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Speech-Language Pathologists and Behavior Analysts: Perspectives Regarding Theories and Treatment of Autism Spectrum Disorder

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Abstract

Speech-language pathologists (SLPs) and behavior analysts (BAs) provide treatment for individuals with autism spectrum disorder (ASD). Little is known about the similarities and/or differences between the two disciplines with regard to their theoretical perspectives and how it relates to intervention. A survey with 10 scenarios was created and distributed to BAs and SLPs. Responses were collected and a descriptive analysis was conducted. Differences in theoretical perspectives and intervention strategies were evident between the disciplines. The need for interprofessional education was apparent given the similarities and differences identified by both SLPs and BAs. There were limited referrals being advocated across disciplines. Recommendations for future areas of collaboration and education are included.

Autism rates have risen significantly in the past 20 years, with current prevalence indicating that 1 in 68 children are diagnosed with an autism spectrum disorder (ASD; Centers for Disease Control, 2016). Given this increase, the need to provide intervention for this growing population has been paramount. Currently, children with ASD are often served in both public and private settings. Recently, both Medicaid and private medical insurance coverage rules have changed to offer more intensive support to children with ASD. While speech and language services were previously covered to an extent (e.g., 1 hour per week for 20 weeks), new coverage options create availability for many children with ASD to receive 20–30 hours per week of behavior analytic services. Currently, both behavior analysts (BAs; e.g., Board Certified Behavior Analysts [BCBA], Board Certified Assistant Behavior Analysts, students in process of attaining certification) and speech-language pathologists (SLPs) provide intervention services for children with ASD. It is not known how much overlap exists between the two disciplines, particularly with regard to theoretical perspectives and intervention practices.

Speech-Language Pathologists

SLPs primarily view language through cognitive, developmental frameworks. Generally, SLPs are presented with multiple foundational, albeit historical, theories for language acquisition that include a psycholinguistic/syntactic approach (Chomsky, 1957), a semantic/cognitive approach (Bloom, 1970), a pragmatic approach (Bruner, 1974), and a behavioral approach (Skinner, 1957). A psycholinguistic/syntactic approach indicates that a brain is “pre-wired” for language and readily available to apply a set of rules to the particular language a child is exposed to. A semantic/cognitive approach suggests that a child’s knowledge base comes from experiences and they begin to talk about what they know. Children then begin to map the form and function of their language based on their experiences. The pragmatic approach views the development of language from a social context. Bruner indicated that relationships and social interactions are the motivation for a child to acquire language. Finally, a behavioral approach to language acquisition

suggests that children learn language because their verbal behavior is reinforced by others in their environment.

With regard to intervention, SLPs often use a developmental framework for planning intervention. SLPs are required to adhere to evidence based practices and are encouraged to make informed decisions based on individual client needs. When it comes to intervention for children with ASD, SLPs have (a) extensive training in communication and development, (b) a focus on reciprocity with communication partners, (c) a strong understanding of the oral mechanism associated with speech, (d) an understanding of pre-linguistic skills, (e) specialization in pre-literacy and literacy skills, (f) a focus on social skills development from a pragmatic language perspective, and (g) experience administering a variety of speech and language assessments.

When it comes to ASD intervention, SLPs adhere to a variety of interventions that employ the aforementioned theories and developmental frameworks. According to the American Speech-Language-Hearing Association (ASHA) Practice Portal, SLPs are responsible for "consulting and collaborating with other professionals, family members, caregivers, and others to facilitate program development and to provide supervision, evaluation, and/or expert testimony, as appropriate" (ASHA, 2016b). Two common strategies used by SLPs to support communication in young children with ASD are sign language and the Picture Exchange Communication System (PECS; Bondy & Frost, 1998). PECS is a behaviorally based intervention based on the concepts of teaching a replacement behavior (i.e., exchanging a picture card) to receive a desired item (i.e., reinforcement). Implementation of PECS includes a systematic progression of skills from exchanging a single picture to exchanging a sentence strip to initiate requests. Some SLPs use speech generating devices (SGD), often tablets or smart phones, to support communication development in individuals with ASD. There is emerging research that indicates a combined approach using a SGD paired with joint engagement and play skills (Kasari et al., 2014) can increase spoken language in minimally verbal children with ASD. According to ASHA's Scope of Practice, SLPs are charged to

> share responsibility with other professionals for creating a collaborative culture. Collaboration requires joint communication and shared decision making among all members of the team, including the individual and family, to accomplish improved service delivery and functional outcomes for the individuals served. (ASHA, 2016a)

Behavior Analysts

BAs are also required to adhere to evidence-based practices and follow the constructs of applied behavior analysis (ABA). In general, BAs regard language development from a behavioral perspective and subscribe to the verbal behavior model posited by B. F. Skinner in 1957. Verbal behavior is defined as, "behavior reinforced through the mediation of other people" where the listener's response "has been conditioned precisely in order to reinforce the behavior of the speaker" (Skinner, 1957, p. 2). In other words, language is viewed from the strict constructs of behaviorism, where a *stimulus* produces a *response* which in turn produces a *consequence* (Sr + R + C). Skinner's focus was on the functional control of the verbal behavior as opposed to the form, use, and content of communication. Skinner's Verbal Behavior hierarchy includes echoics, tacts, mands, intraverbals, textuals, and transcriptions (Cooper et al., 2007; Skinner, 1957). See Table 1 for a description of the four most commonly targeted verbal behaviors. Communication is seen as a behavior produced in response to an antecedent/consequence controlled contingency. This approach focuses heavily on the speaker with the listener functioning as the discriminative stimulus for the speaker's production of verbal behaviors (Cooper et al., 2007). Skinner's approach suggests that language is a learned behavior that can be observed and measured.

Table 1. Verbal Behavior Descriptions.

