A CRUMBLING FOUNDATION? THE RELATIONSHIP BETWEEN INSTRUCTIONAL DELIVERY, PRACTICUM EXPERIENCES AND ACADEMIC MAJOR TO BA’S USE OF CUTS

HEATHER M. WILFORD
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Reviewed and approved* by the following:

Kimberly Schreck
Professor of Psychology
Thesis Supervisor

Gina Brelsford
Associate Professor of Psychology
Faculty Reader

Ronald Walker
Associate Professor of Mathematics
Honors Adviser

* Signatures are on file in the Schreyer Honors College
ABSTRACT

Despite ethical guidelines, clinical observation and empirical research continually indicates that behavior analysts struggle with choosing scientifically supported treatments for people with autism. Although ethical guidelines and training standards exist to guide the academic and practicum instruction of behavior analysts, they continue to choose Contemporary Unsupported Treatments (CUT) and non-scientifically supported eclectic treatment approaches. This study examined academic (i.e., instructional delivery methods, academic majors) and practicum (i.e., location, type of program, level of practicum) influences that perpetuate behavior analysts’ (N=782) choices of CUTs. Surveyed BCBA-Ds and BCBAs used an array of CUT treatments (i.e., sensory integration, auditory integration, and facilitated communication). Instructional delivery methods, practicum experiences, and academic majors related to behavior analysts’ choices to use some of the CUTs but not for others. These results indicate that for some popular CUTs, specific remediation must be made to the instructional and practicum foundations of behavior analysts’ training.
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Chapter 1: Introduction

Hacking coughs, wheezing for breath, and even death – symptoms of a very serious respiratory infection, whooping cough (pertussis). Throughout the United States, the dawn of 2014 indicated a 30% increase in the number of cases of this incapacitating and sometimes deadly disease (Centers for Disease and Prevention [CDC], 2014a). In some states, CDC officials reported more cases of pertussis in the first half of 2014 than in all of 2013. Scientists studied this spread of pertussis and concluded its link to parents’ refusals to immunize their children (Crawford, 2014). Despite numerous assurances by experts and the CDC of the safety of immunizations (CDC, 2014b) parents continued to fear routine immunizations that could potentially save their children.

Parents’ hesitance to immunize their children partially resulted from celebrity endorsements of fraudulent research conducted by Dr. Wakefield, which indicated a connection between Measles Mumps Rubella (MMR) vaccines and Autism Spectrum Disorders (ASD; Wakefield et al., 1998). Editors retracted Wakefield’s research from the Lancet due to the U.K.’s General Medical Council’s conclusion that the research was “irresponsible and dishonest” (Whalen & McKay, 2013). The CDC also deemed no relationship between MMR vaccines and ASD (CDC, 2014b). The endorsements and misinformation concerning the relationships of vaccines to ASD also generalized to faulty endorsements and misinformation regarding appropriate treatments for the more than 1.5 million people with ASD in America (Buescher et al., 2014).

While searching for appropriate treatments for their children with autism, parents became bombarded with these distorted truths. Propaganda surrounded many ASD treatments in the form of celebrities, anecdotal stories, and social media. Research reveals
a high prevalence of parents who believe unreliable resources despite the risks to their children (Schreck, 2014; Miller, Schreck, Mulick, & Butter, 2008; Vyse, 2005). Unlike other medical phenomenon, a uniform treatment to cure developmental disabilities remained inexistent, leaving parents’ treatment decisions to be influenced by factors other than science. With the neglect of science, decisions to use alternative treatments most commonly became dependent upon (a) appealing ideologies, (b) authority’s recommendations, (c) tenacity, and (d) a priori beliefs (Vyse, 2005).

For parents of children impacted by ASD, a copious amount of treatment options existed from which to choose from. The array of treatment options available to parents ranged from those with scientific support (i.e., Applied Behavior Analysis: ABA) to treatments with minimal support (e.g., Floortime, Music Therapy, PECS) to unestablished and potentially harmful treatments (e.g., Sensory Integration, Auditory Integration, Diet Therapies, Facilitated Communication, and Chelation; Jacobson, Foxx, & Mulick, 2005; Richdale & Schreck, 2008; National Autism Center [NAC] 2009; Romanczyk, Gillis, White, & Digennaro, 2008). In recognition of the abundance of information regarding ASD, researchers attempted to provide guidance to parents on how to best choose scientifically supported treatment options for their children (National Autism Center, 2009). By the use of intensive empirical research, the National Standards Report (NSR) stressed the need for evidence-based practice guidelines for ASD and provided categories for treatments based on their research support. These categories included Established (e.g., ABA, DTI, PBS), Emerging (e.g., TEACCH, Floortime, Music Therapy), Unsupported (e.g., Sensory Integration, Auditory Integration, Speech Therapy) and Ineffective/Harmful Treatments (e.g., Facilitated Communication, Diet
Therapy, Vitamin Therapy). These categories provided parents with a resource to begin the treatment decision process.

Although ample research, including the NSR, identified behavioral interventions as the single most effective treatment for ASD, multiple treatment options continued to proliferate and be used by parents (Schreck & Miller, 2010). The abundance of treatment options led to the development of labels in order to distinguish between effective and ineffective treatments. Some of these labels included: Complementary Alternative Treatments (CAMs), fad treatments (treatments which have diminished over time), and alternative treatments. For the purpose of diminishing ambiguity, treatments not currently supported by science will be labeled as Complementary Unsupported Treatments (CUTs) throughout this paper, as these treatments should no longer be described as alternatives, nor have they necessarily diminished over time (Schreck, 2014). These treatments should not be recommended for ASD, until adequate research validates their claims.

The use of CUTs exacerbated further when the idea of using an assortment of treatments simultaneously, known as an “eclectic approach” was used as a compromise between professionals using ABA and those using CUTs. Although supporters of the eclectic approach attempted to combine multiple CUTs and/or other treatment options, research consistently indicated that the use of such combinations remains unsupported by science. Furthermore, when such packages included validated treatments (i.e., ABA) with CUTs (e.g., Facilitated Communication, Sensory Integration) individuals may have even regressed compared to children who have received strictly ABA in similar amounts (Howard et al., 2014). Despite disapproval of CUTs and eclectic packages by researchers,
parents and professionals remain influenced to use them. Use of the eclectic approach remains appealing for many, as parents indicated implementation of an average of four to seven different treatments simultaneously for their child with ASD (Bowker, D’Angelo, Hicks & Wells, 2011; Goin-Kochel et al., 2007; Green, Pituch, Itchon, Choi, O’Reilly, & Sigafoos, 2006; Senel, 2010; Smith & Antolovich, 2000). The treatments used with the eclectic approach included both scientifically supported treatments (e.g., ABA) and CUTs (e.g., Sensory Integration, Facilitated Communication), regardless of the fact that their combination remained invalidated.

Parents reported use of CUTs regardless of recommendations by the scientific community (Tuzikow & Holbum, 2011). Additionally, limited research and resources provided to parents often dictated what treatments they chose to provide a family member with ASD. The varieties of treatment choices could have became confusing to parents, which lead them to choose ineffective methods. Parents previously reported use of treatments despite possessing mixed beliefs on their effectiveness, with or without combining multiple treatments (Miller et al., 2011). Some parents indicated improvement after implementation of CUTs, whereas others discontinued them due to lack of beneficial results (Wong & Smith, 2006; Senel, 2010; Smith & Antolovich, 2000; Schreck, 2014). Furthermore, parents’ receipt of treatment advice from professionals often included CUTs (Miller et al., 2011).

Of specific concern, behavior analysts certified by the Behavior Analysis Certification Board (BACB) were some of the professionals who were recommending these CUTs to parents (Miller et al., 2011). Although numerous studies examined the use of CUTs and, after evaluating their scientific merit, concluded they were unethical
(Jacobson et al., 2005; Pelios & Lund, 2001; Schreck & Miller, 2010), Board Certified Behavior Analysts (BCBA) continued to use them. Schreck and Mazur (2008) supported parents’ claims that BCBAs endorsed and utilized an assortment of treatments, including CUTs. The majority of CUTs within each of the scientific support categories (i.e., established, emerging, unestablished, ineffective/harmful) were used and recommended by BCBAs. They determined the following factors related to BCBA’s treatment choices and beliefs in treatments: (a) treatment effectiveness, (b) ability to change behavior, (c) ease of implementation, (d) cost effectiveness, and (e) research support. Schreck and Mazur also found that BCBA’s decisions to use CUTs seemed to be most dependent upon the ease of implementation and cost effectiveness. Like parents, professionals remain influenced by factors other than science.

Since the publication of Schreck and Mazur (2008), the number of BCBA’s exploded to over 10,000 behavior analysts worldwide by September 2011, and included 7,419 BCBAs. Additional certifications also developed (i.e., BCBA-D and BCaBA), these added 1,150 BCBA-Ds and 1,596 BCaBA’s (BACB, 2011). With the explosion of professionals wanting certification, a number of different approved methods to receive certification training developed, including: (a) online certificate programs, (b) university approved programs, (c) master’s degrees, and (d) PhDs. Additionally, the certification board expanded requirements for clinical experience to include a variety of clinical experience locations and requirements for hours dependent upon the level of practicum completed (i.e., Supervised Independent Fieldwork, Practicum, Intensive Practicum). Schreck and Mazur’s (2008) study did not examine these specific relationships between a professionals foundation of education to their treatment choices. Such variables may
impact professionals’ CUT use.

Therefore, in this thesis I examined the relationship between BCBA’s instructional delivery (i.e., online delivery, on-campus university program, or satellite agency program), academic major (i.e., ABA, education, allied medical, psychology, multiple majors including ABA, and multiple majors excluding ABA), and practicum experiences (i.e., practicum location and practicum level) to their use of CUTs. I hypothesized that an individual’s instructional delivery, academic major, and practicum experiences would relate to their likelihood of using CUTs.
Chapter 2: Literature Review

2.1 Autism Symptoms and Diagnosis

What is ASD?

Every person with ASD is an individual. However, to receive the diagnosis, a person must exhibit specific types of behaviors. These behaviors include problems with 1) social communication/interaction, and 2) restricted and repetitive behaviors (APA, 2013). All individuals with ASD exhibit symptoms, but these symptoms fall on a continuum and vary severely depending upon the individual.

Social Communication/Interaction

For children with ASD, the challenging process of understanding and formulating language makes communication very difficult. ASD symptoms include delays and impairments in cognitive function, social skills, and language, both verbal and non-verbal (Pelios & Lund, 2001). Many struggle with the meaning and rhythm of words and sentences (NIDCD, 2012). Individuals with ASD may also find it difficult to understand body language and vocal tones, making social interactions increasingly challenging. Delays in communication directly influence deficits in social skills, as communication is how individuals socialize. Along with social and communicative deficits, ASD symptoms often include repetitive behaviors and/or fixated interests. These symptoms make everyday life difficult for both the individual with ASD and their caretakers.

Diagnosis of ASD often occurs when parents observe noticeable delays in language development. Approximately 51–91 percent of children exhibit traits prior to
age 3. Therefore, the diagnosis of ASD typically occurs between 4.5 to 5.5 years of age (CDC, 2009). Research continues to grow regarding the diagnosis of ASD, but other facts regarding ASD remain unknown to researchers, practitioners, and parents.

