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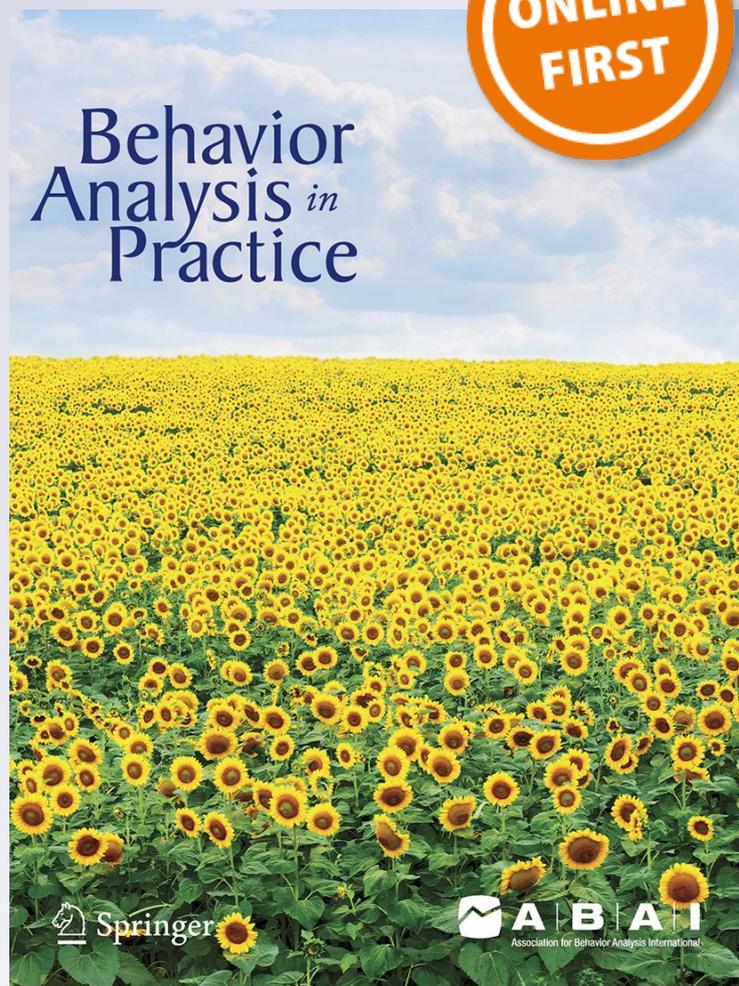
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**Behavior Analysis in Practice**

ISSN 1998-1929

Behav Analysis Practice

DOI 10.1007/s40617-019-00382-1



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# Multilingual Diversity in the Field of Applied Behavior Analysis and Autism: A Brief Review and Discussion of Future Directions

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## Abstract

This review addresses multilingual diversity within the field of Applied Behavior Analysis (ABA) as it relates to treatment for autism spectrum disorders (ASD). The United States was founded as a diverse, multicultural “melting pot” and migration patterns continue to increase cultural and linguistic diversity, making it increasingly important to address these issues within the field of ABA. The role of multilingualism in ABA treatment for autism has scarcely been addressed in practice or in research and yet these factors likely impact the ABA treatment process significantly. The purpose of this review is to discuss how multilingualism might be better addressed within the field of ABA. We briefly review the very small amount of existing research on multilingual approaches when using ABA and discuss directions for future research. In addition, we discuss potential future directions for the field, in terms of increasing the number of international students in graduate programs, enhancing diversity curricula within graduate programs and continuing education, and efforts by professional organizations to address diversity.

**Keywords** Autism · Cultural diversity · Multilingualism · Applied behavior analysis

People from culturally diverse families constitute approximately one third of the total population born in the United States (Zhang & Bennet, 2003) and in 2017, 21.8% of people over the age of 5 years living in the US (71 million) spoke a language other than English at home, which constitutes an increase of approximately 207.4% from the 1980 Census of 23.1 million (United States Census Bureau, 2017). The number of people living in the US with a child with autism and speaking a language other than English at home is also increasing (Drysedale et al., 2015).