Verbal Operant	Antecedent	Behavior	Consequence
Echoic	Verbal stimulus (someone says "candy")	Verbal behavior: repeats all or part of antecedent (says "candy")	Non-specific reinforcement (praise)
Mand	Motivative Operation (want candy)	Verbal behavior (says "candy")	Direct reinforcement (gets candy)
Tact	Sensory stimuli (see or smell candy)	Verbal behavior (says "candy")	Non-specific reinforcement (praise)
Intraverbal	Verbal stimulus (someone says, "what do you eat?")	Verbal behavior (says "candy")	Non-specific reinforcement (praise)

With regard to intervention and treatment for individuals with ASD, BAs engage in various elements of behavior skills training. Seminal work was done by Ivar Lovaas over 40 years ago. His method, known as Discrete Trial Training (DTT) has become synonymous with ABA in some circles. DTT has been utilized to teach attending, skill acquisition, requesting, communication, and academic content to name a few relevant areas (Lovaas, 1987). Another popular intervention among BAs for teaching communication is known as Functional Communication Training (FCT; Carr & Durand, 1985). FCT focuses on challenging behaviors that are used to communicate something. For example, a child who wants to avoid doing a particular task may engage in a self-injurious behavior like biting his hand to avoid the task. When using FCT, a clinician would teach an appropriate replacement behavior (e.g., using a picture, pointing, SGD) to help the child avoid the task, thereby mitigating the self-injurious behavior.

Naturalistic Developmental Behavioral Interventions

Current research advocates utilizing naturalistic developmental behavioral interventions (NDBI) when working with young children with ASD. These types of interventions often employ strategies from the fields of speech-language pathology and applied behavior analysis (e.g., Early Start Denver Model and Pivotal Response Treatment) and are often implemented by teams of interventionists that include members from multiple disciplines including BAs and SLPs (Schreibman et al., 2015). The research behind NDBIs incorporates both developmental and behavioral approaches to intervention. Three core theoretical elements are present in NDBIs, (a) children as active leaners and participants, (b) developmentally appropriate expectations, and (c) intervention occurs during meaningful contexts (Schreibman et al., 2015). Results indicate that children with ASD who receive NDBI are able to generalize skills better than those taught using more traditional ABA approaches, particularly when they are implemented early in development (Dawson et al., 2010).

While there are some approaches such as NDBI's where collaboration and interdisciplinary treatment that includes SLPS and BAs is expected, the majority of SLPs and BAs work independently, possibly only communicating during annual meetings or for progress updates. Discussions of interdisciplinary collaborations are often buzzwords at conferences or trainings; however, the reality experienced by many professionals is more multidisciplinary than interdisciplinary with multiple practitioners treating a client independently as opposed a group of practitioners working collaboratively to treat a client (Van den Besselaar & Heimeriks, 2001).

A recent depiction of the misunderstandings and animosity present between BAs and SLPS has been reflected on various social media platforms. Social media rules and regulations are still being established by many disciplines (Chretien & Kind, 2013); however, social media has become a popular place to crowdsource information and get answers to clinical questions. In addition, social media has also become a platform for complaints, bullying, and outright hostility.

Monitoring various social media sites (e.g., Facebook, Twitter, and Pinterest), certain key words and phrases indicate frustrations between SLPs and BAs: *scope of practice, inappropriate, bad experience, ethics violations, misconceptions, unwilling to budge*, *boundaries*, and the list goes on.

Purpose of This Research

Given the challenges that are facing both SLPs and BAs when it comes to supporting children with ASD, it is imperative that we identify ways in which both disciplines can learn more about each other and find ways to collaborate effectively. This research is a first step at identifying (a) the theoretical perspectives, and (b) the intervention strategies utilized by members from both disciplines when assessing and treating individuals with ASD.

Method

Data Source

A survey was created to identify what types of theories and interventions SLPs and BAs are utilizing in their practice with individuals with ASD. As this is a relatively new area of research, the survey was created based on the author's extensive experience in both disciplines with feedback from experts in each field. Feedback for the survey was provided by two PhD level SLPs, one PhD level BCBA, one PhD level Special Educator, and one Master's level BCBA. The survey included 10 different scenarios followed by a series of answers that were to be selected based on the participants' education and experience (see Appendix A). Two of the 10 scenarios were multiple choice questions with a single answer. Eight were multiple selection questions where more than one answer could be provided.

Participants

The survey was distributed via e-mail and social media networks to SLPs, BAs, and students in training for these professions. The survey was open for four weeks and garnered 194 responses. Inclusion criteria required participants to have a high school diploma and a minimum of 3 or more children with ASD on their current caseload. After eliminating responses that did not meet the inclusion criteria, the total number of responses was 147. One hundred responses were from certified SLPs or students currently enrolled in SLP programs, 34 responses were from BAs or students currently enrolled in Applied Behavior Analysis programs, and 13 responses were from participants dually certified as SLPs and BCBAs (i.e., herafter referred to as BCBA-SLPs). Demographics for the participants can be found in Table 2.

Table 2. Demographics.

Demographic Category	Behavior Analysts (BAs)	Speech Language Pathologists (SLPs)	Dually Certified (BCBA-SLPs)
Age Range:			
20–25	6	5	0
26–30	12	21	3
31–35	5	11	3
36–40	7	13	1
41–45	2	13	2
46–50	1	10	1
51–55	0	7	2
56–60	1	14	1
60+	0	6	0
Work environment:			
Client home	1	0	0
Clinic	1	1	0
Early intervention	7	6	1
Government agency (e.g., regional center, babywatch)	0	1	0
Hospital	1	3	1
Non-profit speech and hearing clinic	0	1	0
Private agency	13	5	3
Private elementary school	0	1	0
Private practice	3	6	5
Private special education school	0	1	0
Public school	2	72	2
Residential School	0	0	1
Specialized psychiatric inpatient program	0	1	0
University	6	2	0
Length in Field:			
20+ years	2	33	3
11–20 years	8	24	4
6–10 years	9	18	3
under five years	15	25	3
Total Number of Responses Per Category:	34	100	13

Note. The number of participants in each category is reported.

