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## APPLIED PSYCHOLOGY | REVIEW ARTICLE

# Is long-term ABA therapy abusive: A response to Sandoval-Norton and Shkedy

Kathryn A. Gorycki<sup>1\*</sup>, Paula R. Ruppel<sup>1</sup> and Thomas Zane<sup>1</sup>

**Abstract:** Applied behavior analysis (ABA) is a common treatment for individuals with autism spectrum disorder (ASD). In a recent volume of this journal, Sandoval-Norton and Shkedy (2019) published a criticism of behavior analysis including the professionals and entire field as a discipline—of demonstrating unethical behavior, creating prompt dependency in the learners, destroying internal motivation, and refusing to collaborate with new and other treatment philosophies. The current paper is a response to these claims by providing several examples of peer-reviewed studies that contradict the authors' arguments, and summarizing the information of the included study's findings by and other objective. The primary purpose of this paper is to demonstrate that, contrary to the perspectives of Sandoval-Norton and Shkedy (2019), ABA is a scientific approach that identifies environmental variables that influence socially significant behaviors and develop strategies to cause behavior change that is practical and applicable, improve educational outcomes, and provide real-life support for parents and families who are seeking treatment for their loved one with ASD. In doing so, this paper will demonstrate that ABA is an efficacious approach that is supported by numerous scientific studies in the peer-reviewed literature

**Subjects:** Autism & Aspergers; Behavior Disorders in Children & Adolescents; Autism & Aspergers in Children & Adolescents

**Keywords:** autism spectrum disorder; applied behavior analysis; behavior analysis; ethics; treatment

### 1. Introduction

Autism Spectrum Disorder (ASD) is a neurological disorder that is increasing in incidence. According to the Center for Disease Control (CDC), the incidence of ASD currently is 1 in 59 (Baio et al., 2018; Center for Disease Control, 2019). Care and treatment for those individuals diagnosed with ASD approaches approximately 11.5 USD–\$60.9 billion annually for the United States, with approximately 4,110 USD–\$6,200 per year in medical costs on an individual basis (Buescher et al., 2014; Lavelle et al., 2014;

### PUBLIC INTEREST STATEMENT

The goal of our paper is to respond to what we believe to be serious errors in statement or complete misunderstandings of applied behavior analysis (ABA) and how it can facilitate the independence of individuals with autism spectrum disorder (ASD). ABA is a set of proven educational strategies designed to teach independent in academics, self-care, social, communication, and work-related areas. ABA has been thoroughly vetted through careful scientific research and has been shown to be one of the most effective interventions for ASD. Therapists and teachers who use ABA follow a very strict ethical code and use objective data and record keeping to track how the learner is doing. If the learner isn't learning, the ABA approach is then to change the way the learner is taught, to hopefully get learning back on track. ABA is ethical, effective, and helpful to improve the independence of the students and clients who are served.

Shimabukuro et al., 2008). Currently, there is no cure for ASD (Center for Disease Control, 2019). However, numerous educational, psychological, and medical approaches being used in an attempt to decrease the characteristic behaviors of ASD that may interfere and effect an individual's independence in life. The National Autism Center (2015) and the State of Maine "State of the Evidence" (Tweed et al., 2009) are two sources that have thoroughly vetted some of the more popular ASD treatments and rated the quality of the evidence supporting (or not supporting) the effectiveness of such treatments. These resources are recommended to consumers, individuals with ASD and their families, and service providers, as these documents offer an unbiased view of the existing evidence.

Applied Behavior Analysis (ABA) is an intervention approach that has gained increasing popularity over the past decades due to its perceived effectiveness. Specifically, ABA utilizes tactics derived from the principles of behavior are applied to improve socially significant behavior and experimentation is used to identify the variables responsible for the improvement in that behavior (Cooper et al., 2020). ABA is founded on seven core dimensions, which were first outlined by Baer et al. (1968). These dimensions include applied (enhances and improves everyday life of a learner, and those closest to the learner), behavioral (behavior chosen is observable and measurable), analytic (using data to make informed decisions), technological (procedures are clearly and concisely so that others may implement the procedure accurately), conceptually systematic (interventions are consistent with the principles demonstrated in the literature and research), effective (interventions are effective when they improve a behavior in a practical manner), and generality (behavior change proves to be durable over time and into other contexts than just the training environment. Indeed, the United States Surgeon General (1999) deemed ABA as the only ASD treatment with known effectiveness, as vetted by quality research (Center for Disease Control, 2019; National Autism Center, 2015; Tweed et al., 2009). Certification of Board Certified Behavior Analysts (BCBAs; Behavior Analyst Certification Board, Inc.®. (BACB®), 2019), who often work with individuals with ASD, continues to increase, another measure of the recognized popularity and effectiveness of ABA.

Regardless of the breadth and depth of the scientific research supporting the effectiveness of ABA, there are misconceptions that exist against the field. Generally speaking, criticism of a field is welcomed—valid criticisms help a field self-evaluate and, perhaps, correct itself toward establishing optimal, high-quality services. For example, Sandoval-Norton and Shkedy (2019) recently published an article, "How much compliance is too much compliance; Is long-term ABA therapy abuse?" They extensively criticized the discipline and practice of ABA, accusing the field and its practicing professionals of unethical behavior, support of punishment, failure to be effective, promoting psychological abuse and trauma, ignoring individuals who might be labeled as "lower functioning," the promoting of learned helplessness, and the destruction of internal motivation. After reading this article, we feel compelled to respond to these authors. As we previously mentioned, valid and thoughtful criticisms of a field are appreciated if presented in a way that is presented based on facts, however, Sandoval-Norton and Shkedy's screed against behaviorism and ABA warrants a larger discussion to address such claims to educate others. Their paper is full of half-truths, cherry-picked information, and unscientific statements, so that to have their paper go unanswered would be a disadvantage to consumers seeking truthful, objective, and scientific information to guide their decisions in terms of assessment, diagnosis, and treatment of ASD.