*Cause of ASD*

Although information regarding ASD symptoms and diagnosis continues to develop, the cause of this disorder remains a significant question. Despite this, evidence consistently classifies ASD as a multifaceted disorder, with a strong genetic origin. Indication of multigenic effects include recurrence rates in siblings with ASD to be between 2% and 8%, equating to approximately 60% in monozygotic twins (Clifford et al., 2007). Furthermore, individuals with certain medical conditions related to chromosomal anomalies and single-gene diseases continue to show increased frequencies of autism. These conditions include, but are not limited to: fragile X syndrome, Down syndrome, tuberous sclerosis, Rett’s syndrome, congenital rubella syndrome and untreated phenylketonuria (PKU; Nebel-Shwalm & Matson, 2008). Nonetheless, researchers have yet to identify the specific genes involved with ASD, and how specific conditions may relate to the disorder. With no specific cause to guide definitive treatment, an increasing number of options originated in recent years for parents to choose from.

2.2 *Influences of Treatment Decisions for Parents*

Due to the ambiguity of ASD’s cause, a multitude of treatment options flourished based on differing theories of the cause of ASD. Despite research warnings of the
inadequacy of most treatments (Hanson et al., 2007; Jacobson et al., 2005; Romanczyk et al., 2008; Schreck & Mazur, 2008; Schreck & Miller, 2010) parents continued to be influenced to use an abundance of treatment options (Bowker et al., 2011; Green et al., 2006; Goin-Kochel et al., 2007; Levy & Hyman, 2002). Parents became influenced by factors other than science including (a) appealing ideologies, (b) a priori beliefs, (c) tenacity and (d) authority recommendations (Vyse, 2005).

**Appealing Ideologies**

Treatments that provided an appealing ideology may be attractive to parents, as they seem to provide “all of the answers”. Similar to modern medical alternatives, Diet Therapies attract individuals that already favor a more natural lifestyle (Cassileth, 1998; Vyse, 1997). Although Diet Therapies remain unsubstantiated by science, like other treatments that appealed to ideologies, they gain a sense of plausibility due to their similarity to other validated health programs (e.g., Phenylketonuria, Diabetes diets). Appealing ideologies may become increasingly attractive to parents who also had a priori beliefs.

**A Priori Beliefs**

For parents who previously held specific beliefs about ASD, treatments that further support their ideas become especially influential. When specific treatments aim to address a specific cause of ASD, the treatment that follows the perceived etiology remains accepted (Vyse, 2005). Chelation provides one example of this perceived truth. Those who support Chelation as a theory, derive their support from their belief that
mercury poisoning causes ASD. Therefore, Chelation Therapy simply removes the toxins of mercury from the body, thus curing ASD (Davis, 2012). Although the treatment logically follows as a solution from the perceived etiology, vaccinations remain consistently refuted by science as a cause of ASD. Therefore, although Chelation Therapy appeals to parents with a priori beliefs, it remains as simply a treatment based on subjective feelings.

Tenacity

Treatment decisions may be influenced by other factors of subjectivity, in addition to a priori beliefs. Tenacity can also influence parents’ treatment decisions as they may systematically refuse to acknowledge anything that may cause them to change their beliefs (Peirce, 1992; Vyse, 2005). In the field of developmental disabilities, use of treatments despite evidence of their ineffectiveness occurs due to tenacity. Once more, Facilitated Communication provides an illustrious example of the power of tenacity. Even with substantial evidence that FC remains ineffective (Herbert et al., 2002; Jacobson et al., 2005), individuals and websites remain devoted to promoting FC as a treatment for ASD (Vyse, 2005).

Authority Recommendations

Promotion of ASD treatments occurs by an abundance of individuals, with and without any level of authority. Treatments endorsed by members of authority especially attract parents, as they may believe they can trust the individual simply due to their authority. These endorsements come from a wide range of individuals from varying
backgrounds to include doctors, celebrities, and professionals (Miller et al., 2011; Senel, 2010). Although most members of authority recommend methods based on scientific evidence, even they remain influenced by other factors (Schreck & Mazur 2008; Schreck & Miller, 2010; Vyse, 2005). The illegitimate research disseminated by Dr. Wakefield that provoked the scare of vaccines provides a significant example of how authority can effect ASD treatment decisions (Wakefield et al., 1998; Whalen & McKay, 2013). Due to these confounding influences on treatments, misinformation and confusion continues to surround parents choosing treatments for their children with ASD.

2.3 Guidance on Treatments

Although beneficial treatments for ASD exist, obtaining scientifically sound information among numerous treatments remained difficult for parents. In 2005 a project known as the National Standards Report (NSR) launched to develop an aid for parents and professionals to properly identify beneficial and scientifically supported treatments for children with ASD. The project examined over 775 research studies in an attempt to identify the level of scientific evidence available for each, and subsequently place each treatment into a specific category based on scientific support (NAC, 2009). These categories included Established Treatments (e.g., ABA, DTI, PBS), Emerging Treatments (e.g., TEACCH, Floortime, Music Therapy), Unsupported Treatments (e.g., Sensory Integration, Auditory Integration, Speech Therapy) and Ineffective/Harmful Treatments (e.g., Facilitated Communication, Diet Therapy, Vitamin Therapy). Although the information disseminated by the NSR included a method to categorize beneficial and scientifically supported treatments, contradictory evidence existed between the NSR and
other reliable scholarly sources (Jacobson et al., 2005; Richdale & Schreck 2008; Romanczyk et al., 2008). Therefore, although advantageous research regarding categorization of ASD treatments occurred, treatment decisions for parents of children with ASD remained taxing.

2.4 Telling the Bad: Non-Science or CUTs

An overwhelming amount of scientific and non-scientific ASD treatment choices exist for parents and professionals from which to choose. To provide a more concise division between treatments (Schreck, personal communication, October 5, 2014) established the term Complementary Unsupported Treatments (CUTs). The CUTs category includes all treatments not supported by scientific research (e.g., Complementary Alternative Treatments (CAMs), fad treatments). The term *Complementary* refers to the fact that treatments continue to be promoted for simultaneous use. The term *Unsupported* refers to the fact that these treatments remain inadequately supported by scientific research. To reduce ambiguity the term CUTs will be used throughout this paper to identify these treatments.

Although research previously identified the dissemination of CUTs, the term used to describe such treatments varied. Some of the terms included: complementary therapy, alternative treatments, and fad treatments. Hanson et al. (2007) identified the use of complementary and alternative therapies (CAM). They surveyed parents’ use of CAM for their children with ASD and found that approximately 90% of parents reported to have used CAM. Not only did parents report using such treatments, multiple sources indicated parents’ use of these treatments occur at the same time. The use of multiple treatments
simultaneously, also known as the “eclectic” approach continued to occur despite evidence of its ineffectiveness. Although supporters of the eclectic approach attempted to combine multiple CUTs with and without supported treatment options, research consistently showed that the use of such combinations remained ineffective (Bowker et al., 2011; Goin-Kochel et al., 2007; Green et al., 2006; Senel, 2010; Smith & Antolovich, 2000). Furthermore, Green et al. (2006) found that out of 111 treatments provided, the average number of treatments used by parents at a given time was 7, with more treatments used for more severe and younger children. Even within the category of CUTs, treatment methods differ greatly. In order to thoroughly examine what he identified as CAM treatments, or CUTs, Hanson and colleagues (2007) organized the various treatment options into two categories: biological and non-biological treatments.

2.5 Telling the Bad: Biological Treatments/CUTs

Biological treatments included treatment options that change the chemicals or compounds within a patient’s body (Hanson et al., 2007). Therefore, these treatments developed to treat the perceived biological ailments of individuals with ASD. Examples of biological treatments used to treat ASD include both Unestablished and Ineffective/Harmful CUTs. Unestablished biological CUTs include: Craniosacral, and Chiropractic Therapy. Ineffective/Harmful biological CUTs include: Chelation Therapy, Vitamin Therapy, Diet Therapy, and Hyperbaric Oxygen Therapy.
Craniosacral

The treatment of Craniosacral Therapy remains categorized as an Unestablished biological CUT for ASD. Craniosacral Therapy involves the physical manipulation of the craniosacral system of the body. The craniosacral system consists of the cranium, spinal cord, and the cerebral spinal fluid and remains the focus of Craniosacral Therapy (Zane, 2011). Proponents of Craniosacral Therapy believe that behavioral problems displayed by children with ASD occur due to disruptions, interruptions, or blockage of the flow of the cerebral spinal fluid (Zane, 2005). Due to this belief, Craniosacral Therapy involves implementation by a specialist who claims that by physically pressing on different parts of the skull and spine they can change the flow of spinal fluid and consequently relieve ASD symptoms (Zane, 2011). An abundance of research indicated that both the foundations from which Craniosacral Therapy derived from, as well as, supporting research lacked scientific evidence including reliability and validity (Green et al., 1999; Moran & Gibbons, 2001; Hartman & Norton, 2002). Overall, Craniosacral Therapy remains among the many Ineffective/Harmful Treatments that should not be recommended for children with ASD.

Chiropractic Therapy

Chiropractic Therapy provides another example of Ineffective/Harmful CUTs for ASD. Proponents of Chiropractic Therapy promote the use of adjustments to the spine and joints to realign the body. Supporters of this treatment believe that use of these chiropractic techniques relieve symptoms of ASD (Romanczyk et al., 2008). To date Chiropractic Therapy remains unsupported by research. Along with Unestablished
biological treatments like Chiropractic Therapy, treatments like Chelation Therapy can even cause harm.

Chelation Therapy

Chelation therapy remains as an Ineffective/Harmful biological CUT for ASD. This therapy involves the administration of chemical substances to remove toxic levels of metal from a patient’s body (Davis, 2012). Supporters of this theory believe that mercury causes ASD. Therefore, by removing mercury from an individual, their ASD will be cured. To date, a scientific link between mercury exposure and autism does not exist (Davis, 2012; CDC, 2014b; Romanczyk, et al., 2008). Furthermore, research for chelation therapy as an ASD treatment is limited as studies that provided support for this treatment, included variation among standard procedures (Davis, 2012). Davis reviewed five studies on chelation therapy and concluded that due to poor experimental design and unreliable assessments, such studies remained insufficient. In addition to methodology flaws, Chelation Therapy attributed to multiple deaths. In 2005, deaths attributed to Chelation-associated hypocalcemia occurred in individuals from Texas, Pennsylvania, and Oregon (CDC, 2006). Chelation Therapy provides just one example of the various detrimental CUTs for ASD.

Vitamin Therapy

Among Unestablished biological CUTs, Vitamin Therapy remains popular. Proponents of Vitamin Therapy theory claim that children with ASD lack essential vitamins (e.g., vitamin B₆ –pyridoxine and magnesium). Vitamin Therapy involves the consumption of high doses of B₆, approximately one to two times the recommended
dietary allowance (Levy & Hyman, 2002). Previous studies indicated that Vitamin Therapy provided symptomatic benefits, but such studies failed to use sound methodology. Like other CUTs, these studies failed to use a double-blind placebo to control for the results, making the studies invalid (Findling et al., 1997). Like the treatment of Vitamin Therapy, Diet Therapy appeals to parents as a treatment for ASD.

Diet Therapy

The treatment of Diet Therapy remains popular as a biological CUT. Diet Therapies encompass both Gluten-free diets and/or Casein-free diets. Gluten free diets involve the exclusion of proteins found in wheats (NSR, 2009). Casein-free diets involve the exclusion of all milk products. Although supporters of this theory report marked improvements of behavior, these studies remain as simply anecdotal reports and should therefore not be considered until further studies occur (Metz et al., 2005; Irvin, 2006). Furthermore, adverse health effects in children who’ve been subjected to Diet Therapies have begun to be reported in literature (Arnold et al., 2003; Heiger et al., 2008). Overall, Diet Therapies provide no scientific support and show prevalence of potential harm. Therefore, the use of Diet Therapies should not be considered for children with ASD.

