to use that same methodology of additional training for Montessori teachers, but instead measuring the Montessori teachers comfort with having children with AS in the classroom.

## **Conclusion**

The purpose of this research was to see what commonalities exist between evidence based practices for social skills training for young children, between the ages of three and six years old, and the Montessori Method of education. This extensive literature review appears to be the first to look at interventions used to teach social skills to young children with AS and comparing those interventions to Montessori education. Between 2004 and 2014, thirteen empirical studies were found meeting the inclusion criteria of the research methodology. All studies met the standards for rigor. The 13 studies were grouped into five intervention types; intensive interventions, low-intensity interventions, script-fading, group teaching, and joint

attention based upon their descriptions and methodology. Of the five intervention methods, script fading, group teaching, and joint attention bore the clearest resemblance to the Montessori Method. Since this is the first known study of its kind, this research must be considered a beginning point in gaining a better understanding of the implications of having a child with AS, HFA, or ASD as a student in a Montessori classroom. More research is needed before there can be a definitive response regarding the appropriateness of that educational placement for the children on the Autism spectrum. However, the finding of this research is promising and indicate that there is similarity between three methods of social skills interventions for children with AS and Montessori educational theories. This research, although not definitive, will be of value to social workers assisting families, children, schools, hospitals, and mental health clinics with educational placements and social skills interventions for their clients with AS. Social workers and other mental health professionals now have information that heretofore has not been available, to support children with AS and their families.

Appendix A

1. Coverage	A. Justified criteria for inclusion and exclusion from review.	Did not discuss the criteria inclusion or exclusion	Discussed the literature included and excluded	Justified Inclusion and Exclusion of Literature	
2. Synthesis	B. Distinguished what has been done in the field from what needs to be done? C. Placed the topic or problem in the broader scholarly literature. D. Placed the research in the historical context of the field. E. Acquired and enhanced the subject vocabulary. F. Articulated important variables and phenomena relevant to the topic. G. Synthesized and gained a new perspective on the literature	Did not distinguish what has and has not been done.  Topic not placed in broader scholarly literature. History of topic not discussed.  Key vocabulary not discussed.  Key variables and phenomena not discussed.  Accepted literature at face value.	Discussed what has and has not been done.  Some discussion of the broader scholarly literature. Some mention of history of topic.  Key vocabulary defined.  Reviewed relationships among key variables and phenomena.  Some critique of the literature.	Critically examined the state of the field.  Topic clearly situated in broader scholarly literature. Critically examine history of topic.  Discussed and resolved ambiguities in definitions. Noted ambiguities in literature and proposed new relationships.  Offered new perspective.	
3. Methodology	H. Identified the main methodologies and research techniques that have been used in the field, and their advantages and disadvantages. I. Related ideas and theories in the field to research methodologies.	Research methods not discussed.  Research methods not discussed.	Some discussion of research methods used to produce claims.  Some discussion of appropriateness of research methods to warrant claims.	Critiqued research methods.  Critiqued appropriateness of research methods to warrant claims.	Introduced new methods to address problems with predominant methods.
4. Significance	J. Rationalized the practical significance of the research problem. K. Rationalized the scholarly significance of the research problem.	Practical significance of research not discussed.  Scholarly significance of research not discussed.	Practical significance discussed.  Scholarly significance discussed.	Critiqued practical significance of research.  Critiqued scholarly significance of research.	
5. Rhetoric	L. Was written with a coherent, clear structure that supported the review.	Poorly conceptualized, haphazard	Some coherent structure	Well developed, coherent	

From *Scholars Before Researchers: On the Centrality of the Dissertation Literature Reviews in Research Preparation* (p.8) by David N. Boote and Penny Beile, 2005, *Educational Researcher*, Vol. 34, No. 6, pp.3-15.