Part of the scientific enterprise is to publish research findings and conceptual positions in public avenues so that the scientific community can review such reports and independently interpret the validity and accuracy of results. Thus, the purpose of our paper is to respond to several of Sandoval-Norton and Shkedy's most concerning and harmful assumptions and claims about ABA as an intervention for individuals diagnosed with ASD. We will focus on the following criticisms by Sandoval-Norton and Shkedy:

**Criticism 1:** ABA is unethical and abusive

**Criticism 2:** ABA promotes prompt dependency

**Criticism 3:** ABA only works for children with particular characteristics of ASD

**Criticism 4:** ABA includes methodologies that are considered “out of date” and ineffective

**Criticism 5:** ABA has no data showing its effectiveness over the long-term

Our purpose of this paper is to provide readers with a response to Sandoval-Norton and Shkedy, a response that is data driven and based on the scientific merit of best treatments for ASD. We believe that readers who read both their paper and ours will come away with a more accurate understanding and depiction of the philosophy and practice of ABA, than they would have by reading Sandoval-North and Shkedy alone.

## **2. Criticism 1: ABA is Unethical and Abusive—Our Response**

Throughout their article, Sandoval-Norton and Shkedy (2019) accused ABA and its practitioners as unethical. For example, they asserted that this approach is “abusive” and therapists commit “psychological and physical abuse” (p. 4), such therapy causes “emotional and psychological harm” (p. 4), and any psychologist who uses ABA strategies is violating the ethical obligation to “do no harm” (p. 5). Service providers who use behavioral strategies, who are also not aware or competently trained in treating comorbid disorders such as anxiety, or who are not trained in ASD-specific information, are operating outside their scope of practice (p. 5). Sandoval-Norton and Shkedy asserted that ABA goes against current knowledge and research on ASD creates “lasting damage and abuse.”

The claims of Sandoval-Norton and Shkedy (2019) fly against substantial evidence. First, behavior analysts follow strict ethical guidelines to prevent these circumstances. The *Professional and Ethical Compliance Code* (Behavior Analyst Certification Board Professional and Ethical Compliance Code for Behavior Analysts (BACB), 2019) obligates the responsibilities of behavior analysts they have towards the people whom they serve. It could not be clearer that the ethical code mandates behaving in a way to maximize benefit and minimize harm. Practicing outside one’s scope is unethical. Practicing incompetently is unethical. Instead, behavior analysts create treatment plans based on the client’s needs, as dictated by the client and his/her significant others. This fundamental treatment approach is embedded in the ethical code for the practice of behavior analysis (BACB, 2019)

A major point mentioned by Sandoval-Norton and Shkedy (2019) is that behavior analyst’s only use training procedures that apply to one skill (e.g. toilet training), and once they master it, conditioning subsides. In doing so, the authors mention that many children with ASD are taught the same skill for years using the same procedures, even though mastery is never achieved. However, this claim is simply false. It is against the Behavior Analyst Certification Board’s *Professional and Ethical Compliance Code for Behavior Analysts* to continue treatment for an extended period of time if that skill is not being mastered. Behavior analysts strive to teach individuals skills that will promote the most independence possible, and toilet training fits within this definition. Furthermore, the ethical code obligates behavior analysts to refer a client who is not making progress, to another professional who might be more successful (BACB, 2019). Johnston et al. (2017) provide a thorough overview of the development of professional credentials that became apparent in the early history of ABA. A system was developed which requires that behavior-analytic practitioners abide by a specific level of expertise in this profession.

Another ethical misconception held by Sandoval-Norton and Shkedy (2019) is that ABA therapists lack training in ASD and interventions on how to treat self-stimulatory behavior. We would first point to the hundreds of studies (both research and clinical) that showed powerful effects in teaching both prosocial skills, as well as effectively reducing behaviors deemed problematic by the consumers, parents, and families (e.g. self-stimulatory behaviors). Furthermore, behavior analysts follow strict ethical requirements that obligate them to work with clients on targets for which the behavior analyst is competently trained on which to work. Additionally, behaviorally-trained staff are obligated to develop treatment plans based on the client's needs, as expressed by the clients or his or her parents/guardians. Specifically, parents may request an intervention to reduce self-stimulation. However, if this behavior does not impede their learning and does not pose any threats to their health, then the behavior analyst is ethically obligated to discuss this with the client and parent/guardian. Sandoval-Norton and Shkedy (2019) seemed to assume that a behavior analyst who practices unethically damns the entire field as being unethical. Fortunately, the governing body overseeing certified behavior analysts have a comprehensive system for reviewing claims of potential unethical behavior (BACB, 2019), and report the results of such investigations regularly, thus giving consumers important information regarding the ethical conduct of those professionals. It is gratifying to see that few reported claims actually are found to violate the ethical code, but the field does well in policing themselves.

The evolution of the ABA ethical code has put in place fundamental guidelines to prevent abuse (Bailey & Burch, 2016). A primary goal of ABA treatment is to protect the well-being of individuals and in doing so, the treatment focus is individualized, allowing individuals to learn the necessary skills to develop the most independence. The focus on the protection and benefit of the client is emphasized by Van Houten et al. (1988) in detail, the rights of all individuals with disabilities to effective behavioral treatment.

Another claim made by Sandoval-Norton and Shkedy (2019) pertained to the possibility that ABA therapy could result in post-traumatic stress symptoms. They cited Kupferstein (2018) who conducted an online survey of individuals with ASD (diagnosed or self-diagnosed) aged 18 years or older. Questions were designed to determine the extent to which post-traumatic stress symptoms (not the formal disorder) might be evident in this group. According to Kuperstein, almost half of the respondents reported evidence of symptoms that would meet the diagnostic criteria for Post-Traumatic Stress Disorder (PTSD). Furthermore, Kuperstein asserted that such symptoms would begin occurring within four weeks after commencing ABA therapy. Sandoval-Norton and Shkedy used this study to suggest this other dangerous outcome of ABA. Once again, an objective analysis would find such claims to be baseless. Actually, Kupferstein (2018) was debunked by Leaf et al. (2018), who provided a critical review of Kuperstein's methodology and assessment methods, and the conclusions to which she arrived. In essence, Kuperstein did not follow good science, her logic was unsubstantiated, and we refer the audience to the study by Leaf et al. (2018).