Hyperbaric Oxygen Therapy

Hyperbaric Oxygen Therapy remains as another potentially harmful treatment for ASD. This therapy provides one example of the many non-biological CUTs that fall within the category of Ineffective/Harmful. Hyperbaric Oxygen Therapy involves a child spending time in a pressurized chamber while breathing in pure oxygen (NSR, 2009).
Although the use of hyperbaric oxygen chambers provides beneficial results for other medical ailments (e.g., osteoradionecrosis, carbon monoxide poisoning, gangrene, brain abscess), no research provides support for its use to treat ASD. In fact, this ineffective/harmful method of treatment led to the death of a woman and her grandson (Seals, 2012). Their deaths were the result of a chamber that caught on fire during Hyperbaric Oxygen Therapy. CUTs like Hyperbaric Oxygen Therapy exemplify the harmful results of using ineffective treatment methods. Along with biological CUTs for ASD, non-biological CUTs exist.

2.6 Telling the Bad: Non-Biological Treatments/CUTs

Non-biologic CUTs include those that do not affect the biology of a patient, but rather aim to address the external factors that may trigger ASD symptoms (Hanson et al., 2007). Examples of non-biological treatments used to treat ASD include treatments from the Emerging, Unestablished, and Ineffective/Harmful categories. Emerging non-biological treatments include: TEACCH, PECS, Floortime, and Music Therapy. Unestablished non-biological treatments include: Sensory Integration, Auditory Integration, Son-Rise, Verbal Behavior, Faith Based Therapy, and Speech Therapy. Ineffective/Harmful non-biological treatments include Facilitated Communication, and Holding Therapy.

TEACCH

Among Emerging non-biological CUTs for ASD, Treatment and Education of Autistic and related Communication-handicapped Children (TEACCH) remains popular.
The treatment of TEACCH involves the use of highly structured, unchanging routines within the classroom. Proponents of this treatment method believe that the disability of ASD remains permanent and thus requires treatment in structured classrooms with visual schedules and workstations (Richdale & Schreck, 2008; Romanczyk et al., 2008). Some research support shows TEACCH as more effective than standard special education (Metz et al., 2005). However, literature cautions that gains made within the educational environment may not generalize easily to other settings (Weiss et al., 2008).

**PECS**

Along with TEACCH, Picture Exchange Communication System (PECS) remains as an Emerging treatment used for children with ASD. The treatment of PECS involves the use of pictures as a means of communication (Romanczyk et al., 2008). Although prevalence of the use of PECS remains consistent (Miller et al., 2011; Schreck & Mazur, 2008) limited research supports the use of PECS as a treatment for ASD (Miller et al., 2011; Jacobson et al., 2005; Richdale & Schreck, 2008). However, PECS research continues to grow, and has begun to provide some evidence of research support (Weiss et al., 2008). PECS represents just one of the many non-biological treatments for ASD, that may provide new techniques to help children with ASD in the future.

**Floortime**

Along with PECS, Floortime remains as an influential treatment for children with ASD. The treatment of Floortime uses developmental theories to emphasize the importance of building social relationships for children with ASD. Delivery of this treatment occurs in a variety of settings (e.g., home, classroom, community), by
individuals trained to implement Floortime techniques (NSR, 2009). Of the seven studies identified and analyzed in the NSR, none identified benefits for children over 5 years old, nor did any study provide effectiveness for increasing academic, learning readiness, personal responsibility, or placement skills (2009). Overall, the use of Floortime must be more stringently studied to ensure it provides the benefits that its supporters claim.

Music Therapy

Along with Floortime, Music Therapy (MT) recently became a popular treatment for children with ASD. Interventions using MT seek to teach individual skills or goals through musical tasks. A targeted skill (e.g., counting, learning colors, taking turns) becomes initially presented through song or rhythmic cuing and music is eventually faded (NSR, 2009). Of the 6 studies analyzed in the NSR, ASD remained as the only population treated using MT, unlike other treatments that generalize to multiple populations. Also, there remains a need for further research using larger samples and generalized outcome measures to examine whether the effects of music therapy are enduring (Geretsegger et al., 2014; NSR, 2009). Along with Emerging Treatments the category of Non-biological CUTs for ASD also includes Unestablished treatments.

Sensory Integration

Within the Unestablished category, Sensory Integration remains as a common non-biological treatment. Identified originally in the 1970s, the theory of Sensory Integration (SI) recently became a popular approach for individuals with ASD (Smith, 2005). Proponents of SI suggest that individuals with ASD have neural pathway deficits
that make sensory information difficult and less tolerable for them to process. These
deficits prohibit efficient learning, language acquisition, social skills, and behavior
(Ayres, 1979). Therapy methods developed based upon the theory of sensory
deficiencies. Sensory therapies now include: joint compression, tactile simulation, gross
motor and balancing activities, sensory orientation activities, and arts and crafts (Metz et
al., 2005).

Although limited evidence supports SI techniques, methodologies of these studies
present flaws. Supporting studies failed to examine techniques of SI individually for
efficacy (Schreck & Miller, 2010). Furthermore, Schreck and Miller explained that the
positive outcomes of SI techniques could be explained by behavioral methods. However,
unlike behavioral therapies, evaluation of SI techniques failed to involve the use of
scientific methods, and should therefore not be recommended. Moreover, techniques used
in SI that can be validated through a behavioral experiment may be beneficial, but only if
these techniques have been empirically supported. Smith et al. (2005) concluded that
claims of SI “fixing” underlying deficits could not be studied scientifically due to
subjectivity in the methods of investigation. None of the above CUTs provided empirical
evidence of their efficacy. Studies provided limited support for some CUTs, but remained
inadequate due to their lack of scientific measures. Thus, results provided by these
studies remain refutable, and therefore unethical to use.

*Auditory Integration*

Auditory Integration (AI) provides one example of the numerous Unestablished
non-biological CUTs for ASD. Auditory Integration assumes oversensitivity to sounds
occurs for individuals with ASD. Therefore, the treatment of AI involves exposing a child with ASD to filtering sounds and music in order to reduce hyperactivity (NSR, 2009). Currently, AI provides no research support of efficacy. Moreover, the use of different frequencies of sounds may cause harm to hearing (Romanczyk et al., 2008). The use of AI as a treatment for children with ASD remains unsupported and should therefore not be used until the conduct of valid research occurs that supports AI claims.

**Son-Rise**

Son-Rise, as a treatment for ASD, remains attractive to parents of children with ASD. The treatment of Son-Rise involves the process of Parents teaching their child using imitation of the child’s stereotypic behavior. Proponents of Son-Rise claim this process builds a “non-judgmental” relationship that assists with learning (Romanczyk et al., 2008). Currently, research to support the theory of Son-Rise as a treatment remains unavailable (Miller et al., 2011; Schreck & Mazur, 2008; Romanczyk et al., 2008). Accordingly, Son-Rise should not be considered as a treatment for children with ASD until research can validate its use.

**Verbal Behavior**

Like Son-Rise, Verbal Behavior can be best categorized as an Unestablished non-biological treatment for ASD. The treatment of Verbal Behavior involves a focus on teaching language based on the Assessment of Basic Language and Learning Skills (ABLLS; Romanczyk et al., 2008; Jacobson et al., 2005; Miller et al., 2011). The foundation of Verbal Behavioral treatment uses B. F. Skinner’s language classification system to guide language instruction (Skinner, 1957). Although this treatment
incorporates efficacious elements of instruction, evidence to support the elements utilization as an instruction package remains limited (Weiss et al., 2008). Therefore, until further research occurs to support Verbal Behavior as a treatment package, it should not be considered as a single effective treatment for ASD.

**Faith Based Therapy**

Like Verbal Behavior, Faith Based Therapy remains as an Unsupported non-biological treatment for ASD. Faith Based Therapy can best be defined as the systematic use of prayer or other religious practices. Although parents report use of this treatment method (Millet et al., 2012) research to support its claims to help children with ASD remain inexistent. Furthermore, use of Faith Based Therapy often occurs within an eclectic package, which continuously proved to be ineffective (Bowker et al., 2011; Goin-Kochel et al., 2007; Green et al., 2006; Senel, 2010; Smith & Antolovich, 2000). Use of Faith Based Therapy should therefore not be considered until research can supports its claims.

**Speech Therapy**

Along with Unsupported treatments like Faith Based Therapy, non-biological treatments also include those within the Ineffective/Harmful category. Speech Therapy consists of methods designed to teach individuals how to speak and use language (Richdale & Schreck 2008; Romanczyk et al., 2008). Although limited research shows improved language for children treated using Speech Therapy, instruction using Speech Therapy must be excessively intense and frequent (Hart & Risley, 1995). Therefore, maintenance of skills acquired using Speech Therapy only result if excessive amounts of therapy occur consistently over extended periods of time, and remains unfeasible.
**Facilitated Communication**

Within the Ineffective/Harmful category Facilitated Communication (FC) provides a prime example of methodology errors among non-biological CUTs. Proponents of FC contend that certain individuals have “undisclosed literacy”, and that individuals with ASD suffer from deficits in expression rather than cognitive functions (See Jacobson et al., 2005 for a description and analysis of FC). FC involves the use of a keyboard and a facilitator who moves the person with ASD’s hand to type. Jacobson, Foxx and Mulick examined research on FC and indicated that not a single supporting study allowed for testability or replication. Although this treatment option flourished, further examination of FC in controlled studies continuously highlighted its invalidity (Jacobson et al., 2005; Gorman, 1999). Furthermore, the United States Court System nullified the scientific community’s rejection of FC and authorities enabled the use of alleged evidence by FC testimony in abuse cases (Gorman, 1999). Therefore, although an abundance of research rejects FC, its use remains prevalent even within the judicial system. CUTS like FC result in an immense waste of time, money, and resources to the scientific community, and subsequently affect other fields such as law.

**Holding Therapy**

Holding Therapy remains as an Ineffective/Harmful non-biological CUT for children with ASD. Proponents of this therapy suggest that a lack of mother-child bond exists (Romanczyk et al., 2008; Metz et al., 2005). Therefore, Holding Therapy involves comforting children, physically restraining a resistant child, or “rebirthing”. There
remains no scientific research support for Holding Therapy. Moreover, restraint of a non-compliant individual may be dangerous (Metz et al., 2005). For these reasons, Holding Therapy should not be considered for children with ASD.

2.7 Using the Good: Established Treatments

Among the copious amounts of treatment options, ample research consistently identifies behavioral interventions as the single most effective treatment for ASD (NSR, 2009; Miller et al., 2012; Schreck & Miller, 2010; Jacobson et al., 2005; Richdale & Schreck, 2008). The use of rigorous and consistent evaluations throughout the duration of a treatment using ABA ensures that beneficial results are apparent and irrefutable. One substantial deficit for individuals with ASD includes the ability to behave and interact appropriately in given situations. The discipline of Applied Behavioral Analysis (ABA) attempts to decrease inappropriate behavior, and increase appropriate behavior (Schoen, 2003). Advocates of ABA argue that because the etiology of autism is unclear, remedial treatments for primary deficits can be best addressed individually (Pelios & Lund, 2001).