Data were analyzed by downloading the survey form responses as a comma separated values file into Microsoft Excel. Data were then organized by scenario, answer, and respondent type. The total number of respondents was calculated per response and a percentage was determined for each answer.

Results

A descriptive analysis to determine similarities and differences in responses from participating SLPs and BAs was conducted to answer the proposed research question. Specifically, the theories and strategies SLPs and BAs utilize when assessing and treating individuals with ASD were examined.

The first scenario stated: A 3-year-old child you work with continually refers to themselves in the third person. What components may be helpful when addressing this concern (see Table 3)? The top three responses from the BAs were (a) Skinner's Verbal Behavior (82%), (b) imitation

training (68%), and (c) explicit teaching (50%). The top three response from SLPs were (a) imitation training (66%), (b) explicit teaching (61%), and (c) Skinner's Verbal Behavior (47%). For participants holding dual certification as BCBA and SLP, the top three responses were similar with 69% identifying Skinner's Verbal Behavior, 62% choosing explicit teaching, and 54% choosing imitation training.

Table 3. Scenario # 1: A Three-Year-Old Child You Work With Continually Refers to Themselves in the Third Person (e.g., "Jack Wants a Cookie," as Opposed To "I Want a Cookie."). What Components May Be Helpful When Addressing This Concern? (Choose All That Apply)

Answer:	**SLP (n=100)**	**BA (n=34)**	**BCBA-SLP (n=13)**
Skinner's Verbal Behavior	9 (9%)	28 (82%)	9 (69%)
Scaffolding	47 (47%)	7 (21%)	5 (38%)
Brown's Morphemes	26 (26%)	2 (6%)	3 (23%)
Chaining	23 (23%)	5 (15%)	4 (31%)
Task Analysis	4 (4%)	4 (12%)	0
Language Sample	32 (32%)	9 (26%)	3 (23%)
Imitation Training	66 (66%)	23 (68%)	7 (54%)
Picture Exchange Communication System	20 (20%)	2 (6%)	0
Explicit Teaching	61 (61%)	17 (50%)	8 (62%)
Other	9 (9%)	7 (21%)	2 (15%)

Scenario two asked what theory of language acquisition most guided the clinical practice of the participant. Participants were asked to select the answer that best fit their theoretical perspective (see Table 4). The BAs responded overwhelmingly (91%) that a Behavioral Approach (Skinner) guided their practice. SLPs were more varied in their responses with a Cognitive/ Semantic Approach garnering 41% of the responses and three other theories sharing similar percentages: Psycholinguistic/Syntactic Approach (15%), Behavioral Approach (14%), Pragmatic Approach (13%). The dual certified respondents selected a Behavioral Approach 77% of the time and the second highest rated approach was the Cognitive/Semantic Approach with 15%.

*Table 4. Scenario #2: There Are Several Different Theories That Address Language Acquisition in Children. The Theory That You Subscribe to Can Impact How You Address Language Related Issues With Clients on Your Caseload. The Theory That **Most** Guides Your Practice Is. (Choose One)*

Answer:	**SLP (n=100)**	**BA (n=34)**	**BCBA-SLP (n=13)**
Cognitive/Semantic Approach (Bloom)	38 (41%)	1 (3%)	2 (15%)
Psycholinguistic/Syntactic Approach (Chomsky)	14 (15%)	0	0
Behavioral Approach (Skinner)	13 (14%)	31 (91%)	10 (77%)
Pragmatic Approach (Bruner)	12 (13%)	0	0
Constructivist/Social Approach (Vygotsky)	9 (10%)	1 (3%)	1 (8%)
Other	6 (7%)	1 (3%)	0
Total Responses	92	34	13

Note. Responses were not a forced choice, so not all respondents answered every question

Scenario three stated: A six-year-old child on your caseload is struggling to learn the steps of the morning routine at his new school. To assist him in learning the routine, choose what you would determine to be the most effective and efficient treatment plan from those listed (see Table 5). The top two answers chosen by BAs were a picture schedule (71%) and a video model of the routine (41%). The top two SLP responses were similar with 90% choosing a picture schedule and 25% choosing a video model of the routine. The dually certified participants top choice was a picture schedule (62%).

Table 5. Scenario #3: A Six-Year-Old Child on Your Caseload Is Struggling to Learn the Steps of the Morning Routine at His New School. To Assist Him in Learning the Routine, Choose What You Would Determine to Be the Most Effective and Efficient Treatment Plan From Those Listed. (Choose the Best Answer)

Answer:	**SLP (n=100)**	**BA (n=34)**	**BCBA-SLP (n=13)**
Video Model of Routine	25 (25%)	14 (41%)	2 (15%)
Written Task Analysis	4 (4%)	9 (26%)	2 (15%)
Picture Schedule	90 (90%)	24 (71%)	8 (62%)
Social Story	22 (22%)	3 (9%)	0
Premack Principle	2 (2%)	7 (21%)	1 (8%)
Physical Prompt	3 (3%)	6 (18%)	2 (15%)
Self Management	2 (2%)	3 (9%)	0
Other	4 (4%)	5 (15%)	0

The fourth scenario in the survey asked respondents to identify the types of assessments they would administer to a child two and a half years of age who is not yet talking and does not respond to his name (see Table 6). Of the 34 BAs that responded, 74% of them indicated that they would administer the Verbal Behavior Milestones Assessment and Placement Program (VBMAPP;

Sundberg, 2008) to the child. Thirty-five percent of the BAs reported that they would administer the Autism Diagnostic Observation Schedule (ADOS; Lord, Rutter, Pamela, Dilavore, & Risi, 2012) to the child. SLPs overwhelmingly indicated that they would administer the Preschool Language Scale (PLS; Zimmerman, Steiner & Pond, 2011) with 63% responding. In contrast, only 16% of the SLPs indicated they would use the VBMAPP. The dual certified respondents indicated they would use the VBMAPP (77%), the Autism Diagnostic Observation Scale (54%), the Modified Checklist for Autism in Toddlers (46%), and the PLS (30%).