Sandoval-Norton and Shkedy (2019) claimed that the practice of ABA is unethical due to the exclusive use of behavioral procedures when, in their opinion, there exist many interventions from "numerous theoretical orientations and schools of thought" (p. 5) that should be folded into a treatment plan. They are correct in that there are many different treatments from a large number of theoretical orientations. ASD is, indeed, a fad magnet. But Sandoval-Norton and Shkedy advocated using numerous treatments, rather than having a bigger concern of using treatments with proven effectiveness. Unfortunately, published research does not support their approach. Specifically, a series of research studies by different authors (e.g. Eikeseth et al., 2002; Howard et al., 2005, 2014) directly compared ABA-only and "eclectic" treatments (i.e. interventions that combine ABA and other interventions from various theoretical models), and the research is quite clear that students served by intensive ABA have significantly better outcomes (IQ scores, language scores, etc.) than those children who are educated with various non-ABA approaches. Although Sandoval-Norton and Shkedy believed

it is better to provide multi-component treatments that reflect a diversity of treatment approaches, the research appears to show that students will not be served best by such approaches.

### 3. Criticism 2: ABA promotes prompt dependency—Our Response

Sandoval-Norton and Shkedy (2019) stated that individuals receiving ABA treatment often remain dependent on the prompts used to train or treat targeted responses such as peer interaction. Specifically, they reference an article that observed child play behavior with respect to prompt dependency (Giangreco et al., 1997) where children were observed to engage in play on the playground only when a paraprofessional was near. Sandoval and Norton asserted that research has “consistently” observed responding to prompts rather than environmental and natural cues. However, Sandoval-Norton and Shkedy seemed to have misunderstood the purpose of the study. First, Giangreco and colleagues focused on the proximity between the instructional assistants and students, which is different from prompts that are used during educational programming. Second, the students in this study were labeled deaf-blind; no diagnosis of ASD. Third, nowhere in the article did Giangreco et al. mention ABA as part of the teaching program that allegedly resulted in prompt dependency; in other words, they did not focus on components of ASD in relation to physical proximity.

We believe that those who practice behavior analysis are uniquely prepared to efficiently fade instructional prompts. For example, Christian and Poling (1997) used self-management procedures to improve productivity in adults with disabilities. In this study, the participants were taught to use a timer to decrease time spent on a vocational activity. During baseline, the trainer regularly interacted with the individual to discuss and train the individual on how to use self-management strategies and task-completion of targeted behaviors. After treatment, the individual was able to select an appropriate time spent on an activity to constitute reinforcement and timed their behavior using a timer. Data collected on participants’ performance relative to their co-workers indicated an increase in performance relative to baseline for all participants across all behaviors. These data indicate the success of behavior analytic strategies at decreasing the likelihood of prompt dependency while promoting self-management in individuals with disabilities.

Garcia-Albea et al. (2014) succeeded in teaching four boys with ASD to initiate conversations through the use of scripts. Scripts are a teaching tool that provide the learner with contextually appropriate and socially meaningful verbal exchanges to facilitate conversations and increase social skills (Krantz & McClannahan, 1993, 1998; MacDuff et al., 2007; Reagon & Higbee, 2009). The goal of this strategy is to systematically remove the stimulus of the script to program for generalization and spontaneity of responding while decreasing the necessity for an adult or teachers presence to facilitate and prompt a child’s behavior to have a conversation with others (Garcia-Albea et al., 2014). Before the intervention, participants did not engage in novel or scripted behaviors to initiate social interactions. Experimenters used manual and verbal prompting initially in the experiment, eventually fading the level of physical and verbal prompts until the participant could engage with peers and emit a scripted response while playing with a toy. Results from this study showed that participants were able to initiate scripted responses independently as well as emit unscripted responses independently up to 2-weeks and 2-months after reaching mastery during teaching. Thus, results demonstrated prompt fading was successful and showed that the amount of reliance on adult presence decreased with the individuals responding independently in the environment.

In another study, Stauch et al. (2018) used video-based group instructions to teach social perception skills involving discriminating social stimuli (e.g. spoken words, gestures, contextual events). Researchers were able to teach participants to interact with peers using video modeling, and four of the five participants, successfully faded prompts altogether and with the participants continued to respond correctly in the absence of an adult and prompts.

While Sandoval-Norton and Shkedy (2019) asserted that a fundamental characteristic of ABA programming is the development of prompt dependency, a numerous number of published studies shows successful fading of instructional prompts, and the only study cited by Sandoval-Norton and Shkedy supporting prompt dependency had absolutely nothing to do with ASD, nothing to do with ABA; and the authors of that study cited behavior analysis strategies as a way to avoid prompt dependency.

#### **4. Criticism 3: ABA only works for children with particular characteristics of ASD—Our Response**

Sandoval-Norton and Shkedy (2019) stated that ABA is only efficacious for individuals with a measurable Intelligence Quotient (IQ) at or above 70 and that nearly all research on ABA efficacy excludes the nonverbal population. However, this statement by the authors seems to be a misinterpretation of the results from two meta-analyses examining the effectiveness of ABA-based interventions (Peters-Scheffer et al., 2011; Virués-Ortega, 2010). Virués-Ortega conducted a review of ten studies (involving 146 participants, some who possessed a measured IQ of under 70) receiving early intensive behavioral intervention (EIBI). Of these ten studies, all but one reported positive effects of ABA interventions, regardless of their IQ. When comparing potential confounding sources such as pre-intervention age and pre-intervention IQ, these factors did not make a difference to treatment effectiveness. Interestingly, results from the meta-analysis still demonstrated that long-term ABA interventions were effective for both verbal and non-verbal participants. Virués-Ortega found no indication that individuals with an IQ under 70 experienced unfavorable outcomes. Rather, Virués-Ortega stated results suggest long-term, comprehensive ABA intervention leads to (positive) medium to large effects in terms of intellectual functioning, language development, and adaptive behavior of individuals with ASD.