Autism deficits often have behavioral components. Expressions such as: excessive hand flapping, body rocking, eye gazing, and echolalic speech are usually less problematic, but more problematic behaviors also occur. These dangerous behaviors include: tantrums, aggression, and self-injurious behaviors (e.g., head-banging, hand-biting, and excessive self-rubbing and scratching; Sturmey, Seiverling, & Ward-Horner, 2008). Characteristic behaviors often make tasks such as learning, for an individual with ASD, more challenging and social interactions as a family unit overwhelming. ABA continues to identify these disruptive behaviors and provide treatments to decrease their
occurrence, while consequently increasing more desirable behaviors. Along with behavior modification, ABA encompasses a wide variety of well-established and useful treatments for individuals with Autism, such as EIBI.

_Early Intensive Behavioral Intervention_

Research in the efficacy of ABA prospered with the research of Dr. Ivar Lovaas. In 1987, Lovaas conducted research that showcased the efficacy of early intervention for children with ASD. Lovaas understood that increased brain plasticity in young children made them more susceptible to intervention early in development (Pelios & Lund, 2001). With this knowledge, Dr. Lovaas’ conducted his research and concluded that using ABA early in a child’s life tends to be most successful (Lovaas, 1987; McEachin et al, 1993). The program, now known as Early Intensive Behavioral Intervention (EIBI), developed based off of Lovaas’ findings. EIBI continues to proliferate and show favorable long-term effects in children with ASD, consequently decreasing their future need for assistance.

As EIBI proliferated, the practice methods of EIBI did as well. Overall, this treatment method includes three standard traits for best outcomes. First, EIBI includes intensive instruction and duration including one-on-one instruction, for at least 40 hours per week, lasting for at least two years, although significant outcomes still occur for children who receive between 20 and 30 hours per week (Lovaas, 1987; Smith et al., 2000). Second, the principles of operant conditioning provide the foundation of EIBI procedures, and structured teaching of ABA alone is most effective. Lastly, EIBI involves the delivery of developmentally sequenced tasks to acquire skills in a
hierarchical order (Love et al., 2009). Research continues to support these necessary components for early autism treatments. For this reason, the Surgeon General of the United States recognizes ABA as the most scientifically effective treatment for individuals with ASD early in life.

*Established Non-Biological Treatments: PBS and DTI*

Like ABA, Discrete Trial Instruction and PBS focus on increasing beneficial behaviors by teaching individual skills. Though, unlike implementers of ABA, some detractors misunderstood the treatment of ABA to only involve the use of DTI techniques and therefore, dismissed all other aspects involved with ABA as a science (Steege et al., 2007). Furthermore, the treatment of PBS involves the use of behavioral techniques to change behavior, but only through the use of positive reinforcement, removing any aversive consequences during treatment (Mulick & Butler, 2005). Although this treatment provides some research support, studies failed to focus on any concepts beyond basic ABA science and therefore remain inconclusive (Richdale & Schreck, 2008). Therefore, DTI remains as an Established treatment due to its behavioral components, but the internal validity studies that provide scientific support for PBS remain questionable and should consequently be recreated. Moreover, even treatments considered Established, like PBS, should not be used to replace more efficacious treatments like ABA and DTI. Although ample research identifies ABA as the single most effective treatment for children with ASD, parents and professionals continue to be influenced to use CUTs.
2.8 Influences of Treatment Decisions

With an abundance of conflicting ASD treatment options to choose from identification of a beneficial treatment can be difficult. Parents and professionals possess access to a widespread of material regarding ASD and available treatments, but the material often includes incorrect and inconsistent information (Bowker et al., 2011).

Parental Treatment Decisions

Many factors contribute to parental decisions on what treatment options to provide their child with ASD. This decision can be based off of a diverse amount of accessible information, such as: television broadcasts, Internet websites, magazines, and even celebrity anecdotes (Miller et al., 2011; Bowker et al., 2011; Senel, 2010). Miller et al. (2011) reported parents’ use of scientifically reported treatments at a rate below 50%. Demographic characteristics also related to treatment choice, and parents from a wide variety of backgrounds remain susceptible to choosing invalid treatments for ASD (e.g., financial, educational, familial; Miller et al., 2011). Furthermore, popular media (e.g., autism books, TV, media), authority figures (e.g., educators, doctors, behavior analysts), and anecdotal reports, all influenced parents’ decisions to use CUTs (Hanson et al., 2007; Wong & Smith, 2006; Miller et al., 2011; Schreck & Mazur, 2008; Schreck et al., 2013). Additionally, parents reported to rely on anecdotal reports and referrals more than scientific sources regarding treatment decisions for their children.

Parents become increasingly fixated on finding assistance for their children and often rely on their own a priori beliefs in the cause of ASD when choosing a treatment (Vyse, 2005). Levy and Hyman (2002) suggested that parents may believe they can
reverse developmental delays in their children by treating their own perceived root cause of the disorder. Parental support for treatments that claim to “cure” their children from ASD may be appealing and provide parents with a sense of hope that an ABA treatment option does not offer (Levy & Hyman, 2002). Parental support remains as just one pretext to BA’s use of CUTs.

2.9 BA’s Treatment Decisions

Like parents, behavioral analysts remain vulnerable to the pressures of CUTs for ASD. In 2008, Schreck and Mazur found that behavior analysts endorsed and utilized an assortment of treatments. The most widely reported treatments, used by over 50% of respondent BCBAs were a mixture of both scientifically established and emerging treatments, for example, ABA ($n = 463$; 98.7%), DTI ($n = 427$; 91%), PECS ($n = 360$; 76.8%), Verbal Behavior ($n = 330$; 70.4%), and PBS ($n = 276$; 58.8%). Other treatments were commonly used at lower percentages including: Floortime ($n = 70$; 14.9%), Sensory Integration ($n = 77$; 16.4%), and Speech Therapy ($n = 74$; 15.8%). Schreck and Mazur (2008) also found that professionals used CUTs despite acknowledgement of their ineffectiveness, costliness, and insufficient research support. Along with use of CUTs, BA’s recommendations of scientific treatments remained minimal. Research found that professionals reportedly recommended fewer than 15% of scientifically validated treatments to parents (Miller et al., 2011).

In addition, BAs advocated the use of multiple treatments simultaneously, also known as the “buffet approach” (Richdale & Schreck, 2008). This resulted in the development and use of multiple treatments at once to aid specific symptoms.
Additionally, therapies established by BAs may even be developed upon faulty assumptions of the cause and nature of ASD. Elder (1994) suggested that professionals may recommend treatments based on their own ideologies related to ASD. These invalid treatments therefore addressed presumed causes and symptoms that have no relation to ASD (Pelios & Lund, 2001). BAs dissemination and use of CUTs remained a concerning problem.

Consequently, Schreck and Miller attempted to provide behavioral analysts with a tool for making ethical treatment choices, as well as, an approach for responding to potential misperceptions and difficulties using ABA. Although Schreck and Miller attempted to provide behavior analysts with methods to make ethical decisions for ASD treatments, in their clinical practice Schreck and Miller suspected that BCBAs continued to endorse and utilize CUTs. They noted that BAs indicated use of treatment options such as Floortime that had similar components and objectives to ABA treatment options. Therefore, BAs may have felt compelled to use alternative treatments that looked similar to ABA. Treatments, like Floortime, resemble ABA techniques, but remain unprincipled as no scientific evidence supports such treatments. Acknowledgement of the similarities among treatments and the numbers found by Schreck and Mazur led Schreck and Miller (2010) to suspect that many BA’s education failed to train them in the science of ABA nor did it provide them with methods to differentiate CUTs from scientifically supported treatments.
2.10 ABA Certifications and Ethical Obligations

Professionals who wish to implement behavioral treatments for individuals with ASD must be trained in the science of ABA. For this reason, the Behavioral Analysis Certification Board (BACB) developed in 1998 to ensure that individuals whom practice ABA follow ethical codes and regulations. Currently, in order to implement ABA as a treatment, professionals must be certified through the BACB. The certifications include: Board Certified Behavior Analyst (BCBA-D and BCBA), or Board Certified Assistant Behavior Analyst (BCaBA). Professionals with the title of BCBA and BCBA-D are either employees of an organization or independent practitioners. BCaBAs conduct descriptive behavioral assessments to interpret the effectiveness of behavioral interventions (BACB, 2004). The BACB sets requirements for ABA certification and provides specific guidelines for professionals to use ABA techniques.

Certification Process

To gain certification to practice ABA, applicants must complete prerequisite objectives. Individuals with certifications in ABA may come from an array of educational backgrounds. Currently, to sit for the BACB examination, an individual must possess, at minimum, a master’s degree in the natural sciences (i.e., behavior analysis, education, human services, engineering, medicine), or a field related to behavior analysis (e.g., applied clinical psychology) from an approved institution by the BACB (BACB, 2004). Along with degree requirements, individuals must complete at least 225 classroom hours of graduate level instruction in ABA.

Furthermore, to qualify at the BCBA level, individuals must complete 1500 hours
of Supervised Independent Fieldwork or 750 hours of Intensive Practicum in behavior analysis at varying locations. To qualify at the level of BCaBA an individual must engage in 1000 hours of Supervised Independent Fieldwork or 500 hours of Intensive Practicum (BACB, 2004). Moreover, to qualify at the BCBA-D level individuals must complete all BCBA requirements prior to enrollment and completion of a doctoral degree from an accredited university. For the duration of their doctoral study individuals must conduct a behavior-analytic dissertation (including at least 1 experiment), as well as complete at least 2 behavior analytic courses (BACB, 2004). Therefore, a behavior analyst’s education requirements and experiences can vary significantly based upon multiple factors (e.g., certification level, practicum intensity level, required hours of practicum). Once an individual completes certification requirements and passes their board test, they become ethically bound to uphold all standards provided by the BACB.

*Ethical Standards*

The BACB provides professional disciplinary and ethical standards including guidelines for responsible conduct for all behavior analysts (BACB, 2004). Current guidelines emphasize that all ABA professionals (a) must be aware of scientific knowledge regarding treatment options, (b) must use treatments with scientific foundation, (c) recommend empirically supported and most scientifically effective treatment methods, (d) evaluate and consider effects of all possible treatments, (e) describe well defined goals of treatment, and (f) support and aid in the progression of behavior analysis to society. These ethical standards must be followed while continuing to cooperate and reduce conflicts with other professionals (Schreck & Miller, 2010).
Due to continued use of ineffective treatments the BACB Board of Directors developed a newly drafted Compliance Code that becomes effective January 1, 2016 entitled the Professional and Ethical Compliance Code for Behavior Analysts (BACB, 2014). This code will replace the old standards and was written to more clearly present the ethics code, and further expand the range of professional conduct and BACB’s disciplinary actions (BACB, 2014). Among the 10 sections of the compliance code there remains an emphasis on the use and dissemination of only science based treatments by all BACB members. Specifically, sections 1.01 Reliance on Scientific Knowledge, 1.03 Maintaining Competence through Professional Development, 1.04 (b) Integrity, 2.09 (a & c) Treatment/Intervention Efficacy, 3.01 (b) Behavior-Analytic Assessment, 6.01 (a) Affirming Principles, 8.01 Public Statements 9.01 (g) Characteristics of Responsible Research emphasize the role of science in behavior analysis, and provide BCBAs with specific guidelines for ethical practice. All standards provided to BCBAs by the BACB present a detailed emphasize on the importance of scientific support when implementing any treatment.

