



The Egg/Nest Problem:  
Teaching Language to Students with Autism

A Meta-Synthesis

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**Abstract**

This meta-synthesis of the literature on methods of instruction to students with ASD examines the various methods of teaching language to students with ASD. While each student learns language at his or her own pace, the author has found that certain methods yield results quicker, and these methods need to be examined critically for any literature on their reliability, efficacy, and scientific research. If a student with autism can be taught language quickly, therefore mitigating any further delays in academic development relative to peers, then this methodology should be made accessible to all teachers of such students.

## 1. Introduction

### 1.1. The problem

The *Diagnostic and Statistical Manual of Mental Disorders-TR*, 4<sup>th</sup> edition, or DSM-IV-TR (American Psychiatric Association, 2000) defines autism based on a set of criteria. In order for a student to be diagnosed as being on the autism spectrum, they must a qualitative impairment in social interaction, manifested by impairment in nonverbal communicative behaviors, such as eye contact, failure to develop relationships with peers, and lack of social or emotional reciprocity. In addition, they must have qualitative impairments in communication, such as delay or lack of spoken language, inability to initiate or sustain conversation, stereotyped or repetitive use of language. They must also display repetitive or stereotyped patterns of behavior or interests. Typically, the delay will manifest before age 3. (American Psychological Associate, 2000)

While a lack of reciprocal communication is the first aspect of autism noticed by parents and caregivers, the lack of acquisition of speech impacts and possibly negates a student with autism's ability to read. LaBarbera and Soto-Hinnman (2009) summarize the problem:

A significant number of students with Autism Spectrum Disorders (ASD) who attend partially or fully integrated classrooms in the United States in increasing numbers, show distinctive difficulties in reading comprehension and difficulty acquiring the foundational oral language skills necessary for reading development." (p. 2)

The challenge for the 21<sup>st</sup> century educator is to identify and implement language instruction strategies that address the particular problems which students with Autism face. Students with autism, it has already been discussed, have great barriers to communication, and suffer significant delays in this area. Beyond the instruction of language and the intrinsic motivation towards speech is the problem of reading, which LaBarbera and Soto-Hinnman (2009) cited as one of the great struggle areas for students with Autism in the regular education classroom.

### *1.2. Author's beliefs and experiences*

Autism is a lifelong, pervasive developmental disorder affecting a student within the first 3 years of life, and greatly affects a person's communication and learning. According to the Centers for Disease Control, an average of 1 in 110 children born in the United States is affected by Autism, with the figure for boys being an alarming 1 in 70. (Rice, 2006, para. 3)

For the past year and a half, I have had the privilege to work with one of these students. This student, who we shall call Tanya, began school as a functionally nonverbal student. She had a few rote phrases which she would utter with ferocity if challenged, such as "get over here!" or "no", or "go away", and the like. She would only rarely even display echolalia; I am referring to the pre-speech echolalia of infants, not the mental illness – Tanya is best defined, at age 6, as pre-speech rather than nonverbal. I have had varying levels of success with several strategies, and incredible success with one key strategy. Our first strategies involved strictly pushing toward repetition of rote phrases in context, with little visual support; our goal was to induce echolalia, and by

modeling and student-observed reaction to the use of these phrases eventually cause the student to understand speech.

We saw little in the way of results. She displayed extremely limited use of language, if prompted. Then, in January, we began using the Boardmaker® program, which previously had been used to merely construct visual schedules and social stories, to create icon-word pairings. Then, with daily practice and the use of carrier phrases, we saw an explosion of language use, from prompted to independent. Then, we gradually saw the generalization of this skill throughout her school day, and then her life outside of school. The growth observed was exciting and remains so: from 20 words per week observed in January 2010 to over 500 words per week in September 2010, even remarkable for the lack of regression over the summer. The personal pride I felt in watching this student grow from functionally nonverbal to, at worst, pre-linguistic, fills me daily; further, there is no greater pleasure than having a student, who once regarded us as objects in her environment, begin using our names. Tanya's newest challenge is to identify words and relate these words to sounds, in order to create the sound/symbol correspondence and automaticity that are prerequisite to reading. Using icons and letters in a pocket board, we are slowly teaching these skills, and pairing it with writing.

A key reason for my research is to find out exactly where we are, and where we could be. I want to know if a systematic approach would have been more appropriate, or if the intelligence of the student would preclude the use of a plodding, slow language instruction system, which we originally suspected. Is there a precedent set for what we had done in our own particular way, and if so, what kind of results were others seeing? And probably the most important question to answer is this: what does the literature say

about our next steps? Once language has learned to use language to request objects or express needs, what is the best way to elicit complex, descriptive language? Finally, once a student is demonstrating complex, descriptive language, how do we so generalize sound/symbol relationships that the student is able to learn to read and write?