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**Appendix C: Dr. Montessori's Education and Experience**

Dr. Montessori graduated from medical school at the University of Rome in 1896 and her last two years of medical school were spent in four hospitals; a children's hospital; a women's hospital; a men's hospital; and a psychiatric clinic (Kramer, 1988). Upon graduation, Dr. Montessori was offered a position at the San Giovanni Hospital which adjoined the University of Rome and she began her own private medical practice. Because of her interest in mental illness, she continued researching at the University of Rome in the psychiatric clinic and a year after her graduation was offered a position there as a voluntary assistant (Kramer, 1988; Standing, 1962). In this position, Dr. Montessori visited the asylums in Rome selecting candidates to receive treatment in the clinic. This is where she became acutely aware of the plight of learning disabled children. At that time in Italy, children with disabilities were warehoused in asylums along with mentally ill adults: a similar milieu to prisons. The disabled children were locked in empty cells with no comforts, furniture, toys, or mental stimulation and they behaved like feral animals. Dr. Montessori theorized that these children could be taught if given the proper method of education.

She (Dr. Montessori) was a physician, oriented toward the relief of human suffering; she had taken a special interest in the diseases of children; she had a passionate commitment to social reform. Everything in her life to this point had sensitized her to this encounter with what were called "the idiot children" (Kramer, 1988, p.58).

Dr. Montessori was greatly influenced by the works of Drs. Jean Marc Gaspard Itard and Édouard Séguin as well as the works of Johann Pestalozzi and Friedrich Frobel (Cossentino, 2010; Kramer, 1988.) Itard was best known for his attempt to educate a feral boy found in the woods of Aveyron, France; Seguin for his continuation of Itard's work on educating the intellectually disabled; Pestalozzi for his development of an educational model for teaching the



poor and laborers; and Frobel for his creation of the kindergarten (Kramer, 1988). Dr. Montessori believed that learning disabled children could be taught and could contribute to society. As she learned more about children and education, Dr. Montessori realized that she needed more education and she returned to the University of Rome for a year (Kramer, 1988). Dr. Montessori's extensive study of educational methods coupled with her medical and psychiatric background supported her hypothesis that the learning disabled children could be educated and she began a public campaign regarding this issue; presenting papers and speaking at professional conferences. She was instrumental in the formation of an organization called *The National League for the Education of Retarded Children*, and in 1900 they opened a special school in Rome for the disabled children known as the Orthophrenic School. Dr. Montessori was appointed co-director and through her observations she saw that the children, regardless of their cognitive abilities, gained skills when provided "hands-on" learning materials. They were also able to learn when their education was self-directed, self-paced, and individualized, as she found each child learned uniquely (Montessori, 1981).

Dr. Montessori's educational program at the school achieved the results she had predicted and the learning disabled children were tested and performed as well as children in public schools. This concerned Dr. Montessori. Her biographer and longtime friend E. M. Standing (1962) quotes her as saying,

Whilst everyone was admiring my idiots I was searching for the reasons which could keep back the healthy and happy children of the ordinary schools on so low a plane that they could be equaled in tests of intelligence by my unfortunate pupils (p. 30).

Dr. Montessori left her position as co-director of the Orthophrenic School in 1901 and returned to the University of Rome to learn about how normal children were educated (Kramer, 1988). What she learned through classroom observations distressed her; the disabled students at the Orthophrenic School had been treated with more respect, their needs had been understood, they had not been taught in groups, nor had they been in receipt of rewards and punishments. Additionally she noticed that the hygiene and cleanliness of the normal schools was deplorable (Kramer, 1988).

From 1904 through 1908, Dr. Montessori taught teachers at the University of Rome and her class lectures were a combination of her medical background as well as her research on both disabled children and normal children and the need to change the structure of the classroom and education. In her first lecture to teachers she presented two important ideas. "...first, that it is the duty of the teacher to help rather than to judge; and second, that true mental work does not exhaust, but rather gives nourishment, food for the spirit" (Standing, 1962, p. 34).

In 1906, Dr. Montessori was approached by the investors of a housing project in Rome, working on urban renewal. They had renovated dilapidated buildings to house the poor but the investors were having problems with the children who were left at home during the day when their parents went to work. The children were not old enough to attend school, but were old enough to get into trouble when left alone all day. The buildings were being defaced by these unsupervised children (Kramer, 1988; Standing, 1962). This was an opportunity for Dr. Montessori to implement the teaching ideas that she had created for normally developing children. On January 6, 1907, Dr. Montessori opened her first school, Casa dei Bambini or Children's House in the Quartiere di San Lorenzo in Rome (Kramer, 1988; Standing, 1962). This

was the beginning of the Montessori Method of education which would gain world-wide attention (Kramer, 1988).

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