2.11 Current Research

Currently, treatment decisions made by professionals consistently include CUTs despite ethical guidelines and education requirements provided by the BACB (e.g., course work, practicum experiences, test completion). Although the BACB provides a basic set of education and practicum requirements, the actual education that each student receives can vary greatly. These experiences can vary significantly according to instructional delivery (i.e., online, hybrid courses, on campus courses), and practicum
experiences (i.e., location, number of supervisors, level). These variables may provide an indication as to why some BCBAs use CUTs while others exclusively use scientifically supported treatments. Based on this information, identification of whether these factors influence professionals to use CUTs remains imperative. Therefore, this study attempted to evaluate the influence of foundations of education on BA’s choices for using CUTs.
Chapter 3: Research Questions and Hypotheses

3.1 Research Questions

How does instructional delivery (i.e., online delivery, on-campus university program, or satellite agency program), academic major (i.e., ABA, education, allied medical, psychology, multiple majors including ABA, and multiple majors excluding ABA), and practicum experiences (i.e., practicum location and practicum level) relate to behavior analysts’ use of CUTs?

3.2 Hypotheses

I hypothesized that BCBA and BCBA-Ds with more online instruction, academic majors not specific to ABA, and those with less stringent practicum experiences would use CUTs more than other BCBA and BCBA-Ds whom received more campus based instruction, specifically ABA majors, and those with more stringent practicum experiences.
Chapter 4: Methodology

4.1 Participants and Instruments

**Personal Demographics**

Personal demographics indicated that the majority of BCBAs and BCBA-Ds ages diverged. Of respondents, most BCBA-Ds were over 30 years of age \((n = 130; 96.2\%)\) whereas the majority of BCBAs were 25 years or older \((n = 625; 96.9\%).\) The older the age of the BCBA-Ds may represent the additional time for BCBA-Ds to complete the doctorate and subsequent certification requirements compared to the BCBA’s requirement of a masters degree. In addition to being younger, more BCBAs were female \((n = 555; 87\%)\) than BCBA-Ds \((n = 95; 70\%).\) Only 20% of both certification levels reported to have a child or relative with ASD (BCBA-D: \(n = 25; 19\%\); BCBA: \(n = 110; 17\%\)). Participants consisted of two levels of Behavior Analysis Certification Board certified behavior analysts \((N = 782).\) Respondents included Board Certified Behavior Analysts (BCBA: \(n = 646\)), and Board Certified Behavior Analysts – Doctoral Level (BCBA-D: \(n = 136\)). The majority of respondents reported a primary certification or licensing specialization in Behavioral Analysis (BCBA-D: \(n = 61, 65.6\%\); BCBA: \(n = 351, 81\%\)). Although all participants were certified behavior analysts, some reported that they primarily identified with another license, such as Psychology (BCBA-D: \(n = 19, 20.4\%\); BCBA: \(n = 5, 1.2\%\)), School Psychology (BCBA-D: \(n = 6, 6.5\%\); BCBA: \(n = 11, 2.5\%\)), Education (BCBA-D: \(n = 5, 5.4\%\); BCBA: \(n = 30, 6.9\%\)), and Speech Language Pathology (BCBA: \(n = 13, 3.0\%\)).
**Education**

A substantial percentage of respondents (BCBA-D: \( n = 83; \ 65.4\% \), BCBA: \( n = 597; \ 95.8\% \)) received training from a BACB University Approved course sequence. Course sequences for certification were primarily completed with on campus course work (BCBA-D: \( n = 97; \ 71.3\% \), BCBA: \( n = 296; \ 46\% \)). Online course sequences were completed for less than \( \frac{1}{4} \) of BCBA-Ds \( (n = 24; \ 17.6\%) \) and almost \( \frac{1}{2} \) of BCBAs \( (n = 290; \ 45\%) \). Those who reported completing online course work either completed a majority of classes online (i.e., \( 75\% \) or more of classes online, \( n = 281; \ 35.9\% \)) or completed all classes on campus \( (n = 370; \ 47.3\%) \). Very few participants reported having hybrid classes that combined both online and campus based instruction \( (n = 90; \ 11.9\%) \).

A wide variety of academic majors were reported. However, basic categories of majors included ABA (e.g., Behavioral Analysis), Psychology (e.g., Counseling, Clinical), Education (e.g., Special Education, School/Education Psychology), Allied Medical Fields (e.g., Occupational Therapy, Speech Language Pathology), and multiple majors with and without ABA. Percentages of each major within the two certifications are shown on Table #1.
Table 1. BA percentages by academic major.

<table>
<thead>
<tr>
<th>Academic Major</th>
<th>BCBA</th>
<th>BCBA-D</th>
</tr>
</thead>
<tbody>
<tr>
<td>ABA only</td>
<td>13.9</td>
<td>10.1</td>
</tr>
<tr>
<td>Psychology</td>
<td>10.5</td>
<td>17.1</td>
</tr>
<tr>
<td>Education</td>
<td>17.4</td>
<td>16.3</td>
</tr>
<tr>
<td>Allied Medical Fields</td>
<td>8.6</td>
<td>2.3</td>
</tr>
<tr>
<td>Multiple Majors including ABA</td>
<td>26.3</td>
<td>38.8</td>
</tr>
<tr>
<td>Multiple Majors without ABA</td>
<td>23.3</td>
<td>15.5</td>
</tr>
</tbody>
</table>

Supervision Experience

Respondents reported a wide variety of locations for their behavior analysis practicum experiences (i.e., Public School System, Private School System, Special Education Unit or Classroom, Specialized Autism School/Autism Centers, Supported or Community Living, Private Consulting Agency, University Clinics, Hospitals/Specialized Clinic, State or Government Agencies, Early Intervention, Home Based, and Multiple Locations). The most reported practicum locations included Private Consulting (n = 155; 41%) School Systems (n = 109; 30.1%), Clinics (n = 53; 19.4%), and Special
Education/Early Intervention (n = 22; 7%). See Table 2 for the percentage of BCBAs and BCBA-Ds by each type of practicum location. Levels of practicum experience varied from Supervised Independent Fieldwork to Intensive Practicums. The majority of participants indicated their level of practicum experience as Supervised Independent Fieldwork (BCBA-D: n = 64; 50.8%, BCBA: n = 433; 69.4%) with 1 to 3 different supervisors (BCBA-D: n = 108; 85%, BCBA: n = 562; 89.5%).

Table 2 Percentage of BAs by practicum location.

<table>
<thead>
<tr>
<th>Supervision Placements</th>
<th>Certification Level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BCBA</td>
</tr>
<tr>
<td>Multiple Locations</td>
<td>37.3</td>
</tr>
<tr>
<td>Private Consulting Agency</td>
<td>20.9</td>
</tr>
<tr>
<td>Specialized Autism School/Centers</td>
<td>12.9</td>
</tr>
<tr>
<td>Public School Systems</td>
<td>11.8</td>
</tr>
<tr>
<td>Hospitals and Specialized Clinics</td>
<td>4.6</td>
</tr>
<tr>
<td>State or Government Agencies</td>
<td>3.0</td>
</tr>
<tr>
<td>Special Education Unit or Classroom</td>
<td>2.2</td>
</tr>
<tr>
<td>University Clinics</td>
<td>1.5</td>
</tr>
<tr>
<td>Private School Systems</td>
<td>3.3</td>
</tr>
<tr>
<td>Supported or Community Living</td>
<td>0.8</td>
</tr>
<tr>
<td>Early Intervention</td>
<td>0.7</td>
</tr>
<tr>
<td>Home Based</td>
<td>1.0</td>
</tr>
</tbody>
</table>
Employment Experience

Current employment locations were similar across the certification levels with the majority of respondents indicating Private Practice (BCBA-D: n = 35; 27.8%; BCBA: n = 137; 22%) and Agencies (BCBA-D: n = 31; 24.6%; BCBA: n = 205; 32.9%) as their current employment locations. The majority of participants obtained their certification while employed at their current job (BCBA-D: n = 79; 63.2%; BCBA: n = 431; 68.8%). However, most participants indicated that certification in behavior analysis was not required for current employment (BCBA-D: n = 89; 71.2%; BCBA: n = 399; 64%).

Along with employment similarities, participants also indicated similar client demographics within their employment. Currently, 95% of participants (BCBA-D: n = 113; 90.4%; BCBA: n = 605; 96.8%) reported to treat individuals with Autism Spectrum Disorders, and also indicated that they had treated 50 or more individuals with ASD (BCBA-D: n = 82; 65.1%; BCBA: n = 316; 50.6%). Of these reported clients, their indicated ages represented a wide age range. The majority of participants indicated treating people in the developmental age ranges under 21 (ages 2 to 5: n = 665; 85%; 6 to 13 years old: n = 711; 90.9%; 14 to 21 years old: n = 568; 72.6%).

4.2 Materials

Autism Treatment Questionnaire

Construction of an online survey occurred by replicating and extending a previous survey used by Schreck & Mazur (2008) which determined treatments used by BCBAs. The updated online survey contained between 81-167 questions related to (a) personal demographics, (b) education, and (c) autism treatment use. The number of
questions depended upon participants’ responses of treatment use. Those who used more treatments responded to more questions.

**Personal demographics**

The questionnaire included 5 questions related to personal demographics. Participants were asked to indicate their certification level (BCBA or BCBA-D) and certification year. Personal demographic questions related to the age and sex of the respondent and to the existence of a relative with autism.

**Education**

The questionnaire included 7 questions about the (a) type of education received, (b) degrees obtained, and (c) academic major. The survey contained three questions regarding participants’ educational background including the location of coursework (i.e., online, on-campus, satellite or agency program) and if coursework was taken at a BACB approved university program. The percentage of online coursework required in their academic program was determined according to 5 categories from 0% online (all classroom coursework) to 75-100%.

The survey included a question concerning what academic major each participant obtained. Another question asked what degrees the participant obtained. For surveyed academic majors in college participants could choose from 11 different majors (i.e., Applied Behavior Analysis, Counseling Psychology, Developmental Psychology, Clinical Psychology, Psychology-other, Special Education, School/Educational Psychology, Speech/Language Pathology, Occupational Therapy, Social Work, and
other). For the question which asked participants what type of degree they obtained, participants could choose from 3 different degrees (i.e., Bachelor’s, Master’s, or Doctoral degree).

Supervision Experience

The questionnaire contained five questions concerning practicum experience. Questions asked the types of training program (i.e., certificate, Bachelor’s, Master’s, or Doctoral program) the participant attended during their behavior analysis training. The location of practicum sites during behavior analysis training was surveyed for public/private school systems, private agency, and specialized autism schools. Participants could also indicate if another type of practicum sites were used for training, the number of supervisors during their practicum experience (ranging from 1-5, or “other” option), and the level of practicum completed (supervised independent fieldwork, practicum (general), intensive practicum).

Employment Experience

The survey contained three questions regarding employment including current practice (i.e., school district, advocacy organization, autism school, private practice, agency), whether the participant obtained their certification prior to or during employment, and if their certification was required for their job. The employment section of the survey also included four questions regarding the professionals’ clients (i.e., whether they currently treat individuals with autism, approximately how many individuals they have treated with autism, which age range(s) represented their clients, and which of the age ranges best reflects the majority of clients they currently treat). The
number of clients a participant treated with autism was determined according to eight categories ranging from 0 to over 50 individuals. Client ages were determined according to six categories ranging from under 2 years old to over 30 years old.