Autism and other developmental disorders impact individuals’ cognitive, social, and linguistic development (American Psychiatric Association, 2013). The most recent data indicate that autism spectrum disorder (ASD) is the most common developmental disorder, affecting approximately one out of

every 59 children in the US (Baio et al., 2018). Substantial research has documented the effectiveness of applied behavior analytic (ABA) approaches to addressing the behavioral and educational needs of individuals with autism (National Autism Center, 2009) but relatively little attention has been played to the role of linguistic diversity in the treatment process.

Children with ASD from multicultural backgrounds are often diagnosed at a later age compared to white and English-speaking children (Morrier, Hess, & Heflin, 2008) and parents with diverse cultural backgrounds in the US often face more challenges when they have children diagnosed with autism. For instance, there is often a lack of ABA therapists who can speak their native language or understand their culture, which may hinder multicultural parents from seeking help. Some parents may experience shame that their child has a developmental disorder, particularly when the disorder is cognitive not physical (Kitzhaber, 2012). As a result, many parents choose not to seek help from professionals, which may then delay their child with ASD from receiving effective treatment.

Additionally, when raising a child with ASD, multicultural parents often experience both emotional and financial difficulties. For instance, annual health care expenses for children with ASD were higher (\$6,132) than for children in general

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(\$860), which includes total outpatient care (\$3,992 vs. \$355), physician visits (\$869 vs. \$200), and prescription medications (\$971 vs. \$77) (Liptak, Stuart, & Auinger, 2006). However, there is a lack of affordable health insurance for children born outside the US and many parents feel the costs of intervention are greater than their financial ability. Even for qualified non-citizen immigrant parents, they have to present in the US lawfully for five years after receiving their immigration status before they could be eligible for coverage through Medicaid and the Children's Health Insurance Program (CHIP) (Altman, Stephens, & Yates, 2011). Many parents also choose to quit work and take care of their child with ASD and the loss of the parent's income brings an even greater burden to the family (Sen & Yurtsever, 2007).

The field of behavior analysis addresses a wide variety of behaviors and issues when supporting individuals with ASD. Primarily, we focus on building a diverse repertoire of socially adaptive and functional behaviors through individualized interventions. Behavioral approaches address a diverse range of behaviors across a diverse range of settings. At the same time, we have tended not to take into account the more traditional meanings of diversity, for example, the interrelated dimensions of human identity such as gender, race, ethnicity, religious beliefs, language, socio-economic status, sexual orientation, and so on. There is currently a substantial need for greater attention to the issue of cultural diversity and cultural humility within the field of ABA in terms of the way that we support diverse families (Fong, Catagnus, Brodhead, Quigley, & Field, 2016; Fong, Ficklin, & Lee, 2017). In addition, the need to consider cultural and linguistic diversity in the treatment process is explicitly dictated in section 1.05 of the Professional and Ethical Compliance Code for Behavior Analysts (Behavior Analyst Certification Board, 2014).

The specific area of diversity that this review focuses on is using or evaluating factors related to multilingual diversity within the scientific literature of ABA. The intent of this brief review and discussion is to shed light on the importance of linguistic diversity in the context of providing behavioral and educational supports to families living with autism and to spur future research and practical action into how to make meaningful improvements in this area.

## Cultural Diversity

As the field of ABA continues to expand and the need to serve individuals from diverse cultural backgrounds increases, one might ponder these questions: How do we define socially appropriate behaviors? How well are we doing in terms of cultural humility when interacting with multicultural clients? Moreover, what are we, as a field, doing to promote diversity and cultivate culturally humble behavior analysts? Before addressing these questions more directly, it might be useful to

first examine what we mean by "culture." Culture has been defined as a dynamic yet stable set of goals, beliefs, and attitudes shared by a group of people (Matsumoto, 2001), which further determines an individual's behaviors, beliefs, and values. From a behavioral perspective, Skinner (1972) suggested "The social environment is what is called culture. It shapes and maintains the behavior of those who live in it" (p. 143). In other words, culture is the extent to which a group of individuals engage in behaviors that reflect shared behavioral learning histories, serve to differentiate the group from other groups, and predict how individuals within the group act under various conditions (Sugai, O'Keeffe, & Fallon, 2012).