### *1.3. The purpose of the meta-synthesis*

This meta-synthesis, which focused on language instruction – including reading and writing instruction – for students with autism, had four purposes. The first purpose was to review and analyze the literature on language instruction strategies for students with autism. The second purpose was to critique these instructional strategies based on the available scientific research. The third purpose was to differentiate between instructional strategies which promote speech, reading, or writing – or all three – in an effort to create a more “user-friendly” deposit of strategies available for educators. The fourth, and final, purpose was to connect the themes that emerged from this meta-synthesis to my work as a special educator who provides language instruction to students with autism.

## **2. Methods**

### *2.1. Selection criteria*

The 30 articles included in this study were selected based on the following criteria:

1. The articles related to autism and instruction.
2. The articles related to reading and instruction.
3. The articles related to language and instruction.
4. The articles were published in professional journals related to the field of education.

5. The articles were published between 1995 and 2010.

### *2.2.1. Database searches*

To obtain these articles I conducted a systematic search using the Education Resources Information Center (ERIC, Ebscohost) database with the following terms and located all 30 articles:

1. (“Autism”) AND (“Reading Instruction”) or (“Language Instruction”).
2. (“Autism”) AND (“Reading”) AND (“Instruction”) AND (“Language”).
3. (“Reading”) AND (“Autism”) AND (“Instruction”).
4. (“Language”) AND (“Autism”) AND (“Instruction”).

The search of the ERIC database using the above search terms resulted in the selection of 30 articles that met my selection criteria (Biederman, & Freedman, 2007; Carnahan, Williamson, & Haydon, 2009; Carnahan, Musti-Rao, & Bailey, 2009; Chan, & O'Reily, 2008; Chiang, & Lin, 2007; Coleman-Martin, Heller, Cihak, & Irvine, 2005; Delano, 2007; Flores, & Ganz, 2009; Ganz, & Flores, 2008; Gately, 2008; Heimann, Nelson, Tjus, & Gillberg, 1995; Jones, Carr, & Feeley, 2006; Kroeger, & Nelson, 2006; Lal, 2010; Lanter, & Watson, 2008; Ledford, Gast, Luscre, & Ayres, 2008; MacDonald, 2010; McGee, & Daly, 2007; Mechling, Gast, & Krupa, 2007; Millar, Light, & Schlosser, 2006; Newman, Macomber, Naples, Babitz, & Volkmar, 2006; Newman, Reinecke, & Ramos, 2009; O'Connor, & Klein, 2004; Pennington, 2009; Randi, Newman, & Grigorenko, 2010; Toth, 2009; Travis, & Geiger, 2010; Vacca, 2007; Whalen, Moss, Ilan, Vaupel, & Fielding, 2010; Whalon, Otaiba, & Delano, 2009).

### *2.2.2 Ancestral searches*

Ancestral searches involve reviewing the reference lists of previously published works to locate works relevant to one's topic (Welch, Brownell, & Sheridan, 1999). I conducted ancestral searches of the reference lists of the articles retrieved through my database search. These ancestral searches yielded three additional items that met the selection criteria (Kamps, Leonard, Potucek, & Garrison-Harrell, 1995; Nation, Clarke, Wright, & Williams, 2006; Williams, Wright, Callaghan, & Coughlan, 2002)

### *2.3 Coding procedures*

I developed a coding form during my research, to categorize each of the 33 articles that I selected. This coding form was used to identify articles based on the articles': (a) publication type; (b) research design; (c) participants; (d) data sources; and (e) findings.

#### *2.3.1 Publication types*

The articles selected for my meta-synthesis were each classified according to publication type (e.g. empirical study, descriptive article, position paper, guides, reviews of the literature). Empirical studies clearly describe the methods used to gather and analyze quantitative and/or qualitative data. Descriptive articles describe experiences and information but do not specifically outline the methods used to gather and analyze data. Position papers explain, advocate, or recommend a particular policy, methodology, position, and/or educational model. Guides are intended as recommendations or descriptions of strategies and practice that can be implemented by the audience. A review of the literature list articles pertaining or in relation to a particular topic and provide analyses of the results or recommendations therein (Table 1).

#### *2.3.2 Research design*

The empirical studies that were examined and evaluated were each classified by the type of research design (i.e., quantitative research, qualitative research, mixed methods research). Quantitative research tracks and presents data, along with results and analyses, in a numerical form, in order to remove the appearance or perception of author bias. Qualitative research lacks the appearance of impartiality of numerical (quantitative) data, and instead seeks to collect and analyze information interpreted through the lens of the author's own experience and possible bias, which would have been described in the beliefs and experiences section of the paper. A mixed methods approach uses both quantitative and qualitative data and analyses in the research (Table 2).

### *2.3.3 Participants, data sources, and findings*

I researched and identified the participants in each of the empirical studies (e.g. students with autism, students with high-functioning autism, general education peers of students with ASD). I also identified the sources of the authors' data in each of the studies (e.g. formal and informal observations, standardized tests, formal assessments, pre and post-test measures). I summarized the results of each of the studies (Table 2).