**Autism Treatment Use**

The survey included questions regarding 22 different autism treatments. For each treatment five questions asked (a) personal professional use of the specific autism treatment (i.e., currently use treatment, used in past, never used), (b) observations of the specific autism treatment used by others, and (c) perception of the treatment’s success. If the participants indicated they had never used a specific autism treatment, they were not presented with additional questions regarding that treatment. If the participants indicated past or current use of a specific autism treatment, they were presented with additional questions related to that treatment, including: (a) how regularly they used the autism treatment with their clients; (b) what sources influenced professional use of the specific treatment (e.g., newspapers, textbooks, colleagues, clients’ parents) and (c) what factors influenced continued professional use of such treatment (e.g., positive feedback, effectiveness, ease, has solid scientific foundation).

**4.3 Procedure**

Autism Treatment Questionnaire

The updated survey included and defined 22 popular autism treatments that were chosen from a variety of sources (Richdale & Schreck, 2008; Schreck & Mazur, 2008; Schreck, Russell, & Vargas, 2013; Romanczyk et al., 2008). Each of these treatments
were categorized according to their scientific classification (i.e., established, emerging, unestablished, and Ineffective/Harmful Treatments) as determined by the National Standards Report (2009). Treatments not included in the National Standards Report were evaluated for classification following evaluation criterion provided in Richdale & Schreck (2008), and Romanczyk et al., (2008). Some treatments (i.e., music therapy, auditory integration, speech therapy, chiropractic) were re-categorized according to more stringent criterion than the NSR (2009) especially if the treatment was shown to be ineffective or cause harm by other sources (e.g., Richdale & Schreck, 2008; Romanczyk et al., 2008). See Table 3 for the list of treatments, definitions, and efficacy classification.

The updated autism treatment questionnaire was evaluated for face validity by graduate students in ABA and professionals specializing in scientific and non-scientific treatments used for people with autism. Once the questionnaire was complete with defined treatments, it was uploaded onto a hosting website (www.surveymonkey.com, 2013).

Trained undergraduate and graduate research assistants piloted the online questionnaire by answering affirmatively and negatively to the use of each treatment. This process was completed to confirm that participants’ answers were correctly recorded and that the navigation of the questionnaire was completed appropriately by the software. These responses were eliminated from resulting databases.
### Table 3 Treatments and Descriptions

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Established</strong></td>
<td></td>
</tr>
<tr>
<td>Applied Behavior Analysis</td>
<td>A science based on behavioral principles that are used to systematically change behavior (e.g., prompting, reinforcement, etc.).</td>
</tr>
<tr>
<td>Positive Behavior Support*</td>
<td>The use of positive approaches to changing behavior in school settings.</td>
</tr>
<tr>
<td>Discrete Trial Introduction</td>
<td>Skills are broken down into discrete parts with each part being taught individually.</td>
</tr>
<tr>
<td><strong>Emerging</strong></td>
<td></td>
</tr>
<tr>
<td>TEACCH</td>
<td>A specific intervention focused on arranging the environment to facilitate the learning process.</td>
</tr>
<tr>
<td>Picture Exchange Communication System</td>
<td>The use of pictures as a means of communication.</td>
</tr>
<tr>
<td>Floortime</td>
<td>A method of teaching play skills that involves following the child’s initiations and teaching skills based on those initiations.</td>
</tr>
<tr>
<td>Music Therapy²</td>
<td>Using music to develop and maintain pro-social behaviors in individuals.</td>
</tr>
<tr>
<td><strong>Unestablished</strong></td>
<td></td>
</tr>
<tr>
<td>Sensory Integration</td>
<td>A means of stimulating the sensory system to improve an individual’s level of functioning.</td>
</tr>
<tr>
<td>Auditory Integration²</td>
<td>Individuals listen to music for a pre-specified amount of time to help retrain the auditory system.</td>
</tr>
<tr>
<td>Son-rise</td>
<td>Parents teach their child by imitating their child’s stereotypic behavior to build a “non-judgmental” relationship that assists with learning.</td>
</tr>
<tr>
<td>Verbal Behavior</td>
<td>A focus on teaching language based on the Assessment of Basic Language and Learning Skills (ABLLS).</td>
</tr>
<tr>
<td>Craniosacral</td>
<td>Manipulation to alter the body’s bio-electric field.</td>
</tr>
<tr>
<td>Faith Based Therapy</td>
<td>Systematic use of prayer or other religious practices.</td>
</tr>
<tr>
<td>Speech Therapy²</td>
<td>A therapy designed to teach individuals how to speak and use language.</td>
</tr>
<tr>
<td>Chiropractic²</td>
<td>Adjustments of the spine and joints are used to realign the body; thus, relieving autism symptoms.</td>
</tr>
<tr>
<td><strong>Ineffective/Harmful</strong></td>
<td></td>
</tr>
<tr>
<td>Chelation</td>
<td>Treatment involves injection of medication to bind to metals and assist the body with purging metals (e.g., Mercury).</td>
</tr>
<tr>
<td>Gluten Casein Free Diets</td>
<td>Gluten free diets exclude proteins found in wheat. Casein free diets exclude milk products.</td>
</tr>
<tr>
<td>Facilitated Communication/Rapid Prompting</td>
<td>An individual assists another in pointing to or typing letters as a means of communication.</td>
</tr>
<tr>
<td>Vitamin Therapy</td>
<td>Deficiencies in vitamins (typically B6 and magnesium) alleviated by providing high doses of vitamins.</td>
</tr>
<tr>
<td>Holding Therapy</td>
<td>Assumes a lack of mother/child bond. Treatment involves comforting children, physically restraining a resistant child, or “rebirthing”.</td>
</tr>
<tr>
<td>Hyperbaric Oxygen</td>
<td>Treatment involves spending time in a pressurized chamber while breathing pure oxygen.</td>
</tr>
</tbody>
</table>

**Notes:**

* * - This was listed as an established treatment only related to the treatment methods directly related to ABA, not as a package.
² * - If the National Standards Report (2009) did not include this treatment, the treatment was classified into a category based upon the criterion used in Richdale & Schreck (2008) or Romanczyk et al. (2008). If contradictory evidence existed between the sources the more stringent classification was used.
**Participant Recruitment**

While the questionnaire was being piloted for accuracy, human subjects approval was obtained from the Penn State University Office for Research Protections. Once approval was obtained, the researchers requested approval from the Behavior Analysis Certification Board BACB for dissemination of a mass email to all BCBAs and BCBA-Ds. The mass email contained a cover letter describing the purpose of the research, description of questions included in the online questionnaire, contact information, and the online link for survey completion. BACB registrants that declined to receive mass emails did not receive any information regarding this study (N=1,432). Participants who received the email were instructed to access the questionnaire via an online link containing the implied informed consent document. No identifying information was collected from those who completed the questionnaire.

The initial mass email was sent to 13,000 individuals on the BACB registry with 35% opening and reading the email (N=4,500). Seven percent of those who read the initial email opened the questionnaire. Consequently, a reminder email was sent to all BCBAs and BCBA-Ds after 3 months from the initial email. The reminder email asked recipients to complete the questionnaire. The questionnaire remained open on Survey Monkey for an additional three months. After both rounds of recruitment, a total of 876 participants responded to the online questionnaire (6.7% of the total number of BACB registrants who received the email).

Respondents accessed the questionnaire through a link provided in their recruitment email. The number of questions each respondent answered depended upon their endorsement of using treatments currently or in the past. Due to the variable number
of questions, the duration of survey completion was between 20 to 45 minutes. After five to six months of participant recruitment and data collection, the responses were downloaded to SPSS for data analyses.
Chapter 5: Data Analysis and Results

Overall Frequencies of Treatment Use

Frequencies of treatment use were calculated by determining the number of BCBA-Ds and BCBAs who currently endorsed treatments. Percentages of use for individual treatments within each category of certification (BCBA and BCBA-D) were determined using a crosstabs analysis.

All treatments were reported as used in the professional practice of at least one behavioral professional except for Chelation and Craniosacral Therapy. Treatments reported as used by more than 50% of BAs occurred in the Established category (ABA: BCBA-D: \( n = 122; 98.4\% \), BCBA: \( n = 616; 99\% \); DTI: BCBA-D: \( n = 97; 81.5\% \), BCBA: \( n = 497; 85\% \) and PBS: BCBA-D: \( n = 59; 51.8\% \), BCBA: \( n = 360; 63.8\% \)). However, more than 50% of BAs also used Emerging Treatments (PECS: BCBA-D: \( n = 80; 69\% \), BCBA: \( n = 366; 64.8\% \)) and Unestablished treatments (Verbal Behavior: BCBA-D: \( n = 62; 55.9\% \), BCBA: \( n = 351; 63.9\% \)).

Although not reported to have been used by over 50% of respondents, treatments within the emerging and unestablished categories were reported to be used by \( \frac{1}{4} \) to just under \( \frac{1}{4} \) of BA’s: (a) Emerging: TEACCH (BCBA-D: \( n = 29; 25.7\% \), BCBA: \( n = 108; 19.6\% \)), Floortime (BCBA-D: \( n = 19; 16.4\% \), BCBA: \( n = 84; 14.9\% \)); (b) Unestablished: Sensory Integration (BCBA-D: \( n = 6; 5.3\% \), BCBA: \( n = 95; 17.1\% \); Speech Therapy (\( n = 223; \) BCBA-D: \( n = 25; 22.3\% \), BCBA: \( n = 198; 36\% \)).

Although not used by the majority of BAs, an assortment of non-established treatments were used by BAs. (a) Unestablished treatments used by BAs included Auditory Integration (BCBA-D: \( n = 3; 2.5\% \), BCBA: \( n = 9; 1.5\% \)), Son-Rise (BCBA-D: \( n = 11; 12.2\% \), BCBA: \( n = 74; 11.5\%)
reported use of (b) **Ineffective/Harmful Treatments**, such as Facilitated Communication (BCBA-D: n = 4; 3.4%, BCBA: n = 22; 3.8%), Diet Therapy (BCBA-D: n = 2; 1.8%, BCBA: n = 14; 2.6%), Vitamin Therapy (BCBA-D: n = 1; 0.9%, BCBA: n = 2; 0.4%), Hyperbaric Oxygen Therapy (BCBA: n = 1; 0.2%), and Holding Therapy (BCBA: n = 1; 0.2%). Figure 1 shows the top three treatments most used by BCBA-Ds and BCBAs from each category of treatment (i.e., Established, Emerging, Unestablished, Ineffective/Harmful).
Figure 1. Most used treatments by BCBA and BCBA-Ds from each category of scientific support.
Analysis of Treatment Use According to Instructional Delivery

BCBA-D and BCBA responses were grouped according to types of instructional delivery (i.e., online delivery, on-campus university program, or satellite agency program) to determine if instructional delivery influenced choices of treatments. Frequencies and percentages of those who endorsed using individual treatments were compared with a Chi-Square analysis. Chi Square analyses were conducted comparing instructional delivery (i.e., online delivery, on-campus university program, or satellite agency program) by certification level (i.e., BCBA and BCBA-D) use of each individual treatment. Each Chi Square analysis was run separately for instructional delivery and each individual treatment’s use. For example, the expected number of BCBAs and BCBA-Ds using Facilitated Communication was compared across each instructional delivery method (i.e., online delivery, on-campus university program, or satellite agency program).