However, the US is clearly not merely one culture, but a collection of many differing cultures, the traditions and practices of which may overlap or conflict with those around them. Like all groups in the US, families living with ASD are members of diverse cultures. It is likely that an individual's intervention plan, family supports, and quality of life are affected by variables related to different cultural backgrounds. For example, behaviors that are viewed as problematic in one culture may be appropriate in others (Sugai, O'Keeffe, & Fallon, 2012). In addition, the impact of an ASD diagnosis may be interpreted differently across cultures for a variety of reasons, not least of which is that some cultures lack words to describe some symptoms. Some cultures may have adapted the English word and the Western description of core symptoms regardless of whether they are a good cultural fit or are contextually appropriate (Dyches, Wilder, Sudweeks, Obiakor, & Algozzine, 2004).

Different social norms across cultures may also affect the experience of families living with ASD. For instance, in many Asian cultures, children are taught to avoid eye contact, minimize facial expressions, and withdraw from social conversations, which resemble some of the symptoms of ASD (Kitzhaber, 2012). As a result, Asian children may receive a diagnosis at a later age compared to Western children, because their linguistic and social deficits are noticed at a later stage in their development, thereby delaying treatment (Morrier, Hess, & Heflin, 2008).

Similarly, cultural differences in social behaviors may affect the success and appropriateness of ABA programs. Subtle social behaviors such as eye contact, wait time, non-vocal body language, personal space, and tone of voice may vary greatly across cultures. For example, in Korea, greeting a peer versus an adult often involves engaging in different topographies of behavior. While a wave of the hand is an appropriate way to greet a friend or someone younger, it is often perceived as disrespectful if a younger person greets an older individual in the same manner. Instead, children may be taught to bow as a sign of respect to greet an elder. Without understanding of this cultural difference, a behavior analyst may misconstrue the child's behavior and may even teach a culturally inappropriate social skill, or an appropriate skill but in the wrong context.

The format and structure of ABA treatment programs in the West are based on research-proven models, however some research warns against “copying and pasting” treatment approaches developed in the West with different cultures around the world (Daley, 2002). Cultural variables affect key aspects of the treatment process including whether, when, and where to seek help, the use of resources and treatment, and the relationships between families and professionals (Ravindran & Myers, 2012). Research has shown that some Chinese respondents who have a child with ASD believed that Western medicine was more effective for acute disease while Chinese medicine was more suitable to treat chronic illness such as autism (Cook, Cook, Tran, & Tu, 1997). Failure to consider these variables when constructing ABA treatment programs in cultures outside the US will likely hamper the programs’ success.

One of the primary concerns that may prevent parents from multicultural backgrounds from seeking help is the lack of providers who speak their language. However, very little research or action in the field of ABA has addressed evaluating a multilingual approach when intervening with individuals with ASD. The purpose of this review is to further understand the relationship between multilingualistic interventions and ABA and how it affects children with ASD from multicultural families whose home language is not English.

## Brief Literature Review

Multilingualism has been defined as the use of more than one language (Baker, 2011). Linguistic diversity has rapidly increased in the United States during the past 30 years and the number of people living in the US with a child with autism and speaking a language other than English at home is increasing (Mueller, Singer, & Grace, 2004). Given that ASD is characterized by difficulties with language, multilingual families likely face a variety of challenges that may be enhanced by the demands of living with two or more languages simultaneously, often within a larger society that provides little, if any, support for multilingual families (Morrier, Hess, & Heglin, 2008).

Multilingual families of children with ASD often struggle with the question of how to balance exposing their child to multiple languages at home and during ABA intervention, especially when the primary language spoken at home may be different from the primary language the intervention is delivered in (Hambly & Fombonne, 2012; Yu 2013). Due to the small amount of research conducted on bilingualism in children with ASD, professionals often struggle to give evidence-based recommendations for multilingual families. Hambly and Fombonne (2012) compared language outcomes in 4.5 year old children with ASD who were exposed to bilingual versus monolingual home environments. They found no statistically significant difference in standardized tests of receptive and expressive language between children with ASD raised in