### *2.4 Data analysis*

I used a modified version of the Stevick-Colaizzi-Keen method previously employed by Duke (2011) and Duke and Ward (2009) to analyze the 33 articles that I included in this meta-synthesis. I first identified significant statements within each article. For the purpose of this meta-synthesis, I defined significant statements as statements that addressed issues related to: (a) autism and language instruction; (b) autism and reading instruction; and (c) autism and writing instruction I then developed a list of both (verbatim) significant statements and (paraphrased) formulated meanings. These

formulated meanings represented my interpretation of each significant statement. Finally, I grouped the formulated meanings from all 33 articles into theme clusters (or emergent themes). These emergent themes represented the essence (or content) of the entire body of literature (Table 3).

### **3. Results**

#### *3.1 Publication type*

I located 33 articles that met my selection criteria. The publication type of each article is delineated in Table 1. Twenty of the 33 articles (60.6%) were empirical studies (Carnahan et al., 2009; Coleman-Martin et al., 2005; Delano, 2007; Flores & Ganz, 2009; Heimann et al., 1995; Jones et al., 2006; Kamps et al., 1995; Kroeger & Nelson, 2006; Lal, 2010; Ledford et al., 2008; McGee & Daly, 2007; Nation et al., 2006; Newman et al., 2006; Newman et al., 2009; O'Connor et al., 2004; Toth, 2009; Travis & Geiger, 2010; Vacca, 2007; Whalen et al., 2010; Williams et al., 2002). Seven of the 33 articles (21.0%) were guides (Biederman, & Freedman, 2007; Chan, & O'Reily, 2008; Ganz, & Flores, 2008; Gately, 2008; Lanter & Watson, 2008; Mechling et al., 2007; Pennington, 2009). Five of the 33 articles (15.2%) were reviews of the literature (Carnahan et al., 2009; Chiang, & Lin, 2007; Millar et al., 2006; Randi, et al., 2010 Whalon et al., 2009;). One of the 33 articles (3.0%) was a descriptive article (MacDonald, 2010)

**Table 1**

<b>Author(s) &amp; Year of Publication</b>	<b>Publication Type</b>
Biederman, & Freedman, 2007	Guide
Carnahan, Williamson, & Haydon, 2009	Empirical Study
Carnahan, Musti-Rao, & Bailey, 2009	Review of the Literature
Chan, & O'Reily, 2008	Guide
Chiang, & Lin, 2007	Review of the Literature
Coleman-Martin, Heller, Cihak, & Irvine, 2005	Empirical Study
Delano, 2007	Empirical Study
Flores, & Ganz, 2009	Empirical Study
Ganz, & Flores, 2008	Guide
Gately, 2008	Guide
Heimann, Nelson, Tjus, & Gillberg, 1995	Empirical Study
Jones, Carr, & Feeley, 2006	Empirical Study
Kamps, Leonard, Potucek, & Garrison-Harrell, 1995	Empirical Study
Kroeger, & Nelson, 2006	Empirical Study
Lal, 2010	Empirical Study
Lanter, & Watson, 2008	Guide
Ledford, Gast, Luscre, & Ayres, 2008	Empirical Study
MacDonald, 2010	Descriptive Article
McGee, & Daly, 2007	Empirical Study
Mechling, Gast, & Krupa, 2007	Guides

Millar, Light, & Schlosser, 2006	Review of the Literature
Nation, Clarke, Wright, & Williams, 2006	Empirical Study
Newman, Macomber, Naples, Babitz, & Volkmar, 2006	Empirical Study
Newman, Reinecke, & Ramos, 2009	Empirical Study
O'Connor, & Klein, 2004	Empirical Study
Pennington, 2009	Guides
Randi, Newman, & Grigorenko, 2010	Review of the Literature
Toth, 2009	Empirical Study
Travis, & Geiger, 2010	Empirical Study
Vacca, 2007	Empirical Study
Whalen, Moss, Ilan, Vaupel, & Fielding, 2010	Empirical Study
Whalon, Otaiba, & Delano, 2009	Review of the Literature
Williams, Wright, Callaghan, & Coughlan, 2002	Empirical Study

### *3.2. Research design, participants, data sources, and findings of the studies*

I located 20 empirical studies that met my selection criteria (Carnahan et al., 2009; Coleman-Martin et al., 2005; Delano, 2007; Flores & Ganz, 2009; Heimann et al., 1995; Jones et al., 2006; Kamps et al., 1995; Kroeger & Nelson, 2006; Lal, 2010; Ledford et al., 2008; McGee & Daly, 2007; Nation et al., 2006; Newman et al., 2006; Newman et al., 2009; O'Connor et al., 2004; Toth, 2009; Travis & Geiger, 2010; Vacca, 2007; Whalen et al., 2010; Williams et al., 2002). The research design, participants, data sources, and findings of each of these studies are delineated in Table 2.