No significant differences were detected for the types of treatments that BCBA-D’s used related to the type of instructional delivery they received during their behavior analysis training. However, for select treatments, BCBAs who completed their behavior analysis training in an online program or satellite agency program were more likely to use (a) Music Therapy ($X^2(6, N = 565) = 13.94, p = .030$), (b) Positive Behavior Support ($X^2(6, N = 564) = 21.41, p = .002$), and (c) Sensory Integration ($X^2(6, N = 556) = 24.61, p = .000$) than BCBAs who completed campus based programs.
Analysis of Treatment Use According to Academic Major

BCBAs and BCBA-Ds were grouped according to six categories of academic majors (i.e., ABA, education, allied medical, psychology, multiple majors including ABA, and multiple majors excluding ABA) to determine if academic major influenced choices of treatments. Participants who indicated an “other” major with a text response that matched existing categories were categorized into the appropriate major. Responses recoded as ABA majors included experimental analysis of behavior, behavior analysis and behavior specialist. Text responses recoded as Psychology included counseling, developmental psychology, clinical psychology, behavioral psychology, conditioning and learning, marriage therapy, psychiatry, human developmental psychology, behavioral sciences, child and adolescent development, school counseling, and psychology other. Text responses recoded as Education consisted of special education, school/educational psychology, education (general), school leadership, school administration, deaf education, and early childhood. Allied medical majors included responses indicating majors in speech language pathology, occupational therapy, human services, and social work. Multiple majors included responses that indicated both ABA and any other major. Multiple majors excluding ABA included responses that indicated any combination of majors, but did not include ABA.

Frequencies and percentages of those who endorsed using individual treatments were compared with a Chi-Square analysis. Chi Square analyses were conducted comparing majors (i.e., ABA, education, allied medical, psychology, multiple majors including ABA, and multiple majors excluding ABA) by certification level (i.e., BCBA and BCBA-D) use of each individual treatment. Each Chi Square analysis was conducted
separately for academic major and each individual treatment’s use. For example, the expected number of BCBA-Ds using Facilitated Communication was compared across each academic major (i.e., ABA, education, allied medical, psychology, multiple majors including ABA, and multiple majors excluding ABA).

**BCBA’s Treatment Use According to Academic Major**

Chi-Square tests were performed to examine the relationships between academic majors (i.e., ABA, Education, Allied Medical, Psychology, Multiple Majors Including ABA, and Multiple Majors Excluding ABA) and individual treatment use (e.g., FC, Sensory Integration). Within the Emerging category of treatments most BCBA-Ds across all majors used ABA and DTI. Thus, no significant differences were found according to the academic major of the behavior analyst during their academic training. However, BCBA-Ds within every category of academic major indicated higher than expected use of PBS (a controversial established treatment) except for those who indicated having multiple majors including ABA ($X^2(10, N = 359) = 52.634, p = .000$). Significant differences according to academic majors were found for Emerging Treatments (i.e., PECS and TEACCH), and Unestablished Treatments (i.e., Sensory Integration and Speech Therapy). Within the Emerging category, BCBA-Ds with majors in ABA, Education, and Multiple Majors without ABA used PECS ($X^2(10, N = 364) = 22.745, p = .012$) more often than expected. BCBA-Ds use of TEACCH was higher than expected for all academic majors except for ABA and Psychology. Similarly, unestablished treatments were less likely to be used by majors in ABA and Psychology, with the exception of lower use of Speech Therapy by BCBA-Ds who indicated having multiple majors including ABA.
However, BCBAs across majors equally chose Ineffective/Harmful Treatments, so these provided no significant differences. See Table 4 for a visual of the significant differences in treatment use percentages among BCBAs according to academic major.
### Table 4 BCBA’s Treatment Use According to Major

<table>
<thead>
<tr>
<th>Treatments</th>
<th>ABA</th>
<th>Education</th>
<th>Psychology</th>
<th>Allied Medical</th>
<th>Multiple including ABA</th>
<th>Multiple excluding ABA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Established</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PBS</td>
<td>45.1</td>
<td>74.5**</td>
<td>69.0**</td>
<td>69.4**</td>
<td>93.9</td>
<td>79.1**</td>
</tr>
<tr>
<td><strong>Emerging</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PECS</td>
<td>69.4*</td>
<td>68.0*</td>
<td>58.6</td>
<td>61.2</td>
<td>62.8</td>
<td>65.5*</td>
</tr>
<tr>
<td>TEACCH</td>
<td>10.0</td>
<td>25.5*</td>
<td>13.8</td>
<td>22.4*</td>
<td>19.7*</td>
<td>21.9*</td>
</tr>
<tr>
<td><strong>Unestablished</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sensory Integration</td>
<td>9.9</td>
<td>19.1*</td>
<td>12.1</td>
<td>18.4*</td>
<td>11.7</td>
<td>27.0*</td>
</tr>
<tr>
<td>Speech Therapy</td>
<td>23.2</td>
<td>43.5*</td>
<td>29.3</td>
<td>43.8*</td>
<td>32.6</td>
<td>41.6*</td>
</tr>
</tbody>
</table>

Note: those with a p<.05 are indicated as * and those with a p<.001 are indicated as **
Figure 2. BCBA’s use of established treatments according to academic major.
Figure 3BCBA’s use of emerging treatments according to academic major.
Figure 4. BCBA’s use of unestablished treatments according to academic major.
Figure 5. BCBA’s use of ineffective/harmful treatments according to academic major.
BCBA-D’s Treatment Use According to Academic Major

BCBA-Ds showed a significant difference among academic majors for use of both Emerging and Ineffective/Harmful Treatments. In the Emerging category BCBA-D’s reported use of Music Therapy $X^2(10, N = 115 = 41.94, p=.000)$. BCBA-Ds reported to have used Music Therapy more than expected for individuals with academic majors including, education (5%), allied medical (100%), and multiple majors including ABA (2.1%). Differences in use of Ineffective/Harmful Treatments were also significant for Diet Therapies and Vitamin Therapies. Diet Therapies ($X^2(10, N = 111 = 41.50, p=.000$) were reported to have been used by all majors except for ABA or Psychology, whom reported to have never used Diet Therapies (100%). In contrast, the use of Vitamin Therapy ($X^2(10, N = 111 = 16.205, p=.000$) was only reported by BCBA-Ds with an allied medical major (100%).
Figure 6. BCBA-D’s use of established treatments according to academic major.
Figure 7. BCBA-D's use of emerging treatments according to academic major.
Figure 8. BCBA-D's use of unestablished treatments according to academic major.
Analysis of Treatment Use According to Practicum Experiences

BCBAs and BCBA-Ds were grouped according to their practicum experiences (i.e., practicum location and practicum level) to determine if practicum experiences influenced choices of treatments. Frequencies and percentages of those who endorsed using individual treatments were compared with a Chi-Square analysis. Chi Square analyses were conducted comparing two variables related to possible practicum experiences. One analysis compared twelve categories of practicum locations (i.e., public school system, private school system, special education unit or classroom, specialized...

Figure 9. BCBA-D's use of ineffective/harmful treatments according to academic major.
autism school or center, supported living, private consulting agency, university clinic, hospitals and specialized clinics, state or government agency, early intervention, home based, or multiple settings) with BCBA’s and BCBA-D’s individual treatment use. Another analysis compared three categories of practicum levels (i.e., supervised independent framework, practicum, and intensive practicum) with BCBA’s and BCBA-D’s individual treatment use. Each analysis was run separately for treatment use according to practicum location and treatment use according to practicum level. For example, the expected number of BCBA’s using FC was compared across each practicum location and each practicum level separately.

**BCBA’s Treatment Use According to Practicum Locations**

For BCBA’s there was a significant difference in use of established treatments in relation to practicum locations. Use of ABA ($X^2 (22, N = 597 = 70.167, p= .000)$) as a treatment was used less than expected for BCBA’s who received practicum training at public schools (98.6%), university clinics (88.9%), and early intervention locations (75%). In contrast, BCBA’s use of PBS ($X^2 (22, N = 541 = 34.126, p= .048)$) was more than expected with those that received training at state/government agencies (66.7%), private consulting agencies (63.8%), supported living locations (80%), special education classrooms (66.7%), and public schools (86.6%). These results indicate that practicum locations may influence BCBA’s treatment choice. Moreover, the influence of treatment choice based on practicum locations only seems to occur within the Established category, but not for the Emerging, Unestablished, or Ineffective/Harmful categories. These categories were used relatively equally across all types of practicum locations.
Figure 10. BCBA’s treatment use of established treatments with higher than expected use according to practicum location.
BCBA-D’s Treatment Use According to Practicum Locations

BCBA-Ds showed a significant difference among all treatment categories, except for established treatments, according to practicum locations. Among (a) Emerging Treatments Music Therapy was used more than expected \( (X^2(20, N = 107 = 45.592, p= .001) \) for BCBA-Ds who received training at university clinics (16.7%), multiple locations (3.6%), and private/home locations (100%). Among (b) Unestablished Treatments Son Rise \( (X^2(20, N = 103 = 59.379, p= .000) \) was used more than expected for those who reported multiple locations for their practicum training (6.9%). Among (c) Ineffective/Harmful Treatments there was a significant difference in reported use of Diet therapy and Vitamin Therapy. Diet Therapy \( (X^2(20, N = 103 = 73.607, p= .000) \) was used more than expected by BCBA-Ds who indicated their practicum location as specialized autism schools (7.1%), and multiple locations (3.4%). Whereas, Vitamin Therapy \( (X^2(20, N = 103 = 105.567, p= .000) \) was used more than expected by BCBA-Ds who indicated their practicum location as private/homes (100%). For BCBA-Ds practicum location provides a much more significant relationship to Unsupported Treatment choices, compared to BCBAs.
Figure 11. BCBA-D’s use of treatments with higher than expected use according to practicum locations.

BA’s Treatment Use According to Practicum Levels

For BCBAs there was a significant difference in use of treatments according to practicum levels. For BCBAs PBS $X^2 (6, N = 559 = 33.399, p= .000)$ was used more than expected for individuals who indicated completion of a Supervised Independent Experience (70.3%) and Diet Therapy $X^2 (6, N = 539 = 14.326, p= .026)$ was used more than expected by individuals who indicated completion of an Intensive Practicum (5.5%) or a Supervised Independent Experience (2.7%). In contrast, there were no significant differences found between CUT use and practicum levels among BCBA-Ds. These findings indicate that practicum levels are much more influential for BCBAs compared to BCBA-Ds, but in contrast practicum locations are only influential to use of unsupported treatment choices by BCBA-Ds.
Figure 12. BCBA's treatment use with higher than expected use according to level of practicum.
Chapter 6: Discussion

The purpose of this paper was to determine the relationship between foundations in education such as instructional delivery (i.e., online delivery, on-campus university program, or satellite agency program), academic major (i.e., ABA, education, allied medical, psychology, multiple majors including ABA, and multiple majors excluding ABA), and practicum experiences (i.e., practicum location and practicum level) to BA’s use of treatments. Variables related to education fluctuated significantly among BAs whom receive their certification to treat individuals with ASD. Therefore, it remained important to understand how these specific differences in educational foundations among BAs related to their treatment choices.