Peters-Scheffer et al. (2011) reviewed 11 studies that included 344 children with ASD and of the 11 studies reviewed, ten included children with an IQ lower than 70 (Eikeseth et al., 2002, 2007; Eldevik et al., 2006; Howard et al., 2005; Reed et al., 2007; Remington et al., 2007; Sallows & Graupner, 2005; Sheinkopf & Siegel, 1988; T. Smith et al., 1997; R. Smith et al., 2000). Specifically, the average IQ of the studies reviewed ranged from 27.52 to 76.53. Their meta-analysis presented similar conclusions that supported the use of ABA among varying IQ and both verbal and non-verbal individuals with ASD. Despite some potential limitations (e.g. small sample sizes and the use of quasi-experimental designs) the results successfully demonstrated that EIBI had a moderate to large effect in young children with ASD on full scale and non-verbal IQ and adaptive behavior (Peters-Scheffer et al., 2011), refuting yet another misinterpretation of research related to effectiveness of ABA by Sandoval-Norton and Shkedy (2019). It is evident that Virués-Ortega (2010) and Peters-Scheffer et al. (2011) supported the effectiveness of ABA among a wide spectrum of IQ scores contrary to claims made by Sandoval-Norton and Shkedy. Further, Peter-Scheffer and colleagues also summarized EIBI outcomes, which went beyond IQ scores, thus, contradicting Sandoval-Norton and Shkedy, who claimed that the studies outcome measures were only IQ scores. It is critical for readers to know that ABA does not solely rely on IQ assessments to support the effectiveness of ABA. Sandoval-Norton and Shkedy (2019) further claimed that ABA is ineffective for the nonverbal population. Professionals in behavior analysis employ numerous alternative communication methods for those individuals with verbal deficits (e.g. Byiers & Reichle, 2015; Chaabane et al., 2009; Rispoli et al., 2010; Shillingsburg et al., 2019). In an attempt to clear up these additional misconceptions of ABA, we offer the following specific points. Given that many individuals with ASD may not acquire functional vocal repertoires (National Research Council, 2001), the use of alternative communication methods may be fundamental since approximately 30% of children with ASD fail to develop vocal communication (Shillingsburg et al., 2019). For these individuals, augmentative and alternative communication (AAC) systems such as manual signs, picture exchange communication system (PECS), and speech generating devices (SGD) are frequently used either as a supplement or replacement for vocal speech. AAC includes all forms of communication (aside from oral speech) that allow individuals to express

thoughts, needs, and wants. Providing access to, and support for, individuals in which spoken language is not feasible holds serious interest for applied behavior analysts due to the sizeable and growing collection of evidence-based research that has contributed to the selection and implementation of these various alternative communication methods (e.g. Byiers & Reichle, 2015). For example, Rispoli et al. (2010) reviewed 35 studies that included the use of SGDs for individuals with intellectual developmental disabilities (IDD). Results indicated that 86% of individuals showed positive outcomes with 54% providing conclusive evidence. Another positive feature of AAC methods is that there are different methods for individuals to communicate, thus allowing for more individualized treatment tailored towards the individual to develop spontaneous, meaningful communication that generalized to all environments. In deciding which method is best, behavior analysts determine what type of communication is likely to provide the most influential impact in the shortest amount of time. For instance, PECS (Bondy & Frost., 2001) has been shown to be an effective method that uses pictures and symbols to develop a functional communication system for individuals to exert control over their environment by requesting preferred items. For example, Chaabane et al. (2009) noted the efficiency of PECS, as individuals can be taught to use improvisation, such as an individual requesting for an item using a picture that represents the item when the original PECS card is unavailable. As individuals learn to improvise their requests, they can potentially request a greater number of preferred items with fewer picture cards. Chaabane et al. evaluated the effects of parent-implemented PECS training on the improvisation of requests by children with ASD. These results demonstrated that the children acquired the ability to use alternative symbols when the corresponding symbol was unavailable. Additionally, results found that parents were able to teach their children to use novel picture responses.

In general, studies have demonstrated that PECS is an effective communication method for individuals with ASD who have limited verbal repertoires. The specific strategies and tactics organically involved in the PECS procedure (such as prompting and reinforcement) are behavioral in nature, and grew out of applied behavior analysis (e.g. Son et al., 2006; Yoder & Stone, 2006).

#### **5. Criticism 4: ABA includes methodologies that are considered “out of date” and ineffective—Our Response**

Sandoval-Norton and Shkedy (2019) claimed that ABA’s approaches are outdated (especially for nonverbal children) and that ABA therapy creates lasting damage and abuse. However, the published scientific literature suggests otherwise, with numerous scientific positions unequivocally stating the effectiveness of ABA as an evidence-based treatment. Here are some examples supporting ABA as an evidenced-based procedure for use when treating ABA:

- (A) The United States Surgeon General (1999) established that “Thirty years of research demonstrated the efficacy of applied behavioral methods in reducing inappropriate behavior and in increasing communication, learning, and appropriate social behavior.”
- (B) The Association for Science in Autism Treatment (The Association for Science in Autism Treatment, 2020) supports the positive impact ABA has on increasing behaviors and teaching new skills.
- (C) Tweed et al. (2009) also reviewed a large number of interventions for ASD. Within this review, they established research criteria for labeling interventions as established (i.e. empirical evidence of effectiveness), promising (i.e. some empirical evidence, but not yet of a sufficient amount), preliminary evidence, insufficient evidence, and evidence of harm. These authors reviewed several treatments (ABA and non-ABA), and were classified accordingly. ABA treatments were, once again, identified as being effective through supporting research.
- (D) The National Autism Center’s (2015) National Standards Report conducted a similar meta-analysis across treatments for use with ASD, and identified specific behavior-analytic

strategies to be evidenced-based (e.g. chaining, joint attention training, forward chaining, imitation training, reinforcement schedules, response interruption and redirection, repeated practice, standard echoic training, etc.)

- (E) Last, Wong et al. (2014) completed their own review of the state of the evidence and concluded that ABA is a set of effective intervention practices for individuals with ASD.