Table 6. Scenario #4: A Mother Is Concerned That Her Two-And-A-Half-Year-Old Son Is Not Talking. He Doesn't Seem Interested in Toys and Spends the Majority of His Time Spinning in Circles. He Doesn't Respond When His Mother Calls His Name. The Mother Brought the Child to You for an Evaluation. What Type of Assessment(s) Would You Administer? (Check All That Apply)

Answer:	**SLP (n=100)**	**BA (n=34)**	**BCBA-SLP (n=13)**
Clinical Evaluation of Language Fundamentals	4 (4%)	0	1 (8%)
Preschool Language Scale	63 (63%)	0	4 (31%)
Verbal Behavior Milestones Assessment and Placement (VBMAPP)	16 (16%)	25 (74%)	10 (77%)
Goldman-Fristoe	4 (4%)	1 (3%)	0
Autism Diagnostic Observation Scale (ADOS)	32 (32%)	12 (35%)	7 (54%)
Childhood Autism Rating Scale	31 (31%)	7 (21%)	3 (23%)
Ages & Stages Questionnaire	25 (25%)	2 (6%)	5 (39%)
Modified Checklist for Autism in Toddlers	36 (26%)	4 (12%)	6 (46%)
Refer to Another Practitioner	31 (31%)	4 (12%)	0
Other	33 (33%)	4 (12%)	4 (30%)

A problem behavior involving spitting was presented in scenario five with respondents being asked what they would do to evaluate the spitting behavior (see Table 7). The responses from the BAs were primarily spread across four options: conduct a Functional behavioral analysis (FDA; 88%), ask the teacher to document when he spits (68%), observe the client in multiple environments (56%), and conduct an experimental functional analysis (50%). The SLPs top three responses were similar with 69% indicating they would conduct an FBA, 62% asking the teacher to document the spitting, and 58% indicating they would observe the client across multiple settings. Interestingly, 17% of the SLPs indicated that they would implement a time out procedure, while 0% of the BAs indicated they would use a time out procedure. The BCBA-SLPs responses were spread out across the same four categories as were the BAs with 0% of them indicating they would use a time out procedure.

Table 7. Scenario #5: A 10-Year-Old on Your Caseload Has Started Spitting. Mom Reports He Is Spitting at Home "All the Time" and His Classroom Teacher Confirms That She Has Noticed an Increase in His Spitting at School. What Would You Do to Evaluate the New Spitting Behavior? (Check All That Apply)

Answer:	**SLP (n=100)**	**BA (n=34)**	**BCBA-SLP (n=13)**
Conduct a Descriptive, Functional Behavior Analysis	69 (69%)	30 (88%)	11 (85%)
Ask the Teacher to Document When He Spits	62 (62%)	23 (68%)	9 (69%)
Conduct an Experimental Functional Analysis	5 (5%)	17 (50%)	5 (38%)
Observe the Client in Multiple Environments for 15 Minutes at a Time	58 (58%)	19 (56%)	9 (69%)
Implement a Time-Out Procedure	3 (3%)	0	0
Refer to Another Practitioner	17 (17%)	1 (3%)	1 (8%)
Other	9 (9%)	2 (6%)	1 (8%)

Scenario six consisted of two parts with the first part asking what the respondent would do to evaluate sound errors (see Table 8). Over half (53%) of the BAs' indicated that they would refer to another practitioner with the second highest response being the VBMAPP (47%). Twenty-nine percent of responding BAs indicated that they would use a language sample to evaluate sound errors. Among SLPs, three responses garnered the majority of responses: Goldman-Fristoe Test of Articulation (71%; Goldman & Fristoe, 2000), Kaufman Speech Praxis Test for Children (70%; Kaufman, 1995), and Language Sample (67%). Responses were similar among BCBA-SLPs with 77% indicating they would administer the Goldman-Fristoe Test of Articulation and 70% conducting a language sample.

Table 8. Scenario #6a: A Four-Year-Old Child That You Are Working With Is Very Hard to Understand. They Pronounce Multiple Words Incorrectly. The Child Can Imitate Sounds in Isolation When You Work With Them, but When They Try to Say Complete Words and Sentences, the Sound Errors Return. What Would You Do to Evaluate the Child's Sound Errors? (Choose All That You Would Consider)

Answer:	**SLP (n=100)**	**BA (n=34)**	**BCBA-SLP (n=13)**
Verbal Behavior Milestones Assessment and Placement (VBMAPP)	1 (1%)	16 (47%)	0
Goldman-Fristoe	71 (71%)	0	10 (77%)
Language Sample	67 (67%)	10 (29%)	9 (69%)
Phonological Mean Length of Utterance	16 (16%)	5 (15%)	3 (23%)
Kaufman Speech Praxis Test	70 (70%)	6 (18%)	6 (46%)
Refer to Another Practitioner	1 (1%)	18 (53%)	0
Other	18 (18%)	1 (3)	4 (30%)

The second part of scenario six asked what treatment programs could be utilized for the four-year-old child with sound errors (see Table 9). BAs overwhelmingly responded that they would employ echoic training to work on sound errors (82%). Responses among SLPs were mixed

with 77% indicating echoic training, 63% indicating a contrast approach, 53% using tactile stimulation, and 49% indicating visual cueing. The top two responses among the dually certified respondents were visual cueing (85%) and echoic training (76%).