multilingual homes versus children raised in monolingual homes. Similarly, Ohashi et al. (2012) compared language development of newly diagnosed children with ASD who were raised in monolingual to bilingual environments. When controlling for the number of ABA treatment hours children were receiving per week, no statistically significant differences were found on age of first word, age of first phrase, nor on standardized tests of receptive and expressive language. In a review of published studies, Drysdale, van der Meer, and Kagohara (2015) found that seven out of eight studies evaluating language skills in children with ASD have failed to show that raising children with ASD in a bilingual environment hampers their language development. They conclude that there is no evidence to recommend against bilingualism for children with ASD. However, it is important to note that these studies were correlational and did not evaluate the effects of multilingual exposure in the context of autism *treatment*. Rather, they compared language development across groups who self-assigned as either bilingual or monolingual family environments. Because bilingual exposure was not experimentally evaluated in the context of evidence-based behavioral intervention, it is not possible to know whether the results summarized above apply equally to young children with ASD in ABA programs. Much more research is needed that directly compares outcomes using bilingual to monolingual treatment (Thordardottir, 2010).

Relatively little research has been conducted on multicultural parents’ perspectives, preferences, and advice they have received from professionals regarding multilingualism. Kay-Raining Bird, Lamond, and Holden (2012) studied 49 multilingual parents’ opinions on whether they wanted to raise their child with ASD to be multilingual. Seventy five percent of the participants hoped to teach their child multiple languages and their most frequently reported reason was to let their child communicate with other family members and neighbors. However, their most frequently reported concern was a lack of professionals who could provide multilingual behavioral intervention or other treatments to their child. Professionals have argued that schools and agencies should provide support in a client’s home language but there remains a critical shortage of bilingual or multilingual behavior analysts in the US, which results in instruction and support often being delivered only in English (Mueller et al., 2004).

Additionally, there are problems associated with limiting the exposure of language to only English in bilingual children with ASD. For instance, many children with ASD have difficulty with social interactions and their communication with their family members are an important part of their daily life. However, limiting their exposure to English only at home may limit the natural interactions between the children and their families and parents with limited English proficiency may not have effective communication with their children (Yu, 2013). Below, we review research on variables relevant to multilingualism in the ABA treatment process.

## Discrete Trial Training (DTT)

DTT is an instructional approach commonly used with children with autism that can be individualized based on the client's specific target behavior, reinforcers, pace of instruction, and delivery of instructional cues (Lovaas, 1987). Lang et al. (2011) conducted DTT using English and Spanish with a child with ASD from a Spanish-speaking family attending an English-speaking school. With the use of an alternating treatments design, they evaluated the effects of language on the child's response accuracy and challenging behavior within sessions via programs such as motor imitation and receptive instructions. They observed more correct responses (i.e., engaged in the desired target behavior following the instruction) and fewer challenging behaviors when instruction was delivered in the child's home language (Spanish) compared to English. While this study provided an excellent first foray into multilingualism in DTT, it did not evaluate the reasons why the participant performed better in the home language condition, such as fluency with each language. More research is needed to identify the behavioral principles and family factors that account for why instruction in one language would be more effective than another. For example, a child's history with her native language may make learning in that language less effortful, which may serve as an abolishing operation for negative reinforcement in the form of escape from the learning environment. It is also possible that words in a child's native language could have a history of being paired with positive reinforcement from parents and therefore learning in that language may make the overall learning environment more positively reinforcing. Social validity in the form of parent preference should also be evaluated when behavior analysts are making language decisions when using DTT.

## Play Intervention

Very little research has evaluated the effects of the language of intervention on play behavior in children with ASD. A recent study by Lim and Charlop (2018) directly compared play instruction in which the child's heritage language was spoken by the ABA therapists to sessions in which English was spoken. Four children with ASD, ages 8-12, from bilingual families, participated. The heritage languages included Spanish for one child and Korean for the other three. Using an alternating treatments and multiple baseline across participants design, experimenters directly compared play intervention sessions in which scripted experimenter prompts and praise were provided every 30 seconds in either heritage language or English. The dependent variables were functional pretend play and interactive play. All participants showed an increase in play behavior in the heritage language condition, as well as the English condition, relative to baseline. Intervention was somewhat more effective in the heritage language condition

across all four participants. Challenging behaviors were measured for one participant and were observed to occur at substantially lower levels in the heritage language condition.