**Table 2**

<b>Author</b>	<b>Research Design</b>	<b>Participants</b>	<b>Data Sources</b>	<b>Findings</b>
Carnahan, Williamson, & Haydon, 2009	Quantitative	The participants included six students (5 males, 1 female), five students with school-based identifications of autism and one student (i.e., Jack) with a school-based identification of other health impairment (OHI).	Photographic evidence of attention to task, including facing the teacher and verbal responses; teacher interviews; Teacher Post-Intervention Acceptability and Importance of Effects Survey	The results indicate an increase in engagement using interactive materials paired with music, but a lower rate of engagement when the materials are not paired with music.
Coleman-Martin, Heller, Cihak, & Irvine, 2005	Quantitative	Three students (a) having a severe speech impairment, (b) having letter-sound correspondence of the alphabet, (c) having a reading recognition level at or above the first-grade and below the third-grade level, (d) having at least a 2-year difference between chronological age and expected reading level.	Teacher questionnaire, post-instructional measurement of student progress in word recognition by the teacher.	All three students were able to reach mastery criteria with teacher instruction only, teacher- and computer-assisted instruction, and computer-assisted instruction only.
Delano, 2007	Quantitative	Participant was one twelve-year old student having been diagnosed with Asperger's Syndrome.	Writing samples graded by individual observers; measure of observer agreement	The student demonstrated gains in both the quantity and quality of his writing samples.

Flores, & Ganz, 2009	Quantitative	Four students aged 11-14, two diagnosed with ASD, and two with developmental disorders. (ADHD and Mental Retardation)	Curriculum Based Measures; pre-instructional probes	A positive relationship was demonstrated between DI and reading comprehension skills.
Heimann, Nelson, Tjus, & Gillberg, 1995	Quantitative	Thirty children aged 6-13, eleven with ASD, nine with multiple disabilities, and ten normal preschool children.	Childhood Autism Rating Scale and video observations of children's verbal and nonverbal communication	Children with autism increased both their word reading and their phonological awareness.
Jones, Carr, & Feeley, 2006	Quantitative	Five preschool children aged 2-3, with ASD.	Observations of student attention at baseline and post-intervention	Joint attention and expressive language improved apace.
Kamps, Leonard, Potucek, & Garrison-Harrell, 1995	Quantitative	Five students with autism and 51 regular education peers aged 10-11.	Curriculum based measures.	Increased attention and successful inclusion with demonstration of mastery criteria were shown.
Kroeger, & Nelson, 2006	Quantitative	The participant was a 9-year-old boy dually diagnosed with DS and autism.	Observation of the frequency count of the number of verbal utterances was recorded: verbalizations sorted into one of three categories: prompted language, responsive language, or	An increase and maintenance of spontaneous and reciprocal communication was shown.

			spontaneous language.	
Lal, 2010	Quantitative	Nineteen students with autism aged 9-12 in north Mumbai.	Language Assessment Tool for Autistic Children; Social Behavior Rating Scale	Use of AAC had a positive effect on expressive and receptive language.
Ledford, Gast, Luscre, & Ayres, 2008	Quantitative	Six students identified as having autism and speech language impairments, aged 5-8.	Pre and post-test measures of percent correct on word sets	Despite initial deficits in social awareness and imitation, students learned observational and incidental information during small group instruction.
McGee, & Daly, 2007	Quantitative	Three preschool students aged 4-5, diagnosed with autism.	Observation; rate per minute of conversational phrases, measured by teacher	Students demonstrated immediate use of the targeted social phrases
Nation, Clarke, Wright, & Williams, 2006	Quantitative	Forty-one children aged 6-15, diagnosed with autism.	Graded Non-word Reading Test, British Ability Scales, Neale Analysis of Reading Ability - 2	Word, non-word, and text reading were within the average range, but comprehension did not.
Newman, Macomber, Naples, Babitz, & Volkmar, 2006	Quantitative	The study included forty-one students with ASD, and 18 typically developing students.	Woodcock-Johnson Test of Achievement - 2 (selected subtests), Comprehensive Tests of Phonological	Study demonstrated that hyperlexic reading is characterized by a discrepancy between single-

			Processing (CTOPP), Visual Memory subtest of the Test of Visual Perceptual Skills	word reading and reading comprehension.
Newman, Reinecke, & Ramos, 2009	Qualitative	Three students aged three to four and a half, diagnosed with moderate MR, participated in the study.	Accuracy of response on curriculum based measure associated with intervention	Demonstrated that children learned vocal skills quicker through shaping than reasonable attempts condition.
O'Connor, & Klein, 2004	Quantitative	Twenty-five students, with an average age of 15.11, with ASD, participated in the study.	Woodcock Johnson Reading Mastery Test-Revised, Stanford-Binet Intelligence	Anaphoric cuing facilitation yielded greater gains than the other interventions attempted.
Toth, 2009	Qualitative	Thirty-eight students, aged zero to six took part.	Paper questionnaires, pre- and post-evaluation forms, performance journals, and video recordings of each child were used.	Children who used the Bridge of Signs Model were able to communicate effectively and in some cases transitioned to speech easier.
Travis, & Geiger, 2010	Quantitative	Two boys aged 9, diagnosed with Pervasive Developmental Disorder – Autistic type took part in the study.	Observation; comments per session were measured by intervention providers.	Students demonstrated considerable increases in intentional communication and in functional communication.