Table 9. Scenario #6b: What Element(s) Would You Utilize in a Treatment Program for the Child in the Above Scenario? (Choose All That You Would Consider)

Answer:	**SLP (n=100)**	**BA (n=34)**	**BCBA-SLP (n=13)**
Augmentative Communication Device	7 (7%)	9 (26%)	3 (23%)
Echoic Training	77 (77%)	28 (82%)	10 (77%)
Visual Cueing	49 (49%)	10 (29%)	11 (85%)
Tactile Stimulation	53 (53%)	4 (12%)	3 (23%)
Cycles Approach	32 (32%)	0	5 (38%)
Contrast Approach	63 (63%)	1 (3%)	3 (23%)
Imitation Training	4 (4%)	16 (47%)	5 (38%)
Mimetic Training	3 (3%)	7 (21%)	0
Tact Training	18 (18%)	10 (29%)	0
Other	27 (27%)	4 (12%)	4 (31%)

The next scenario asked respondents how they would determine the most effective course of treatment when considering two different types of treatment (see Table 10). Respondents were asked to select the best answer and could only select one answer. Over half of the BAs (53%) responded that they would conduct an alternating treatment experiment to determine the most effective course of treatment. Only 13% of the SLPs indicated they would utilize an alternating treatment design. The majority of SLPs (44%) indicated they would research effective vocabulary interventions with 30% of the SLPs choosing the answer, “Take data on one type of treatment for three weeks, then switch to the other type of treatment and take data, then compare.” Dual certified respondents were evenly split between conducting an alternating treatment design (31%) and researching effective vocabulary interventions (31%).

Table 10. Scenario #7: You Have a Client Who Is Learning New Vocabulary and You Would Like to Determine Which Treatment Is the Most Effective for Them. There Are Two Specific Treatments You Are Considering. What Would Be an Effective, Evidence Based Way to Determine the Most Effective Course of Treatment? (Chose the Best Answer)

Answer:	**SLP (n=100)**	**BA (n=34)**	**BCBA-SLP (n=13)**
Research effective vocabulary interventions.	44 (44%)	11 (32%)	4 (31%)
Conduct an alternating treatment experiment.	13 (13%)	18 (53%)	4 (31%)
Take data on one type of treatment for three weeks, then switch to the other type of treatment and take data, then compare.	30 (30%)	1 (3%)	2 (15%)
Ask colleagues on Facebook what intervention has worked best for them.	1 (1%)	0	0
Choose a treatment based on your clinical expertise and stick with it for three months so as to not confuse the client.	8 (8%)	2 (6%)	1 (8%)
Other	4 (4%)	2(6%)	2 (15%)
Total Responses	100	34	13

In scenario eight, respondents are asked what they would do to change the behavior of a five-year-old client who is crying and screaming to gain access to crackers (see Table 11). Eighty-two percent of BAs indicated they would use a differential reinforcement procedure. Eighty-one percent of the SLPs and 69% of the BCBA-SLPS indicated they would use the PECS.

Table 11. Scenario #8: You Have a 5-Year-Old Client Who Is Trying to Gain Access to His Favorite Crackers by Crying and Screaming. You Talk With His Parents About Several Options to Change This Behavior. Choose the Option Below That You Think Provides the BEST Option. (Choose All That You Would Consider)

Answer:	**SLP (n=100)**	**BA (n=34)**	**BCBA-SLP (n=13)**
Teach the child to sign "more."	42 (42%)	6 (18%)	0
Teach the parents to ignore the child when he cries for crackers	6 (6%)	14 (41%)	3 (23%)
Use a differential reinforcement procedure.	28 (28%)	28 (82%)	7 (54%)
Use a Picture Exchange Communication System (PECS)	81 (81%)	23 (68%)	9 (69%)
Remove the crackers from the house.	0	0	0
None of the above	3 (3%)	0	0
Other	16 (16%)	11 (32%)	6 (46%)

A social skills scenario was presented in scenario nine and respondents were asked to identify a social skills strategy they would use to teach a 12-year-old client how to join a table of classmates in the lunch room (see Table 12). The BAs' top two responses included using the PECS (97%) and video modeling (94%). The SLPs' top two responses included writing a social

story (92%) and video modeling (85%). The third most popular response among SLPs was social thinking (72%). Similarly, 92% of the BCBA-SLPs also indicated they would use video modeling while only 7.7% of the dually certified individuals selected the social thinking option.

Table 12. Scenario #9: You Have a 12-Year-Old Client Who Needs to Work on Social Skills. She Is Struggling to Find Someone to Sit With at Lunch. What Type of Strategy(Ies) Would You Utilize to Teach Her How to Join a Table of Classmates in the Lunch Room? (Choose All the You Would Consider)

Answer:	**SLP (n=100)**	**BA (n=34)**	**BCBA-SLP (n=13)**
Video Modeling	86 (86%)	32 (94%)	12 (92%)
Task Analysis	11 (11%)	7 (21%)	3 (23%)
Social Story	92 (92%)	25 (74%)	3(23%)
Chaining Procedure	2 (2%)	5 (15%)	8 (62%)
Social Thinking	72 (72%)	14 (41%)	1 (8%)
Super Skills	3 (3%)	4 (12%)	0
Direct Instruction	39 (39%)	11 (32%)	4 (31%)
Picture Exchange Communication System (PECS)	0	33 (97%)	0
Other	11 (11%)	5 (15%)	2 (15%)

The final scenario asked respondents to rank the team members who could be part of an ASD intervention team. Respondents were asked if a team member was *critical and required*, *helpful but not required*, or *not necessary*. Over half of the BAs indicated the following team members were *critical and required*: SLP (74%), parent/caregiver (85%), BA (88%), medical provider (65%), teacher (85%), paraprofessional/aide (59%). Over half of the BAs deemed the following team members *not necessary*: recreational therapist (50%), naturopath (59%), music therapist (56%). Over half of the SLPs identified the following team members as *critical and required*: SLP (98%), parent/caregiver (99%), occupational therapist (87%), behavior analyst (67%), medical provider (58%), teacher (98%), and paraprofessional/aide (55%). There were no categories where over half of the SLPs indicated that a team member was *not necessary*. More than half of the dually certified respondents indicated the following team members as *critical and required*: SLP (92%), parent/caregiver (92%), occupational therapist (69%), behavior analyst (77%), medical provider (85%), teacher (85%), and paraprofessional/aide (62%). Over half of the BCBA-SLPs indicated that naturopaths (62%) and music therapists (54%) were *not necessary*.