BAs remain separated by levels of certification. Significant differences were found between certification types (i.e., BCBA, BCBA-D) and treatment choices for clients with ASD. All scientific categories of treatments (i.e., Established, Emerging, Unestablished, and Ineffective/Harmful) were reportedly used by at least one BA. When we compared BCBA’s specific treatment use versus BCBA-D’s, it was found that BCBAs used treatments not categorized as Established more than BCBA-Ds. Furthermore, BCBAs were found to have used three specific treatments in the Unestablished and Ineffective/Harmful categories that BCBA-Ds reported to not use (i.e., Chiropractic, Hyperbaric Oxygen Therapy, and Holding Therapy). These differences provided an indication that the higher level of certification that a BA received, the less likely they used CUTs. This indicated that obtaining a doctorate degree that includes longer, more stringent schooling, may provide a more solid foundation from which BAs
can better identify scientifically supported treatment options. Along with levels of certification, a BA’s education could vary based on the type of academic delivery they received.

In addition to the intensity of schooling, types of academic delivery (i.e., online delivery, on-campus university program, or satellite agency program), was investigated. We found no significant differences in BCBA-D’s treatment use related to the type of academic delivery. This may provide indication that doctoral programs provide similar foundations in education across instructional deliveries, or that fewer doctoral programs compared to masters programs existed and therefore significant differences remained undetected.

Unlike BCBA-D’s treatment choices, BCBA’s CUT use was significantly related to instructional delivery for some CUTs. BCBAs who completed their behavior analysis training in an online program or satellite agency program were more likely to use Music Therapy, Positive Behavior Support, and Sensory Integration than BCBAs who completed campus based programs. Among these three treatments used by BCBAs, Music Therapy and Sensory Integration remain inadequately supported by scientific research (Romanczyk et al., 2008; Miller et al., 2011; Jacobson et al., 2005).

These differences seen between campus-based instruction and online-based instruction continue to be controversial topics among all aspects of education, not just for BAs. These numbers provide indication that online based instruction obtained by BAs lacked the foundation and advantages related to choosing scientifically supported treatments that campus based instruction provided. Although the BACB requires specific prerequisites to sit for the BACB exam, the BACB only provides distinct requirements
for certain variables (i.e., practicum levels, hours of coursework, hours of practicum experience). Therefore, requirements of instruction should be analyzed more stringently to ensure BAs who receive the title of BCBA or BCBA-D, complete adequate programs that have an equivalent criterion of requirements (e.g., instructional delivery).

Unlike instructional delivery, academic majors provided a stronger prediction of BCBA’s CUT use. Although academic instructional delivery only partially predicted use of CUTs, academic majors related to CUTs use for both levels of BCBAs. When comparing treatment use by BCBAs and BCBA-Ds in relation to academic major we found significant differences for both certification levels. For BCBAs, significant differences among majors were found when comparing use of Emerging and Unestablished treatments. Of the Emerging Treatments, BCBAs with majors in ABA, Education, and Multiple Majors without ABA used PECS more often than expected. Although PECS is categorized as emerging due to preliminary research support (Weis, 2008), BCBA’s need to understand the ethical implications of using a treatment that is not fully established.

Among Emerging Treatments, TEACCH also was used more than expected for all academic majors except for ABA and Psychology. In contrast, use of all treatments categorized as Unestablished were found to be used less often by ABA and Psychology majors, with the exception of lower use of Speech Therapy by those who indicated having multiple majors including ABA. These findings indicated that treatments with more scientific research support were used more frequently by individuals who majored in the fields of behavioral sciences (i.e., ABA, Psychology), compared to BCBAs with different majors. Similarly, those who majored in behavioral sciences used Unestablished
Treatments far less frequently. These differences suggest that obtaining a major in ABA or Psychology provided an individual with a more solid foundation from which to choose scientifically supported treatments.

Further investigation into what ABA and Psychology programs provide that the others lack remains crucial. Although not significant, only individuals who majored in ABA reported to not use the ineffective/harmful treatment of FC. Also, BCBAs who indicated having multiple majors including ABA reported lower use of FC than BCBAs with multiple majors excluding ABA. Therefore, regardless of how many different majors a BA received, if they indicated majoring in any major in addition to ABA they were less likely to use FC. This statistic provides profound implications as FC continues to be used, despite consistent rejections by the scientific community, as well as nullification by the United States Court System due to unethical use of FC for abuse cases (Jacobson et al., 2005; Gorman, 1999). These findings supported our hypothesis that individuals who majored in ABA would be less likely to use CUTs. Although, our hypothesis was not consistently supported across all treatments, a trend of reduced CUT use among ABA majors remained consistent. These results indicated that individuals with a more solid backing of behavioral sciences, specifically ABA, may be more prepared to identify scientifically Established Treatments from CUTs.

Lastly, all BCBAs, regardless of major, indicated use of Ineffective/Harmful Treatments. These findings remain concerning as research continues to indicate how futile Ineffective/Harmful Treatments are alone, and when used simultaneously with effective treatments (Bowker et al., 2011; Goin-Kochel et al., 2007; Green et al., 2006; Senel, 2010; Smith & Antolovich, 2000). Based on these findings it may be important for
the BACB to require potential BAs to obtain a degree from the behavioral sciences. By requiring specific education requirements the BACB may be able to reduce future endorsements of treatments categorized as anything less than established.

Among current education requirements for BAs practicum experiences differ greatly. Results indicated differences among treatment use according to practicum experiences (i.e., location, level) for BAs. For BCBAs practicum locations only influenced treatment choice for specific treatments within the Established Category (i.e., ABA, PBS), but not for any other treatment category. These findings indicate that practicum locations may influence a BCBA’s use of Established Treatments. However, these findings oppose our hypothesis that BCBA’s use of all treatments would differ depending upon their practicum location. Even so, it remains alarming that CUT use by BCBAs exists across all practicum locations.

Compared to BCBAs, there was an inverse relationship for practicum location to treatment use for BCBA-Ds. For BCBA-Ds practicum location provided significant numbers for all categories of treatments, except for established treatments. This may indicate that the use of established treatments remains consistent and adequately used for BCBA-Ds regardless of practicum location, but that treatments not considered established fall along a continuum of use based upon specific locations. This may indicate that specific locations recommend or allow use of different treatments regardless of scientific support. To determine this relationship, a more stringent study must be completed in the future that should survey specific practicum location variables, and CUT use outcomes. Even without further research, the current variance of CUT use among BCBA-Ds according to practicum location indicates the need to regulate which
practicum locations should be available for training requirements. Furthermore, there remains need for strict regulation of practicum locations to ensure CUTs are neither promoted nor disseminated.

This study exemplified that foundations in education (e.g., academic major and delivery and practicum experience) related to CUT use by behavior analysts. For portions of all variables, we found significant differences among BA’s treatment use. Specifically, differences among certification type (i.e., BCBA, BCBA-D) and academic major (i.e., ABA, Education, Psychology, Allied Medical, Multiple Majors Including ABA, Multiple Majors excluding ABA) provided unequivocal results that indicated the need for the BACB to provide more stringent education requirements to those in pursuit of their certification. Moreover, the variance among treatments used in relation to practicum experiences (i.e., location, level) indicate that individuals’ practicum experiences vary substantially, yet they receive the same certification. For individuals to receive drastically different practicum experiences, yet receive the same designation remains both unethical and concerning. Furthermore, significant differences seen among BCBA’s receipt of educational instruction provides indication that online masters degree programs lack the scientific foundation that campus based programs offer, and should therefore be analyzed more carefully to ensure their coursework parallels campus based programs. Among these variables the use of CUTs by BAs remains apparent. Therefore, this study should be a starting point to identify needed changes for the current education provided to BAs to ensure the long-standing use of CUTs diminishes.

Previous studies identified the problem of behavior analysts using CUTs. Schreck and Mazur (2008) found that BCBAs endorsed and utilized an assortment of treatments
regardless of acknowledgement of their ineffectiveness, costliness, and insufficient research support. In congruence with previous studies, we found that BAs continued to utilize and endorse an assortment of treatments. In fact, CUT use by BAs rose for many treatments from 2008 to 2014. In the category of Emerging, use of Floortime increased with BCBA-Ds self-reporting a higher percentage of use, whereas BCBA percentages stayed consistent with 2008 percentages (BCBA-D: 16.4%; BCBA: 14.9%). In the Unestablished category, use of both Sensory Integration (BCBA-D: 5.3%; BCBA: 17.1%) and Auditory Integration (BCBA-D: 2.5%; BCBA: 1.5%) increased from 2008 (Sensory Integration: 16.4%; Auditory Integration: 1.1%). Moreover, current BCBA-D use of ABA (BCBA-D: 98.4%) was lower than 2008 percentages of both BCBAs and BCBA-Ds (BA: 98.7%). Therefore, not only does BA’s use of CUTs remain a prominent issue, use of such treatments increased in recent years despite previous research warning of their harm.

Although this study is limited by the drawbacks of uneven representation of BCBAs due to the lack of responses of BCBA-Ds, as well as the exclusion of BCaBAs, we provided evidence that the foundation of BA’s education influenced treatment choices for clients with ASD. Future studies should further explore the influence that state laws regarding ASD have on treatment choices. Moreover, a more extensive study can be done to identify national differences in treatment choices. Nonetheless, this study identified potential antecedents to the problem of CUT use among BAs.

Despite these limitations, this study demonstrated that parents remain influenced by the recommendations of professionals on ASD treatments. Further, although BA’s education appeared to be predominantly focused on the science of ABA, they also
reported using a plethora of treatments simultaneously, including those categorized as Ineffective/Harmful. These results suggest that BAs may be promoting treatments to parents that lack scientific support in conjunction with, or more than, scientifically supported treatments.

Epidemics such as the current pertussis outbreak in the U.S. and the Measles outbreak in the U.K. exemplify the potentially disastrous outcomes of ignoring ill-informed parental treatment choices. Given the apparent discrepancies surrounding current training provided to BAs, reevaluation of behavioral analysis educational programs remains imperative. Subsequently, the BACB should be more stringent in enforcement of the ethical standards regarding the use of ASD treatments that have not demonstrated scientific efficacy. Additionally, professionals should strive to disseminate accurate information to parents regarding appropriate and effective treatments for ASD. In summation, if professionals refrain from endorsing treatments that lack scientific support, the likelihood that parents will choose potentially harmful treatments will decrease, resulting in children with ASD receiving only the most appropriate and beneficial care.
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ACADEMIC VITA

Heather Wilford
5566 Edsel St.
Harrisburg, PA 17109
(717)-579-4495
hmwilford13@gmail.com

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Education:
Bachelor of Science Degree in Psychology, Penn State University, Fall 2014
Honors in Psychology
Thesis Title: A Crumbling Foundation? The Relationship Between Instructional Delivery, Practicum Experiences and Academic Major to BA’s Use of CUTs.
Thesis Supervisor: Dr. Kimberly Schreck
Faculty Reader: Dr. Gina Brelsford

Experience:
Internship with Dauphin County Human Services, Fall 2013- Spring 2014
Supervisor: Mr. Jack Wright
Junk Science Undergraduate Lab Assistant, Summer 2012-Spring 2014
Lab Coordinator: Dr. Kimberly Schreck
Harrisburg IMPACT Network Coordinator, Fall 2013-Fall 2014
Junk Science Senior Lab Assistant, Fall 2014
Lab Coordinator: Dr. Kimberly Schreck

Awards:
Dean’s List
Psi Chi Honors
Capital College Honors Program
Schreyer Honors College
Recipient of the Bunton Waller Scholarship

Activities/Presentations:
Psi Chi Mental Health Awareness Presenter, Fall 2013
Project Youth Coordination Team Member, Fall 2013 & Spring 2014
ABAI Convention Co-Author 2014