## Learner Language Preference

In addition to the question of whether first language or second language instruction is more effective is the question of which modality is preferred by the learner, which is another example of social validity (Wolf, 1978) and is explicitly called for in the *Professional and Ethical Compliance Code for Behavior Analysts* (Behavior Analyst Certification Board, 2014). A recent study by Aguilar, Chan, White, and Fragale (2017) directly measured learner preference between English and Spanish delivery of language instruction. The study included five children with ASD, ages 5-10, whose families spoke exclusively Spanish at home. The learners were allowed to choose between instruction in English or Spanish by pressing buttons of different colors. Easy tasks were defined as being answered correctly 100% of trials, whereas difficult tasks were defined as being answered correctly no more than 33% of trials on pre-experimental probes. Participants showed no preference in the easy condition, however, four of five participants preferred Spanish when instructional trials were difficult. This study demonstrates a method for empirically assessing learner preference, rather than relying on parent report alone.

## Vocal Speech Instruction

As described in the introduction, very little published research has directly compared bilingual to monolingual intervention for children with autism or language delays (Thorsdardottir, 2010). In a rare exception, Thorsdardottir, Weismer, and Smith (1997) used a multielement design to directly compare natural environment language intervention sessions conducted in English-only to those conducted in the learner's heritage language and English. The participant in the study was a four-year-old boy whose heritage language was Icelandic but who resided in the US. His language was severely delayed, as assessed in both English and Icelandic (English assessments placed his language development at the 1st percentile and Icelandic assessments approximated it at the 3rd percentile). Precise descriptions of procedural details are lacking from the article but the treatment was described as occurring in the context of naturalistic play interactions and involving a mix of modalities, likely involving a mix of echoics, tacts, listener responses, and intraverbals. Separate sets of words were assigned to either English-only or bilingual instruction and the dependent variable was the number of words acquired from each set in English. Overall, acquisition of English was comparable in the two conditions, with a slight advantage observed in the bilingual condition. It should be noted that

the participant in this study did not have a diagnosis of ASD but his language delays before intervention were severe.

### Listener Behavior Instruction

No previous research of which we are aware has directly compared bilingual to monolingual listener (i.e., receptive) language instruction in children with autism. However, a study by Perozzi and Sanchez (1992) is worth noting. The experimenters used a between-groups design to compare bilingual to monolingual listener instruction on prepositions and pronouns, in 38 first-graders with language delays from Spanish-speaking homes. The English-only group received listener instruction in English only, while the bilingual group were taught targets in Spanish first and then English after the Spanish targets were mastered. The bilingual group mastered their English targets in 32% fewer total learning trials (including both Spanish and English) than the English-only group. It is important to note that the participants in this study had language delays but were not diagnosed with autism. However, the results of this imply that it may be more efficient to teach language targets in a learner's heritage language first.

### Functional Communication Training

FCT is among the most commonly used and empirically-supported reinforcement-based interventions for problem behaviors in ABA programs (Tiger et al., 2008). FCT consists of teaching an individual a replacement communication behavior (e.g., vocal mands) and placing the challenging behavior on extinction (Carr & Durand, 1985). Very little previous research has evaluated variables related to linguistic diversity within FCT. Dalmau et al. (2011) evaluated the influence of Spanish and English language on the effectiveness of FCT for young children with developmental disorders. The two participants in their study were exposed to both Spanish and English at home. Data were collected for four categories of child behavior: destructive behavior, language choice, independent target manding, and independent task completion (Dalmau et al., 2011). The effectiveness of FCT was evaluated within a reversal design across baseline, FCT, and extinction conditions. Additionally, the researchers studied whether participants showed a preference for the use of language during FCT by allowing participants to choose the language their mothers spoke during the reinforcement period. The findings suggested that FCT was effective in reducing destructive behavior and increasing independent manding and task completion. However, the participants displayed no preference for the use of language during FCT. One potential limitation of this study is that participants may not have been able to discriminate the difference between the two languages from the visual cues displayed during FCT, and therefore, their responding may not have accurately reflected their actual preference. Much

further research is needed on linguistic diversity in the context of FCT, both from the standpoint of treatment effectiveness, as well as parent preference and cultural contextual fit.