Discussion

According to the *Diagnostic and Statistical Manual of Mental Disorders* (DSM–5) (American Psychiatric Association, 2013), a diagnosis of ASD includes two domains: (a) deficits in social communication, and (b) the presence of restrictive, repetitive patterns of behaviors or interests. The very definition of ASD indicates that both the disciplines of SLP and BA are required to address the complex needs of individuals with this multifaceted disorder. As indicated by the findings of this research, while there are differences in theoretical ideology and approaches to intervention, both SLPs and BAs often have similar outcomes in mind. One example of a shared goal is to support the acquisition of communication skills.

Responses indicate clear theoretical differences for language acquisition with multiple perspectives dispersed across SLPs while a singular theory is evident among BAs. SLPs responses

were spread out across Cognitive/Semantic, Psycholinguistic/Syntactic, Behavioral, and Pragmatic with Cognitive/Semantic garnering 41% of the response. On the other hand, 91% of BAs chose a behavioral construct to language acquisition. Among dually certified individuals, the majority still identify with a behavioral approach (77%) with only 15% indicating a cognitive/semantic approach. These differences may be an indicator as to why there are distinct differences in the intervention approaches subscribed to by each discipline. BAs overwhelmingly responded to intervention scenarios with behavior analytic strategies (i.e., task analysis, video modeling, differential reinforcement, chaining) and SLPs chose responses that indicated the use of intervention strategies supported by a developmental, cognitive approach to language acquisition (i.e., visual cueing, social story, signing, and direct instruction).

One specific area where an increased need for inter-professional education was evident involved diagnostic capabilities and limitations. SLPs receive specific training in diagnostics and are licensed to diagnose a variety of communication disorders; however, specialized training is required to administer the ADOS and diagnose ASD. While some BAs are trained as psychologists and diagnosticians, many students attend programs that offer approved course sequences to become BCBAs outside of a psychology program. These types of approved course sequences for BCBAs offer minimal training in diagnostics that is limited in scope (e.g., VBMAPP, Functional Behavior Analysis). One concern in particular was that 35% of BAs and 32% of SLPs indicated they would administer the ADOS to a client who was exhibiting signs of ASD. This diagnostic tool may be beyond the scope of some BAs and SLPs.

A need for increased inter-professional education was also evident in the responses to scenarios five and six. Scenario five presented a maladaptive behavior where the services of a trained BA would be highly beneficial, yet only 17% of the SLPs stated that they would refer to another practitioner. Similarly, in scenario six a child with sound errors was described and only 53% of the BAs stated that they would refer to another practitioner. Ideally, education and collaboration between disciplines would increase future referrals. Similarly, concerns were noted when BAs indicated tools that they would use to evaluate a child presenting with sound errors. Sixteen (47%) of BAs stated they would utilize the VBMAPP, which is a tool used in part to determine a child's skill level (e.g., verbal behavior, fine motor, etc.); however it is not a tool for articulation testing and some would argue sound error assessments are outside the scope of practice of BAs. Only one SLP out of the 113 SLPs/SLP-BCBAs that responded indicated they would administer the VBMAPP given this particular scenario. The BAs also indicated they would administer the Kaufman Speech Praxis Test (18%), conduct a language sample (29%), and obtain a phonological mean length of utterance (15%). Fortunately, 53% of the BAs indicated they would refer to another practitioner if a child with sound errors needed an assessment.

Further needs for interprofessional education involve differing terminology. In scenario seven, the term alternating treatment is introduced as an answer. The very next answer describes a type of alternating treatment design without actually using the direct term. BAs overwhelminging chose the alternating treatment option (53%), while SLPs overwhelming chose the option describing the same technique (30%). In scenario eight, the PECS is a type of differential reinforcement system because individuals are taught to exchange a picture to get their needs met and in the scenario presented, the picture exchange card would be replacing the crying and screaming behavior while reinforcing the exchange of a card. While BAs recognize the similarity between the terms, SLPs do not tend to be familiar with the term differential reinforcement, as was evident in their responses to this scenario.

On the other hand, when the behavioral scenario in number five was presented, 69% of the SLPs reported they would conduct a descriptive, functional behavior anlysis and only 17% indicated they would refer to another practitioner. The majority of SLP training programs do not provide any formal training on conducting a functional behavior analysis. Similarly, SLPs did not seem familiar with single subject design when they were presented with the options to scenario seven that included the term "alternating treatment experiment" with only 13% selecting that

option; however, 30% of the SLPs responded that they would "take data on one type of treatment for three weeks, then switch to the other type of treatment and take data, then compare," which is essentially a description of an alternating treatment design. Training programs for SLPs could benefit from explicit teaching in single subject designs.

Both disciplines would benefit from more familiarity with evidence based practice recommendations as reported by the National Standards Project, Phase 2 for the treatment of children with ASD. For example, scenario nine includes popular interventions, not all of which are evidence-based (i.e., social thinking, super skills), but are widely used in public education. The National Autism Center (2015) lists *social thinking* as an unestablished intervention. According to the National Autism Center, "There is little or no evidence in the scientific literature that allows us to draw firm conclusions about their effectiveness with individuals with ASD. There is no reason to assume these interventions are effective" (p. 72). The SLPs selected social thinking as an option 72% of the time while BAs selected the option 41% of the time, with the dually certified SLP-BCBAs only selecting it 7.7% of the time. Continuing education on evidence-based practices across disciplines as well as inter-professional education to learn about evidence based approaches from the other disciplines is recommended.

Limitations

One of the limitations of this research was the response rate from BAs. More SLPs responded to the survey than did BAs. The ratio of BAs to SLPs is reflected in the response rate; however, given that licensing of BAs is a relatively new option in many states. Survey data has the potential to over or under report what is actually occurring, so future research should focus on observations of SLPs and BAs working directly with children with ASD. To control for this possible disconnect, scenarios in the survey attempted to reflect real world circumstances.