Vacca, 2007	Qualitative	Two students with autism were part of the study.	Parent and caregiver interviews, pre- and post-intervention	Students demonstrated increased reading ability and attention to task.
Whalen, Moss, Ilan, Vaupel, & Fielding, 2010	Quantitative	Forty-seven students, aged 3 to 6, with eligibility category of autism took part.	Peabody Picture Vocabulary Test, Expressive Vocabulary Test, Brigance Inventory, CARS	Students who used the CAI for more time demonstrated increased performance on outcome measures.
Williams, Wright, Callaghan, & Coughlan, 2002	Quantitative	The study included eight children (ages 3-5) with autism.	Observation, time on task, pre- and post-assessment of word recognition	Time on task increased, and five of the eight children could reliably identify at least three words after the CAI.

### *3.2.1. Research design*

Eighteen of the 20 studies (85.7 %) included in this meta-synthesis employed a quantitative research design (Carnahan et al., 2009; Coleman-Martin et al., 2005; Delano, 2007; Flores & Ganz, 2009; Heimann et al., 1995; Jones et al., 2006; Kamps et al., 1995; Kroeger & Nelson, 2006; Lal, 2010; Ledford et al., 2008; McGee & Daly, 2007; Nation et al., 2006; Newman et al., 2006; O'Connor et al., 2004; Travis & Geiger, 2010; Whalen et al., 2010; Whalon et al., 2009; Williams et al., 2002). Three of the studies (14.3%) used a qualitative research design (Newman et al., 2009; Toth, 2009; Vacca, 2007).

### *3.2.2. Participants and data sources*

Eighteen of the 20 (90.0%) studies included in this meta-synthesis analyzed data collected from K-12 students with Autism or PDD (Carnahan et al., 2009; Coleman-Martin et al., 2005; Delano, 2007; Flores & Ganz, 2009; Heimann et al., 1995; Kamps et al., 1995; Kroeger & Nelson, 2006; Lal, 2010; Ledford et al., 2008; Nation et al., 2006; Newman et al., 2006; Newman et al., 2009; O'Connor et al., 2004; Travis & Geiger, 2010; Vacca, 2007; Whalen et al., 2010; Williams et al., 2002). Three of the 20 studies (15.0%) analyzed data collected from Preschool-aged students with ASD or PDD (Jones et al., 2006; McGee & Daly, 2007; Toth, 2009).

Six of the 20 studies (30.0%) used norm-referenced assessment instruments to collect data (Heimann et al., 1995; Lal, 2010; Nation et al., 2006; Newman et al., 2006; O'Connor, & Klein, 2004; Whalen et al., 2010). Eight of the 20 studies (40.0%) used observations of time on task or other behavioral observations (Carnahan et al., 2009; Coleman-Martin et al., 2005; Jones et al., 2006; Kroeger, & Nelson, 2006; McGee, & Daly, 2007; Toth, 2009; Travis, & Geiger, 2010; Vacca, 2007). Seven of the 20 studies

(30.0%) used curriculum-based measures to assess student progress (Delano, 2007; Flores & Ganz, 2009; Kamps et al., 1995; Ledford et al., 2008; Newman et al., 2009; Williams et al., 2002). In addition to scale-based assessments and interviews, other sources of data were also used to collect data for one or more of the 20 studies; these additional sources of data included direct observation, focus group meetings, test scores, questionnaires, and pre-and-post measures.

### *3.2.3. Findings of the studies*

The findings of the 20 studies included in this meta-synthesis can be summarized as follows:

1. Students with autism made greater gains in all areas of language development with incremental, purposeful instruction. Students learned to speak at a quicker rate if they had a structured signing program or assistive communication device to bridge the gap. Students learned to read by engaging in programming or instruction that began at the single word level, though not necessarily the phonetic level.
2. Students with autism typically have a discrepancy between their decoding skills and their reading comprehension skills.
3. Students with autism benefited greatly from responsive, interactive curricula. Students using CAI responded quicker and were shown to make permanent, substantial gains. Students learned to communicate better and more purposefully using a structured, tiered program such as PECS.
4. Students who were instructed using the above strategies also typically saw an increase in their time on task.

### *3.3. Emergent themes*

Five themes emerged from my analysis of the 33 articles included in this meta-synthesis. These emergent themes (or theme clusters) include: (a) qualities and characteristics of reading skills in students with autism; (b) qualities and characteristics of writing skills in students with autism; (c) qualities and characteristics of language skills in students with autism; (d) reading and writing skill development strategies for students with autism; (e) strategies for developing language in students with autism. These five theme clusters and their associated formulated meanings are delineated in Table 3.