### Functional Analysis

Experimental functional analyses are used to evaluate functional relations between problem behavior and environmental influences, for the purposes of identifying operant function (Cooper, Heron, & Heward, 2007). One study to date evaluated the effects of language on functional analysis outcomes (Rispoli et al., 2011). One participant's challenging behavior (from a Spanish-speaking home) was assessed under four conditions and two phases (English vs. Spanish). The results showed that the participant engaged in higher levels of challenging behavior during the English conditions, which indicated that the language used in functional analyses may have an impact on behavioral function. However, the reason why the participant's challenging behaviors occurred more frequently during English conditions was not clear. The authors suggested that a more thorough analysis of whether deficits in receptive language are accountable for these results should be conducted. Additionally, because this study only involved one participant with an intellectual disability, future research could replicate these procedures across additional participants of different ages and diagnoses, including ASD, to determine more clearly whether using heritage language can affect the frequency of problem behavior under different conditions.

### Future Research

Overall, the studies briefly reviewed above provide some initial examples of how multilingualism might be studied in the context of ABA treatment for autism. The results thus far are mixed and much more research is needed. One particularly pressing question remains: should ABA therapy be conducted in only one language or two, particularly in the early stages of intervention, for children from multilingual families? In the absence of research, behavior analysts sometimes recommend restricting language use to only the one that is the primary language spoken by the ABA professionals (which is usually English), based on the concern that including two languages might slow the rate of learning relative to the outcome that might be produced by using only one language, although findings from Perozzi and Sanches (1992) indicate that the opposite may be true (heritage language first then English). Also in the absence of research that definitively addresses this question, many families request that two languages be included from the start, in hopes that the child will reap the benefits of greater connection to the community and greater ability to communicate with family members that may speak only their native language. Much more controlled research is needed on this question, so that recommendations can be made based on data.

In terms of specific directions for future research, several simple modifications could be made to existing verbal behavior interventions that require very little additional time. For example, future research might evaluate bilingual “instructive feedback” (Werts, Wolery, Holcombe, & Frederick, 1993) in which a word in the heritage language is embedded into praise. For example, if a child mands or tacts “milk,” the instructor might reply by saying, “Yes! Leche!” and delivering the appropriate respective reinforcer. It seems unlikely that this procedure would result in outright mastery of the word in the heritage language but it may have a priming effect and, given that it requires no additional time or effort, it may be worth evaluating. A second possible direction for future research that would require very little extra time or effort would be to incorporate bilingual “transfer” trials (Barbera, 2007), wherein a second language listener trial is followed immediately by a heritage language speaker trial and vice versa. For example, the instructor might present a listener trial for “dog” (e.g., “touch dog”) and immediately after the learner touches the dog, the instructor might say “That’s right, what is it?” and immediately prompt “perro.”

A third option, which would require slightly more time and effort, would be to insert heritage language trials into multiple exemplar instruction, as described by Greer and colleagues (Greer, Stolfi, Chavez-Brown, & Rivera-Valdes, 2005). In this procedure, trials of listener, tact, and matching operants are interspersed within the same block of trials. For example, on trial 1, one might target the listener response “white,” trial 2 the tact “black,” trial 3 the tact “blanco,” trial 4 the listener response “negro,” and so on, so that the learner is being taught both listener responses and tacts in both a first and second language, all interspersed in the same block of trials. A substantial amount of research has shown that procedures such as these are highly effective with children with autism (Fiorile & Greer, 2007; Greer, Stolfi, Chavez-Brown, & Rivera-Valdes, 2005).

In summary, because so very little research on bilingual ABA exists, the potential for research is vast. Such research has the potential to enhance both the social validity and effectiveness of ABA treatment for individuals with ASD coming from multilingual families. It is possible that research will reveal that learning is actually hindered when ABA is delivered bilingually, but such findings would be immensely valuable, too, because they would provide an empirical basis upon which to recommend monolingual ABA, where one currently does not exist.

## Future Directions

In order for the field of ABA to better address the needs of multicultural and multilingual families living with ASD, we will briefly discuss four potential future directions that may help to address the lack of progress in this area: (1) Increasing

recruitment efforts within ABA agencies, (2) increasing the number of international students in graduate programs in ABA in the United States, (3) enhancing diversity curricula in graduate programs, and (4) working with professional organizations to improve our resources and support in this area.