Conclusion

Given the recommendations from both ASHA and the Behavior Analyst Certification Board, collaboration between both disciplines is imperative. The results of this research indicated that BAs and SLPs need to provide and participate in inter-professional education opportunities. SLPs would benefit from learning more about what a BA does and the techniques and strategies they use. Likewise, it would behoove BAs to learn about language and communication from the SLPs. Some very prominent, evidence based interventions have developed when SLPs and BAs work together (e.g., PECS, Pivotal Response Treatment, Early Start Denver Model, NDBI). Continued collaboration to support individuals with disabilities is required to more effectively treat complex disorders.

Students in both disciplines get extensive training and hands on experience. BCBAs complete a minimum of 750 hours and SLPs get a minimum of 1,260 hours. This training does not often offer insights into the practices of other disciplines; however, and extensive continuing education is required to address this critical need. In addition, neither discipline is required to focus on training specific to ASD. Given the results of this research, in addition to inter-professional education to understand the theoretical and intervention perspectives from each discipline, it is recommended that SLPs and BAs develop a plan to work collaboratively and recognize the talents and resources that each discipline brings to the table. State and national governing boards for both SLPS and BAs could facilitate conversations to help develop sustainable, respectful, and meaningful collaborations across disciplines to benefit the clients we serve.

References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC: Author.

American Speech-Language-Hearing Association. (2016a). *Scope of practice in speech-language pathology* [Scope of Practice]. Available from www.asha.org/policy/

American Speech-Language-Hearing Association. (2016b). *Practice portal–Autism*. Retrieved from http://www.asha.org/PRPSpecificTopic.aspx?folderid=8589935303&section=Overview

Bloom, L. (1970). *Language development: Form and function in emerging grammars*. Cambridge, MA: MIT Press.

Bondy, A. S., & Frost, L. A. (1998). The picture exchange communication system. *Seminars in Speech and Language, 19*(4), 373–88.

Bruner, J. (1974). *Toward a theory of instruction*. Boston, MA: Harvard University Press.

Carr, E. G., & Durand, V. M. (1985). Reducing behavior problems through functional communication training. *Journal of Applied Behavior Analysis, 18*(2), 111–126.

Centers for Disease Control. (2016). *Autism spectrum disorder data and statistics*. Retrieved June 28, 2016 from http://www.cdc.gov/ncbddd/autism/data.html

Chretien, K., & Kind, T. (2013). Social media and clinical care: Ethical, professional, and social implications. *Circulation, 127*(13), 1413–1421.

Chomsky, N. (1957). *Syntactic structures*. Berlin, Germany: Walter de Gruyter.

Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied behavior analysis*, Second Edition. Publisher: Pearson.

Dawson, G., Rogers, S., Munson, J., Smith, M., Winter, J., Greenson, J., … Varley, J. (2010). Randomized, controlled trial of an intervention for toddlers with autism: The early start denver model. *Pediatrics, 125*(1), e17–e23.

Goldman, R., & Fristoe, M. (2000). *Goldman Fristoe test of articulation-Second Edition*. CA: Pearson Publishing.

Kasari, C., Kaiser, A., Goods, K., Nietfeld., J., Mathy, P., Landa., R., … Almirall, D. (2014). Communication interventions for minimally verbal children with autism: A sequential multiple assignment randomized trial. *Journal of the American Academy of Child and Adolescent Psychiatry, 53*(6), 635–646.

Kaufman, N. R. (1995). *The Kaufman speech praxis: Test for children*. Wayne State University Press.

Lord, C., Rutter, M., Pamela, C., Dilavore, & Risi, S. (2012). *Autism diagnostic observation schedule,* Second Edition (ADOS®-2). Western Psychological Services.

Lovaas, O. I. (1987). Behavioral treatment and normal educational and intellectual functioning in young autistic children. *Journal of Consulting and Clinical Psychology, 55,* 3–9.

National Autism Center. (2015). *Findings and conclusions: National standards project, phase 2*. Randolph, MA: Author.

Schreibman, L., Dawson, G., Stahmer, A. C., Landa, R., Rogers, S. J., McGee, G. G., & McNerney, E. (2015). Naturalistic developmental behavioral interventions: Empirically validated treatments for autism spectrum disorder. *Journal of Autism and Developmental Disorders, 45,* 2411–2428.

Skinner, B. F. (1957). *Verbal behavior*. Acton, MA: Copley Publishing Group.

Sundberg, M. L. (2008). *The verbal behavior milestones assessment and placement program: The VB-MAPP*. Concord, CA: AVB Press.

Van Den Besselaar, P., & Heimeriks, G. (2001, July). Disciplinary, multidisciplinary, interdisciplinary: Concepts and indicators. In M. Davis and C. S. Wilson (Eds.), *ISSI 2001, 8th international conference of the Society for Scientometrics and Informetrics* (pp. 705–716). Sydney: UNSW.

Zimmerman, I. L., Steiner, V. G., & Pond, R. E. (2011). *Preschool language scale,* Fifth Edition (PLS-5). Psychological Corporation.

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Appendix A. Autism Assessment & Treatment Survey for Behavior Analysts and Speech Therapists.

This survey is being distributed to help researchers learn more about work that BAs and speech–language pathologists are doing with children on the autism spectrum. The results of this survey are confidential and no identifying information is being requested or stored as a result of this research. All responses are completely voluntary and you can quit the survey at any time with no penalty. This research has been approved by the Utah Valley University Institutional Review Board #01506.

Demographics:

1. Education: Bachelors, Master's, PhD, EdD, Other _____
2. Degree: BCBA, SLP, Psychology, Special Education, Applied Behavior Analysis, Social Work, Other_____
3. Certification: BcaBA, BCBA, BCBA-D, CCC-SLP, SLP-A, PhD CCC-SLP, Other _____
4. Age Range: 20–25, 26–30, 31–35, 36–40, 41–45, 46–50, 51–55, 56–60, 60+
5. Work environment: public school, private agency, university, early intervention, government agency (e.g., baby watch, regional center, etc.), private practice, hospital, skilled nursing facility, group home, other _____.
6. How long have you been working in your field: under five years, 6–10 years, 11–20 years, 20+ years

Criteria for inclusion:

1. Do you currently have individuals with autism spectrum disorder (ASD) on your caseload? Yes/No (Answer must be YES to continue)
2. On average, per week, how many children (under the age of 18) with autism do you see? (Must be three or above to continue)

Instructions: A short scenario will be followed by a question(s). Please read the scenario and then pick the answer(s) that best designate your response. Because this project is analyzing two different disciplines (Speech Therapy and BAs), terms from both disciplines will be utilized. If you are unfamiliar with a term, feel free to select an answer using a term you are more familiar with and skip over the terms you may not be familiar with.