**Table 3**

<b>Theme Clusters</b>	<b>Formulated Meanings</b>
<b>Qualities and Characteristics of Reading Skills in Students with Autism</b>	<ul style="list-style-type: none"> <li>• Students with autism have relative strength in decoding and difficulty with language and reading comprehension.</li> <li>• Students with autism, regardless of IQ, have difficulty with language comprehension.</li> <li>• The duration or intensity of necessary instruction for students with ASD to master skills is not clear.</li> <li>• Students with ASD are considered good rule-based or rote learners.</li> <li>• Students with ASD exhibit a range of strengths and weaknesses, including in their IQ scores.</li> <li>• Some children with ASD can be categorized as hyperlexic, having a discrepancy between single-word reading and comprehension.</li> <li>• Children with ASD rely on the same phonological and orthographic mapping to decode words as their typically developing peers.</li> <li>• Children with ASD usually have good word-recognition skills.</li> <li>• Children with ASD focus on details they understand, and ignore details they don't or can't conceptualize.</li> <li>• At upper grade levels, a deficit in reading comprehension can be masked by proficient reading fluency.</li> <li>• Students with ASD can acquire reading comprehension skills.</li> <li>• Students with ASD may be better able to comprehend expository texts over narrative texts.</li> <li>• Anything longer than one or two sentences may adversely affect comprehension for students with ASD.</li> <li>• Some students with ASD may know the alphabet and be able to read some words despite language difficulties.</li> <li>• Personal narratives are more challenging for students with ASD than story narratives.</li> <li>• Students with ASD may have difficulty understanding the function of literacy.</li> <li>• The majority of students with ASD do not become skilled readers because of difficulties with interpretation.</li> <li>• Students with ASD have poorer silent reading skills versus oral reading skills.</li> <li>• Students with ASD have difficulties with attention and motivation.</li> <li>• Nouns are the easiest words to learn because they are concrete.</li> <li>• Some students with ASD perseverated on prior knowledge during pre-reading, and failed to comprehend the text.</li> <li>• Students who fail to develop word identification skills will not be fluent readers or able to comprehend; students with autism have relative strength in this area, but computerized instruction has been</li> </ul>

<p><b>Qualities and Characteristics of Writing Skills in Students with Autism</b></p>	<p>shown to increase skills further.</p> <ul style="list-style-type: none"> <li>• Students with ASD have demonstrated varied writing deficits and deficits in areas associated with writing, such as working memory, syntax, and perspective taking.</li> <li>• Students with autism are often excluded from rich writing experiences, as well as rich reading experiences.</li> <li>• Students with ASD have variability in writing performance, but generally produce writing samples that are shorter and less complex.</li> <li>• Students with ASD have self-regulation skill deficits, which lead to difficulties in writing.</li> </ul>
<p><b>Qualities and Characteristics of Language Skills in Students with Autism</b></p>	<ul style="list-style-type: none"> <li>• Autism is a developmental disorder characterized by deficits in communication and interactions.</li> <li>• Children with ASD tend to focus too much attention on details, rather than global meaning.</li> <li>• Students with ASD have strengths in rote memory; they have memory impairment and poor use of organizational strategies.</li> <li>• Some researchers consider the deficit exhibited by students with ASD in coherence to be a relative strength in local processing and a processing bias.</li> <li>• Children with ASD have delays in the ability to infer emotions and intentions in others.</li> <li>• Children with ASD have difficulty with language pragmatics, such as intention and social context.</li> <li>• Oral language is not a prerequisite for literacy.</li> <li>• Children with ASD have difficulty deciphering what others are thinking.</li> <li>• No more than a quarter of children with ASD have normal-ranged language skills.</li> <li>• Students with ASD scored better on nonverbal versus verbal IQ tests.</li> <li>• Students with ASD who do acquire language skills have intact grammar development.</li> <li>• Students with ASD can be taught sounds through games and music.</li> <li>• Students with ASD cannot communicate needs and so resort to tantrums and aggression.</li> <li>• Nouns are the first words acquired by students with ASD.</li> <li>• Joint attention skills in students with ASD are typically poorly developed.</li> </ul>
<p><b>Reading and Writing Skill Development Strategies for Students with</b></p>	<ul style="list-style-type: none"> <li>• Sight word reading approaches for students with autism have been shown to be beneficial.</li> <li>• It is important that reading instruction focus on both code and meaning-focused skills.</li> <li>• Children with ASD can benefit from instruction in the National</li> </ul>