Sandoval-Norton and Shkedy (2019) also criticized another aspect of behavior analysis, that of the use of reinforcement, typically what they call “external” (to the student) reinforcement. The authors trotted out the long-voiced belief that external reinforcement will lessen or outright ruin intrinsic motivation, which, according to them, is the “standard” motivation of utmost importance. However, readers must be aware that there are hundreds of empirical studies investigating this issue, and the preponderance of these results are quite different from the position of Sandoval-Norton and Shkedy. Most of the studies support the assumption that external rewards do not impinge on intrinsic motivation (e.g. Cameron et al., 2001; Cameron & Pierce, 1994). A recent review by Cameron et al. (2001) showed definitively that rewards actually increase internal motivation in many situations. The reader is suggested to review this article. Generally speaking, studies that report the detrimental effects of external rewards have methodological or statistical flaws that reduce the certainty of the claim of a harmful effect. Cameron and colleagues identified many factors that could explain a harmful effect, such as sample size and characteristics, statistical analyses, type of research design (i.e. group versus within-subject), type of tasks employed, and type of external reinforcement provided. We suggest that readers should give more credence to experiments that are well designed with good controls over internal and external validity. Based on a rigorous scientific criteria, there are many experimental studies that clearly show that external reinforcement does not have a negative effect on intrinsic reinforcement.

#### **6. Criticism 5: ABA has no data showing its effectiveness over the long-term—Our Response**

Sandoval-Norton and Shkedy (2019) made yet another inaccurate claim stating there exists no data proving the long-term effectiveness of ABA therapy among the ASD population. Support for the long-term effectiveness of an ABA approach comes from several different sources. For example, McEachin et al. (1993) implemented intensive behavioral therapy (IBT) on young children diagnosed with ASD. They provided data showing improvements, as well as the long-term impact of ABA therapy. Not only did the subjects gain significant skills during the therapeutic program, but they maintained their gains (intellectual functioning, adaptive behavior, and personality scores) for up to six years. Thus, the results suggest that behavioral treatment may produce long-lasting and significant gains for many young individuals with ASD.

Dawson et al. (2010) presented the first randomized controlled trial to demonstrate the efficacy of a comprehensive developmental behavioral intervention for toddlers with ASD. Results found that compared to children who received a community intervention, individuals who were placed in a comprehensive developmental behavioral intervention 20 hours a week over two years made substantial gains in IQ, adaptive behavior, and ASD diagnosis. After two years, follow-up measures were taken, showing that children in the ABA intervention group continued to show significant improvements in cognitive ability and found that the two groups (ABA and control) differed greatly in terms of adaptive behavior. Children in the ABA group displayed similar scores after the follow-up, indicating a steady rate of development, whereas the control group showed an average decline.

More evidence comes from Howard et al. (2014), who studied three year outcomes of children who were involved in either IBT or more traditional special education services. The children studied were subjects in a study comparing intensive behavioral services to traditional special educational services (Howard et al., 2005). In this study, the results showed significant gains (over pretest scores) for the children in the IBT group, and this group outscored the subjects in the general special education

groups. With regards to long-term outcomes (Howard et al., 2014), the children in the IBT not only maintained their gains over 3 years but continued to outperform the subjects in the other groups.

D. P. Smith et al. (2019) examined treatment gains from early and EIBI after 10 years. All 19 participants participated in a previous study by Hayward et al. (2009), who examined children's progress after one year of receiving a mean of 36 hours per week of EIBI. Follow-up results showed significant progress on IQ, visual-spatial IQ, language comprehension, expressive language, social skills, motor skills, and adaptive behavior. These general findings (from Hayward et al., 2009) were replicated by Smith and colleagues who reported data from intake, at the end of EIBI, and ten years after services were terminated when the children were on average, 15 years-old. Results showed that participants substantially increased their cognitive and adaptive standard scores between intake and 2 years of EIBI. Additionally, these scores maintained at the 10-year follow-up. Further, participants also showed a reduction of ASD characteristics between intake and follow up. These results are critical in that these gains indicate that the treatment gains from EIBI maintained into adolescence.

The Association for Science in Autism Treatment (2020) reported findings from several studies that when ABA interventions are intensive (approximately 20 hours a week) and early in life (prior to the age of 4-years old), significant gains in development are realized and, more importantly, there are significant reductions in the need for special services over the lifetime of the individual (e.g. Reichow, 2012). Since Sandoval-Norton and Shkedy (2019) were skeptical of the effectiveness of ABA treatment, they were, naturally, critical of the expansion of ABA within the autistic community to a market size as large as 17 USD billion. States have passed laws advocating for insurance coverage in children with ASD; thus, providing over 200 million families with autistic children and young adults can obtain services through these insurance mandates (Autism Speaks, 15 Autism Speaks, 2020). Given the efficacy data presented above, this expansion of ABA is a positive development, especially given that many insurance companies are now requiring companies to reimburse for therapy. Roane et al. (2016) stressed the importance of early diagnosis and several considerations for intensive treatment to maximize the effectiveness of behavioral services, factors to be considered when developing treatment plans. With this support from insurance, ABA is now more accessible to more individuals, thus, providing individuals with an effective form of treatment that was not as easily accessible in the past

## 7. Conclusion

ABA has a long history of use with the ASD population. It stems from a very strong breadth and depth of high-quality and well controlled research studies that demonstrate, beyond question, the effectiveness of this approach. Over the decades, ABA has evolved and grown (see Vollmer and colleagues, 2020, for a review of the background, history scope of practice, and the evolution of certification), but still retains the unique criteria of vetting each procedure to ensure it is effective and does what it is designed to do. Criticisms of ABA (and other treatment strategies) are welcome and needed, so as to increase confidence amongst consumers that the quality of ABA treatment remains high. Based on our review of Sandoval-Norton and Shkedy (2019), we conclude that their criticisms are unfounded. They describe ABA as it was decades ago—before the ethics code, before the recognition of social validity emphasis -, not like it is today. Many of their arguments are based on published reports for which there is little reliability or replication, with no connection to ASD or ABA, with literature existing that contradicts the claims made by Sandoval-North and Shkedy, but is conveniently ignored by them. Sandoval-Norton and Shkedy (2019) are obviously strong critics of ABA. The authors of the current paper are strong proponents of ABA. We implore the readers to access readily- available and neutral resources that advocate for individuals with ASD and their care. Two excellent resources are the National Autism Center National Autism Project (National Autism Center, 2015) and the State of Maine State of the Evidence (Tweed et al., 2009). These organizations exist to objectively evaluate the effectiveness of treatments provided individuals with ASD. They are neither for or against any particular treatment methodology or philosophy; these organizations are merely interested in what

treatments exist that are based on strong empirical research showing effectiveness with individuals with ASD. We urge readers to review these documents that describe what ASD treatments work and do not. Take guidance from them in making treatment decisions.