Scenario #1: A 3-year-old child you work with continually refers to themselves in the third person (e.g., "Jack wants a cookie" as opposed to "I want a cookie"). What components may be helpful when addressing this concern? Choose all that apply.

1. Skinner's Verbal Behavior
2. Scaffolding
3. Brown's Morphemes
4. Chaining
5. Task Analysis
6. Language Sample
7. Imitation Training
8. Picture Exchange Communication System (PECS)

9. Explicit Teaching
10. Other _____

Scenario #2: There are several different theories that address language acquisition in children. The theory that you subscribe to can impact how you address language related issues with clients on your caseload. The theory that **most** guides your practice is:

1. Cognitive/Semantic Approach (Bloom)
2. Pragmatic Approach (Bruner)
3. Constructivist/Social Approach (Vygotsky)
4. Behavioral Approach (Skinner)
5. Psycholinguistic/Syntactic Approach (Chomsky)
6. Other _____

Scenario #3: A six-year-old child on your caseload is struggling to learn the steps of the morning routine at his new school. To assist him in learning the routine, choose what you would determine to be the *most effective and efficient* treatment plan from those listed. Choose the best answer:

1. Video model of the routine
2. Written task analysis
3. Picture schedule
4. Social story
5. Premack Principle
6. Physical prompt
7. Self management
8. Other _____

Scenario #4: A mother is concerned that her two-and-a-half-year-old son is not talking. He doesn't seem interested in toys and spends the majority of his time spinning in circles. He doesn't respond when his mother calls his name. The mother brought the child to you for an evaluation. What type of assessment(s) would you administer? (Check all that apply)

1. Clinical Evaluation of Language Fundamentals (CELF)
2. Preschool Language Scale (PLS)
3. Verbal Behavior Milestones Assessment and Placement Program (VBMAPP)
4. Goldman Fristoe
5. Autism Diagnostic Observation Scale (ADOS)
6. Childhood Autism Rating Scale (CARS)
7. Ages & Stages Questionnaire
8. Modified Checklist for Autism in Toddlers
9. Refer to Another Practitioner
10. Other

Scenario #5: A 10-year-old on your caseload has started spitting. Mom reports he is spitting at home "all the time" and his classroom teacher confirms that she has noticed an increase in his spitting at school. What would you do to evaluate the new spitting behavior? (Check all that apply)

1. Conduct a descriptive, functional behavior analysis.
2. Ask the teacher to document when he spits.
3. Conduct an experimental functional analysis.
4. Observe the client in multiple environments for 15 minutes at a time.
5. Implement a time out procedure.
6. Refer to practitioner.
7. Other

Scenario #6: A four-year-old child that you are working with is very hard to understand. They pronounce multiple words incorrectly. The child can imitate sounds in isolation when you work with them, but when they try to say complete words and sentences, the sound errors return. What would you do to evaluate the child's sound errors? (Choose all that you would consider)

1. Verbal Behavior Milestones Assessment and Placement Program (VBMAPP)
2. Goldman Fristoe
3. Language Sample
4. Phonological Mean Length of Utterance
5. Kaufman Speech Praxis Test
6. Refer to Practitioner
7. Other

What element(s) would you utilize in a treatment program for the child in the above scenario? (Choose all that you would consider)

1. Augmentative Communication Device
2. Echoic Training
3. Visual Cueing
4. Tactile Stimulation
5. Cycles Approach
6. Contrast Approach
7. Imitation Training
8. Mimetic Training
9. Tact Training
10. Other _____

Scenario #7: You have a client who is learning new vocabulary and you would like to determine which treatment is the most effective for them. There are two specific treatments you are considering. What would be an effective, evidence based way to determine the most effective course of treatment? (Chose the **best** answer)

1. Research effective vocabulary interventions.
2. Conduct an alternating treatment experiment.
3. Take data on one type of treatment for three weeks, then switch to the other type of treatment and take data, then compare.
4. Ask colleagues on Facebook what intervention has worked best for them in the past.
5. Choose a treatment based on your clinical expertise and stick with it for 3 months so as to not confuse the client.
6. Other _____

Scenario #8: You have a 5-year-old client who is trying to gain access to his favorite crackers by crying and screaming. You talk with his parents about several options to change this behavior. Choose the option below that you think provides the BEST option. (Choose all that you would consider)

1. Teach the child to sign "more."
2. Teach the parents to ignore the child when he cries for crackers.
3. Use a differential reinforcement procedure.
4. Use a Picture Exchange Communication System (PECS).
5. Remove the crackers from the house.
6. None of the above
7. Other _____

Scenario #9: You have a 12-year-old client who needs to work on social skills. She is struggling to find someone to sit with at lunch. What type of strategy(ies) would you utilize to teach her how to join a table of classmates in the lunch room? (Choose all the you would consider)

1. Video Modeling
2. Task Analysis
3. Social Story
4. Chaining Procedure
5. Social Thinking
6. Super Skills
7. Direct Instruction
8. Picture Exchange Communication System (PECS)
9. Other _____

Scenario #10: When it comes to supporting individuals with Autism Spectrum Disorder, some consider a team approach to be ideal. Please indicate if a team member is *critical and required*, *helpful but not required*, or *not necessary*.

Occupational Therapist

Physical Therapist

Medical Provider

Behavior Analyst

Caregiver/Parent

Speech Language Pathologist

Social Worker

Teacher

Paraprofessional/Instructional Assistant

Music Therapist

Recreational Therapist

Naturopath