<b>Autism</b>	<p>Reading Panel's five areas of reading strategies.</p> <ul style="list-style-type: none"> <li>• The NRP recommends decoding skills in a number of different contexts, including connected text so that the skill is generalized.</li> <li>• Results showed that using computer-assisted instruction to augment instruction was promising.</li> <li>• Oral reading fluency practice increased proficiency and fluency with decoding skills.</li> <li>• Children can be taught to write using cartoon strips with captions to write in.</li> <li>• Peer-mediated strategies can be effective in increasing reading comprehension skills.</li> <li>• Children with ASD can benefit from reading comprehension interventions and training in reading comprehension strategies.</li> <li>• It is recommended to simplify required tasks, scaffold through modeling and think aloud.</li> <li>• Children can be taught to generalize a main idea in an expository text by underlining repeated words and guiding towards a generalization.</li> <li>• Children with ASD can use narrative to organize their own life experiences.</li> <li>• Reading and understanding narrative may improve social and pragmatic skills in students with ASD.</li> <li>• Children with ASD are benefited by direct instruction in literary devices to engage listeners.</li> <li>• Students with ASD could benefit from reading comprehension instruction using multiple instruction strategies matched to the student's stage of literacy development.</li> <li>• Graphic cues may facilitate comprehension in students with ASD.</li> <li>• Visual supports aid students with ASD as they engage in academics.</li> <li>• Color-coding can assist students with ASD to organize materials and find answers to questions from the text.</li> <li>• A balanced literacy approach to instruction is crucial for effective instruction for students with ASD, including all components of reading.</li> <li>• Theme-based instruction is essential for building comprehension in students with ASD.</li> <li>• Successful writing interventions for students with ASD mirror writing interventions for students without ASD at comparable skill levels.</li> <li>• Behavioral skill instruction has been used to teach writing to students with ASD.</li> <li>• Students with ASD can see increases in oral language and attention and decreases in negative behaviors when included in shared book reading frequently.</li> </ul>
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	<ul style="list-style-type: none"> <li>• Using word labels in the environment of a student with ASD may promote sight word learning.</li> <li>• Strategies appropriate for emergent readers continue to apply for conventional readers.</li> <li>• Activating background knowledge, using think-aloud strategies, using comic strip bubbles and using other social story or graphics help students with ASD to develop reading comprehension.</li> <li>• Direct Instruction interventions have been shown to correlate with improvement in reading comprehension skills in students with ASD.</li> <li>• Video modeling when combined with passive modeling can assist in the acceleration of learning.</li> <li>• Computer assisted instruction may be an effective vehicle in the teaching of several skills to children with ASD.</li> <li>• Observational learning in small groups of typically developing peers by students with autism in reading skill acquisition.</li> <li>• Self-Regulated Strategy Development (SRSD) provides explicit, direct instruction in the entire writing process, and was demonstrated to be an effective intervention for students with ASD.</li> <li>• Direct instruction programs have shown effectiveness in increasing reading fluency and reading comprehension skills in students with ASD.</li> </ul>
<p><b>Strategies for Developing Language in Students with Autism</b></p>	<ul style="list-style-type: none"> <li>• Early intervention targeting sentence-level linguistic processing may help remediate students with ASD.</li> <li>• Through direct instruction, students with autism might understand and identify causality.</li> <li>• Experience with written language may facilitate the development of expressive language skills in students with ASD.</li> <li>• Augmentative and alternative communication (AAC) interventions can benefit individuals with developmental delays, including ASD, in language development.</li> <li>• AAC allows students to bypass motor and cognitive demands and focus on communication, provides a consistent and concrete model for students with developmental disabilities, and may facilitate speech gains in people with ASD in any stage of life.</li> <li>• Video modeling can be used to teach social communication, basic self-help skills, and academics.</li> <li>• The development of reading skills helps some students with ASD to develop their oral language skills.</li> <li>• Social stories help children with ASD empathize with others and help consider others' perspectives.</li> <li>• Direct instruction has been shown to improve language skills in students with ASD.</li> <li>• Social stories interventions have been shown to decrease negative</li> </ul>

	<p>behaviors and increase positive behaviors, including social language.</p> <ul style="list-style-type: none"><li>• The Picture Exchange Communication System (PECS) or other icon communication system can increase the length and complexity of verbal utterances in students with ASD.</li><li>• The presence of prompts and reinforcers helped to develop use of phrases and generalize these skills.</li><li>• Systematic fading of prompts can help language to become functional.</li><li>• The improvement of joint attention skills in students with ASD parallels with improvement in language and social skills means that joint attention skill development should be a part of their interventions.</li><li>• A self-monitoring checklist can be created to prompt the student with ASD when to ask questions.</li></ul>
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#### **4. Discussion**

In this section, I summarized the major themes that emerged from my analysis of the 33 articles included in this meta-synthesis. I then connected these emergent themes to my teaching practice.

##### *4.1 Qualities and characteristics of reading skills in students with autism*

Students with ASD have difficulty with reading comprehension. They are typically stronger decoders, by an order of magnitude. Developing reading comprehension requires direct instruction and specific skill development. Decoding skills in students with autism are typically at or near grade level, and word recognition skills are higher, especially in those students who are considered hyperlexic. Nouns are typically easier to learn, as they have concrete meaning. In addition, students with ASD are typically much better at oral reading than at silent reading.