By all means, ABA is not perfect, and continues to evolve, for the benefit of the individual with ASD, family, guardians, and service providers. Criticism is welcome. Practitioners of behavior analysis have been taught to “look at the data” and to adopt a basic philosophy of science, that of “philosophic doubt,” meaning to question current data when new data arise that conflict with current practice. In that regard, criticism is welcome because, as noted earlier, assessment of the validity of the criticism may help improve the quality of services and, ultimately, improve the quality of the outcomes for individuals with ASD. But only criticism that is well-founded, logical, and based on science can be productive and have a positive impact. Sandoval-North and Shkedy’s screed is unlikely to improve the quality of treatments for ASD. Their criticisms are misinformed, weakly supported, and illogical. The danger of their paper is that readers may take their position at face value. That is why we wrote this response, to give readers a more data-based, research-founded counters to their criticisms. Hopefully, Sandoval-Norton and Shkedy (2019) argument will be seen as an inaccurate, pejorative attack on ABA, a treatment that has been vetted for effectiveness, met that challenge, and stands as a very strong signal of hope for families impacted by ASD.

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#### References

- Applied Behavioral Analysis, (2020) *State-by-state guide to insurance laws covering the treatment of ASD with applied behavior analysis*. [www.appliedbehavioranalysis.edu/state-by-state-guide-to-autism-insurance-laws/](http://www.appliedbehavioranalysis.edu/state-by-state-guide-to-autism-insurance-laws/)
- Autism Speaks (2020). Retrieved February 22, 2020 [https://www.autismspeaks.org/search?search\\_api\\_fulltext=insurance](https://www.autismspeaks.org/search?search_api_fulltext=insurance)
- Baer, D. M., Wolf, M. M., & Risley, T. R. (1968). Some current dimensions of applied behavior analysis. *Journal of Applied Behavior Analysis*, 1(1), 91–97. <https://doi.org/10.1901/jaba.1968.1-91>
- Bailey, J., & Burch, M. (2016). *Ethics for behavior analysts*, (3rd ed.). Taylor and Francis.
- Baio, J., Wiggins, L., Christensen, D. L., Maenner, M. J., Daniels, J., Warren, Z., Kurzius-Spencer, M., Zahorodny, W., Rosenberg, C. R., White, T., Durkin, M. S., Imm, P., Nikolaou, L., Yeargin-Allsopp, M., Lee, L., Harrington, C., Lopez, R., Fitzgerald, M., Hewitt, R. T., & Dowling, N. F. (2018). Prevalence of autism spectrum disorder among children aged 8 Years: Autism and developmental disabilities monitoring network, 11 sites, United States, 2014. *MMWR Surveillance Summaries*, 67(6), 1–23. <https://doi.org/http://dx.doi.10.15585/mmwr.ss6706a1>
- Behavior Analyst Certification Board Professional and Ethical Compliance Code for Behavior Analysts. (2019). *Professional and ethical compliance code for behavior analysts*. [https://www.bacb.com/wp-content/uploads/BACB-Compliance-Code-english\\_190318.pdf](https://www.bacb.com/wp-content/uploads/BACB-Compliance-Code-english_190318.pdf)
- Bondy, A., & Frost, L. (2001). The picture exchange communication system. *Behavior Modification*, 25(5), 725–744. <https://doi.org/10.1177/0145445501255004>
- Buescher, A., Cidav, S., Knapp, M., & Mandell, D. (2014). Costs of autism spectrum disorders in the United Kingdom and the United States. *JAMA Pediatrics*, 168(8), 721–728. <https://doi.org/10.1001/jamapediatrics.2014.210>
- Byiers, B. J., & Reichle, J. E. (2015). Toward behavior analytic practice in augmentative and alternative communication (AAC). in H. S. Roane, J. E. Ringdahl, & T. S. Falcomata (Eds.), *Clinical and organizational applications of applied behavior analysis; clinical and organizational applications of applied behavior analysis*, (pp. pp. 273–301, Chapter xv, 661). Elsevier Academic Press. <https://doi.org/10.1016/B978-0-12-420249-8.00012-5>
- Cameron, J., Banko, K. M., & Pierce, W. D. (2001). Pervasive negative effects of rewards on intrinsic motivation: The myth continues. *The Behavior Analyst*, 24(1), 1–44. <https://doi.org/10.1007/BF03392017>
- Cameron, J., & Pierce, W. D. (1994). Reinforcement, reward and intrinsic motivation: A meta-analysis. *Review of Educational Research*, 64(3), 363–423. <https://doi.org/10.3102%2F00346543064003363>
- Center for Disease Control. (2019). *Data and statistics on autism spectrum disorder*. Retrieved January 26, 2020, from <https://www.cdc.gov/ncbddd/autism/data.html>
- Chaabane, D. B. B., Alber-Morgan, S. R., & DeBar, R. M. (2009). The effects parent-implemented PECS training on improvisation of mands by children with