As a teacher of students with ASD, I have experienced the frustration of teaching them comprehension skills, and also experienced the joy of a child's success with learning to read words. It was good to find out that I'm not alone in the education world, and that other teachers have experienced both of those, and research seems to bear out that that is how a student with ASD typically learns.

##### *4.2 Qualities and characteristics of writing skills in students with autism*

Students with autism have been shown to have difficulty with working memory, perspective taking, and other skills critical to writing. They also have self-regulation skill deficits, which generally lead to less writing production and less focused time spent writing. Because of self-regulation and other deficits, students with ASD typically miss

the more rich experiences in both writing and reading that their peers enjoy, which can lead to further skill deficits over time, relative to their peers.

I have seen one of my students left behind as a result of her lack of focus, and lack of ability to take perspective. But in all probability, it was also due to a lack of materials that she failed to develop age and grade level writing skills. It is good to know that there are ways to develop the skills of these students, in visually friendly ways that cater to the specific skills of students with ASD.

#### *4.3 Qualities and characteristics of language skills in students with autism*

Students with autism are characterized by deficits in communication and interaction. Both receptive and expressive language is impacted. They focus on details and tend to ignore global meaning; even more importantly, they have delays in their ability to interpret emotions and intentions in others. This can lead to a host of social misunderstandings, as they have a high degree of difficulty interpreting what others are thinking or intending to communicate. In fact, as I learned, less than 25% of children with ASD have normal-ranged language skills, which includes children described as “high-functioning autistic.” To underscore the difference, children with autism typically have a much higher nonverbal IQ relative to their verbal IQ. This lack of verbal skills leads to a great deal of difficulty, as a student who fails to adequately communicate his or her needs will instead resort to tantrums.

The great majority of the interventions attempted so far for my students with autism has focused on language, especially as they are both quite young and in need of explicit language training. We have used PECS-like icon communication tools to elicit expressive language, and have begun a receptive language program; in the end, we are

seeing slow, steady progress, but the difficulties of language development and use in students with ASD is daily evident in my students.

#### *4.4 Reading and writing skill development strategies for students with autism*

My research showed that there are numerous techniques and ideas available to develop reading skills in students with autism. The National Reading Panel's five areas of reading strategies have been shown to benefit students with ASD. Peer-mediated instruction, in a small group setting, has shown positive results; this would bear out in what I've observed: both of my students learn through peer modeling. It is also important to assist children in generalizing reading comprehension skills; this can be accomplished by guiding the students to accomplish the task, and also through scaffolding. Children can be taught reading through their own life experiences, which in turn may improve their social skills in all other areas of their lives. In reading comprehension curriculum for students, it is important to remember that students with autism are very visual thinkers: computer-assisted instruction has shown promise. Graphic cues also facilitate comprehension, as do visual supports; students with autism above all need direct, repetitive instruction to learn new skills. My reading instruction for students with autism focused on sight word development, and highly visual reading books with ease of comprehension. It was valuable to read about strategies for higher-level students.

My research has shown that writing instruction is less clear, as so much attention has been focused on reading instruction. It is important to note that writing interventions for students with ASD are similar to interventions for students without ASD. One writing intervention for students with ASD that did show some promise was the use of

comic books or cartoons with captions on which the students could write what is happening or being said.

It was extremely valuable to learn what interventions can be used to assist students with autism in developing their writing, and especially in perspective taking in their writing. Right now we're at the state in our interventions of basic spelling and handwriting. It was good to see what the goal would ultimately be, and what we can expect to encounter in our writing instruction.

#### *4.5 Strategies for developing language in students with autism*

My research showed that language, both receptive and expressive, has seen the most development of interventions, owing to the fact that the communication and language deficit evident in students with autism is profound, and the exceptionality that most characterizes a student with ASD. The literature shows that early intervention is crucial. Direct instruction in all aspects of language can be helpful, especially causality. An assistive device, or AAC, can benefit individuals by removing the motor and cognitive demands that speech entails, and allowing the student to directly access language and use it effectively. Video modeling is also effective, which I find particularly interesting, as I would like to diversify how I'm teaching language. Currently I am using direct instruction involving icon communication at the sentence level for basic requests, it would be interesting to use more social stories and video modeling to build language pragmatics. As I begin fading the use of the visual prompts, it will be crucial to have an alternative.

## 5. Conclusion

This project has helped me to find and identify multiple techniques to develop the language skills, including communication, reading, and writing, in my students with autism. It has also helped me to identify what could be future concerns in my students, as they begin to make more considerable gains in the areas of reading fluency and basic writing. It has been helpful to see the ways in which students with autism learn, and the areas which will be consistently in deficit; it is remarkable the degree of similarity across the board in all students with autism, at least as remarkable as the variability in performance. Hopefully this meta-synthesis will assist other educators of students with autism to develop curriculum to assist them in the improvement of their language skills.

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