- autism. *Journal of Applied Behavior Analysis*, 42(3), 671–677. <https://doi.org/10.1901/jaba.2009.42-671>
- Christian, L., & Poling, A. (1997). Using self-management procedures to improve the productivity of adults with developmental disabilities in a competitive employment setting. *Journal of Applied Behavior Analysis*, 30(1), 169–172. <https://doi.org/10.1901/jaba.1997.30-169>
- Cooper, J. O., Heron, T. E., & Heward, W. L. (2020). *Applied behavior analysis*, (3rd ed.). Pearson.
- Dawson, G., Rogers, S., Munson, J., Smith, M., Winter, J., Greenson, J., Donaldson, A., & Varley, J. (2010). Randomized, controlled trial of an intervention for toddlers with autism: The early start denver model. *Pediatrics*, 125(1), e17–e23. <https://doi.org/10.1542/peds.2009-0958>
- Eikeseth, S., Smith, T., Jahr, E., & Eldevik, S. (2002). Intensive behavioral treatment at school for 4- to 7-year-old children with autism: A 1-year comparison controlled study. *Behavior Modification*, 26(1), 49–68. <https://doi.org/10.1177%2F0145445502026001004>
- Eikeseth, S., Smith, T., Jahr, E., & Eldevik, S. (2007). Outcome for children with autism who began intensive behavioral treatment between age four and seven: A comparison controlled study. *Behavior Modification*, 31(3), 264–278. <https://doi.org/10.1177%2F0145445506291396>
- Eldevik, S., Eikeseth, S., Jahr, E., & Smith, T. (2006). Effects of low-intensity behavioral treatment for children with autism and mental retardation. *Journal of Autism and Developmental Disorders*, 36(2), 211–224. <https://doi.org/10.1007/s10803-005-0058-x>
- Garcia-Albea, E., Reeve, S. A., Brothers, K. J., & Reeve, K. F. (2014). Using audio script fading and multiple-exemplar training to increase vocal interactions in children with autism. *Journal of Applied Behavior Analysis*, 47(2), 325–343. <https://doi.org/10.1002/jaba.125>
- Giangreco, M., Edelman, S. W., Luiselli, T. E., & MacFarland, S. Z. C. (1997). Helping or hovering? Effects of instructional assistant proximity on students with disabilities. *Exceptional Children*, 64(1), 7–18. <https://doi.org/10.1177%2F001440299706400101>
- Hayward, D., Eikeseth, S., Gale, C., & Morgan, S. (2009). Assessing progress during treatment for young children with autism receiving intensive behavioural interventions. *Autism*, 13(6), 613–633. <https://doi.org/10.1177/1362361309340029>
- Howard, J. S., Sparkman, C. R., Cohen, H. G., Green, G., & Stanislaw, H. (2005). A comparison of intensive behavior analytic and eclectic treatment for young children with autism. *Research in Developmental Disabilities*, 26(4), 359–383. <https://doi.org/10.1016/j.ridd.2004.09.005>
- Howard, J. S., Stanislaw, H., Green, G., Sparkman, C. R., & Cohen, H. G. (2014). Comparison of behavior analytic and eclectic early interventions for young children with autism after three years. *Research in Developmental Disabilities*, 35(12), 3326–3344. <https://doi.org/10.1016/j.ridd.2014.08.021>
- Johnston, J. M., Carr, J. E., & Mellichamp, F. H. (2017). A history of the professional credentialing of applied behavior analysts. *The Behavior Analyst*, 40(2), 523–538. <https://doi.org/10.1007/s40614-017-0106-9>
- Krantz, P. J., & McClannahan, L. E. (1993). Teaching children with autism to initiate to peers: Effects of a script-fading procedure. *Journal of Applied Behavior Analysis*, 26(1), 121–132. <https://doi.org/10.1901/jaba.1993.26-121>
- Krantz, P. J., & McClannahan, L. E. (1998). Social interaction skills for children with autism: A script-fading procedure for beginning readers. *Journal of Applied Behavior Analysis*, 31(2), 191–202. <https://doi.org/https://dx.doi.org/10.1901%2Fjaba.1998.31-191>
- Kupferstein, H. (2018). Evidence of increased PTSD symptoms in autistics exposed to applied behavior analysis. *Advances in Autism*, 4(1), 19–29. <https://doi.org/10.1108/AIA-08-2017-0016>
- Lavelle, T. A., Weinstein, M. C., Newhouse, J. P., Munir, K., Kuhlthau, K. A., & Prosser, L. A. (2014). Economic burden of childhood autism spectrum disorders. *Pediatrics*, 133(3), e520–e529. <https://doi.org/10.1542/peds.2013-0763>
- Leaf, J. B., Ross, R. K., Cihon, J. H., & Weiss, M. J. (2018). Evaluating Kupferstein's claims of the relationship of behavior intervention to PTSD for individuals with autism. *Advances in Autism*, 4(3), 122–129. <https://doi.org/http://doi.10.1108/AIA-02-2018-0007>
- MacDuff, J. L., Ledo, R., McClannahan, L. E., & Krantz, P. J. (2007). Using scripts and script-fading procedures to promote bids for joint attention by young children with autism. *Research in Autism Spectrum Disorders*, 1(4), 281–290. <https://doi.org/http://dx.doi.org/www2.lib.ku.edu/10.1016/j.rasd.2006.11.003>
- McEachin, J. J., Smith, T., & Lovaas, O. I. (1993). Long-term outcome for children with autism who received early intensive behavioral treatment. *American Journal on Mental Retardation*, 97(4), 359–372. [https://dddc.rutgers.edu/pdf/mceachlin\\_et\\_al.pdf](https://dddc.rutgers.edu/pdf/mceachlin_et_al.pdf)
- National Autism Center. (2015). *Findings and conclusions: national standards project, phase 2*. Author.
- National Research Council. (2001). *Educating children with autism*. National Academy Press.
- Peters-Scheffer, N., Didden, R., Korzilius, H., & Sturmey, P. (2011). A meta-analytic study on the effectiveness of comprehensive ABA-based early intervention programs for children with autism spectrum disorders. *Research in Autism Spectrum Disorders*, 5(1), 60–69. <https://doi.org/http://dx.doi.org/www2.lib.ku.edu/10.1016/j.rasd.2010.03.011>
- Reagon, K. A., & Higbee, T. S. (2009). Parent-implemented script fading to promote play-based verbal initiations in children with autism. *Journal of Applied Behavior Analysis*, 42(3), 659–664. <https://doi.org/10.1901/jaba.2009.42-659>
- Reed, P., Osborne, L. A., & Corness, M. (2007). The real-world effectiveness of early teaching interventions for children with Autism Spectrum Disorder. *Exceptional Children*, 73(4), 417–433. <https://doi.org/10.1177%2F001440290707300402>
- Reichow, B. (2012). Overview of meta-analyses on early intensive behavioral intervention for young children with autism spectrum disorders. *Journal of Autism and Other Developmental Disorders*, 42(4), 512–520. <https://doi.org/10.1007/s10803-011-1218-9>
- Remington, B., Hastings, R. P., Kovshoff, H., Degli Espinosa, F., Jahr, E., Brown, T., Alsford, P., Lemaic, M., & Ward, N. (2007). A field effectiveness study of early intensive behavioral intervention: Outcomes for children with autism and their parents after two years. *American Journal of Mental Retardation*, 112(6), 418–438. [https://doi.org/https://psycnet.apa.org/doi/10.1352/0895-8017\(2007\)112\[418:EIBIOF\]2.0.CO;2](https://doi.org/https://psycnet.apa.org/doi/10.1352/0895-8017(2007)112[418:EIBIOF]2.0.CO;2)
- Rispoli, M. J., Franco, J. H., van der Meer, L., Lang, R., & Camargo, S. P. (2010). The use of speech generating devices in communication interventions for individuals with developmental disabilities: A review of the literature. *Developmental Neurorehabilitation*, 13(4), 276–293. <https://doi.org/10.3109/17518421003636794>

- Roane, H. S., Fisher, W. W., & Carr, J. E. (2016). Applied behavior analysis as treatment for autism spectrum disorder. *The Journal of Pediatrics*, 175, 27–32. <https://doi.org/10.1016/j.jpeds.2016.04.023>
- Sallows, G. O., & Graupner, T. D. (2005). Intensive behavioral treatment for children with Autism: Four-year outcome and predictors. *American Journal on Mental Retardation*, 110(6), 417–438. [https://doi.org/10.1352/0895-8017\(2005\)110\[417:IBTFCW\]2.0.CO;2](https://doi.org/10.1352/0895-8017(2005)110[417:IBTFCW]2.0.CO;2)
- Sandoval-Norton, A. H., & Shkedy, G. (2019). How much compliance is too much compliance: Is long-term ABA therapy abuse? *Cogent Psychology*, 6(1), 1–8. <https://doi.org/10.1080/23311908.2019.1641258>
- Shillingsburg, M. A., Marya, V., Bartlett, B. L., & Thompson, T. M. (2019). Teaching mands for information using speech generating devices: A replication and extension. *Journal of Applied Behavior Analysis*, 52(3), 756–771. <https://doi.org/10.1002/jaba.579>
- Shimabukuro, T. T., Grosse, S. D., & Rice, C. (2008). Medical expenditures for children with an autism spectrum disorder in a privately insured population. *Journal of Autism and Developmental Disorders*, 38(3), 546–552. <https://doi.org/https://doi-org.www2.lib.ku.edu/10.1007/s10803-007-0424-y>
- Smith, D. P., Hayward, D. W., Gale, C. M., Eikeseth, S., & Klintwall, L. (2019). Treatment gains from early and intensive behavioral intervention (EIBI) are maintained 10 years later. *Behavior Modification*, 1–21. <https://doi.org/10.1177%2F0145445519882895>
- Smith, R., Groen, A. D., & Wynn, J. W. (2000). Randomized trial of intensive early intervention for children with pervasive developmental disorder. *American Journal on Mental Retardation*, 105(4), 269–285. [https://doi.org/https://psycnet.apa.org/doi/10.1352/08958017\(2000\)105%3C0269:RTOIEI%3E2.0.CO;2](https://doi.org/https://psycnet.apa.org/doi/10.1352/08958017(2000)105%3C0269:RTOIEI%3E2.0.CO;2)
- Smith, T., Eikeseth, S., Klevstrand, M., & Lovaas, O. I. (1997). Intensive behavioral treatment for preschoolers with severe mental retardation and pervasive developmental disorder. *American Journal on Mental Retardation*, 102(3), 238–249. [https://doi.org/10.1352/0895-8017\(1997\)102%3C0238:IBTFPW%3E2.0.CO;2](https://doi.org/10.1352/0895-8017(1997)102%3C0238:IBTFPW%3E2.0.CO;2)
- Son, S. H., Sigafos, J., O'Reilly, M., & Lancioni, G. E. (2006). Comparing two types of augmentative and alternative communication systems for children with autism. *Pediatric Rehabilitation*, 9(4), 389–395. <https://doi.org/10.1080/13638490500519984>
- Stauch, T., Plavnick, J., Sankar, S., & Gallagher, A. (2018). Teaching social perception skills to adolescents with autism and intellectual disabilities using video-based group instruction. *Journal of Applied Behavior Analysis*, 51(3), 647–666. <https://doi.org/10.1002/jaba.473>
- The Association for Science in Autism Treatment. (2020). <https://asatonline.org/>
- Tweed, L., Connolly, N., & Beaulieu, A. (2009). *Interventions for autism spectrum disorders: State of the evidence*. Augusta, ME: Muskie school of public service and the maine department of health and humans services. A collaboration of the Maine Department of Health and Human Services & the Maine Department of Education. Muskie School of Public Service and the Maine Department of Health and Human Services. <https://digitalcommons.usm.maine.edu/cgi/viewcontent.cgi?article=1015&context=cyf>
- United States Surgeon General (1999). *Mental health: A report of the Surgeon General*. Department of Health and Human Service. Retrieved from The Library of Congress, <https://lccn.loc.gov/2002495357>
- Van Houten, R., Axelrod, S., Bailey, J. S., Favell, J. E., Foxx, R. M., Iwata, B. A., & Lovaas, O. I. (1988). The right to effective behavioral treatment. *Journal of Applied Behavior Analysis*, 21(4), 381–384. <https://doi.org/org/0.1901/jaba.1988.21-381>
- Virúes-Ortega, J. (2010). Applied behavior analytic intervention for autism in early childhood: Meta-analysis, meta-regression and dose–Response meta-analysis of multiple outcomes. *Clinical Psychology Review*, 30(4), 387–399. <https://doi.org/10.1016/j.cpr.2009.10.004>
- Wong, C., Odom, S. L., Hume, K., Cox, A. W., Fettig, A., Kucharczyk, S., Brock, M. E., Plavnick, J. B., Fleury, V. P., & Schultz, T. R. (2014). *Evidence-based practices for children, youth, and young adults with Autism spectrum disorder*. The University of North Carolina, Frank Porter Graham Child Development Institute, Autism Evidence-Based Practice Review Group. <https://doi.org/10.1007/s10803-014-2351-z>
- Yoder, P. J., & Stone, W. L. (2006). A randomized comparison of the effect of two prelinguistic communication interventions on the acquisition of spoken communication in preschoolers with ASD. *Journal of Speech, Language, and Hearing Research*, 49(4), 698–711. [https://doi.org/10.1044/1092-4388\(2006\)051](https://doi.org/10.1044/1092-4388(2006)051)



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