### Increase Recruitment Efforts within ABA Agencies

In order to increase the availability of multilingual ABA clinicians, ABA agencies should proactively reach out to potential therapists who are multilingual at recruiting events. Therapists and BCBAAs who are multicultural and/or multilingual are likely to be valuable for families from various backgrounds that are receiving ABA services in the US. For example, an immigrant family whose native language is not English may feel more comfortable working with therapists and/or BCBAAs who share similar cultural background or language as them. Furthermore, ABA agencies could look into providing financial support or other forms of mentorship for therapists who are willing to learn a second language.

### Increase Enrollment of International Students in US Graduate Programs

In 2016, there were a total of 362,228 international students in graduate programs in the US (Institute of International Education, 2016). However, there is a shortage of multilingual professionals in the field of ABA, which often results in instruction and support delivered only in English. One of the most efficient ways to have more multicultural behavior analysts to work in the field of ABA is to increase the number of international students in ABA graduate programs which in turn increases the diversity of clinicians.

Currently, graduate programs in ABA that are based in the US accept international students and encourage them to disseminate training in behavior analysis around the world. However, more could be done to actively recruit students from other countries that currently have few or no BCBAAs working in the country. Supports that could help in this regard include helping students arrange off-campus work permits, which allows them to receive professional training in real-life ABA agencies while attending graduate school at the same time. Practicum sites need to be hand-picked and carefully evaluated (e.g., the presence of appropriate supervision opportunities) for inclusion in the program. In addition, effort should be made to keep international students in the US after they graduate, thereby enhancing diversity in the ranks of clinicians and professors here.

Additional English language supports should be provided so that international students can be successful in graduate school. ABA is a science, not a language art. Proficiency in written English, while helpful in graduate school in the US may not actually be a critical part of graduate training in

behavior analysis, even if that training occurs in the US. For example, if a student from China comes to the US for graduate school and then returns to China to establish an ABA program there, proficiency in written English may be of little or no importance to that very important activity of global dissemination. Therefore, every effort should be made by US graduate programs to help international ABA graduate students be successful, so long as they demonstrate mastery of behavioral competencies, and not be overly hindered by skills that may be of importance only when inside the US. Of course, if a student in an English-speaking graduate program is not proficient in English, it may be difficult for professors to assess the student's mastery of the conceptual material in a nuanced way. We are not suggesting that English proficiency is irrelevant to behavior analytic graduate training in the US, but simply that every effort should be made to prevent lack in English proficiency, *per se*, from preventing the dissemination of behavior analysis through the education of international students.

Increasing the enrollment of international students into graduate ABA programs in the US not only benefits international students but also students born in the States. Students from diverse cultural backgrounds can enhance the richness and variety of contextual factors present within a classroom by cultivating a more varied and rewarding learning environment. Therefore, we anticipate that including more culturally diverse students will enrich the learning experience of all students.

### **Enhance Diversity Curricula in Graduate Programs and BCBA Training**

Graduate programs should incorporate readings related to the importance of ethnic diversity and cultural awareness into their curricula. Fong et al. (2016) provided useful guidelines for behavior analysts to practice cultural awareness and readers are encouraged to refer to their article. Salend and Taylor (2002) recommend behavior analysts involve family, community members, and professionals to familiarize themselves with the client's culture and examine possible sociocultural explanations of behavior. They also suggest continued training and engagement in activities that allow time for reflection on how one's own culture might impact their belief system (Salend & Taylor, 2002). When working in a cross-cultural context, Tanaka-Matsumi, Seiden, and Lam (1996) provide a procedure for conducting a culturally-informed functional assessment. The authors emphasize respect for the client's culture and considering sociocultural factors that might be relevant to the behavior of concern. They suggest that doing so may enhance the accuracy of the assessment, as well as enhancing the credibility of the therapy process and potentially decrease attrition due to clients leaving therapy. Their article primarily describes culturally-informed functional assessments in the context of cognitive behavioral therapy

but the basic framework is likely relevant to the practice of behavior analysis. Incorporating articles such as those described above into core ABA curricula may serve as an initial step in expanding diversity in curricula but much more is needed.

Students from diverse backgrounds should be encouraged to engage in discussions with their mentors and colleagues about the limitations and cultural considerations of ABA interventions. This may be helpful for students to learn about themselves and also encourage cross-cultural interactions with one another. Rather than merely hoping that such discussions occur, professors should consider explicitly setting the occasion for them when developing their classes.

Bolling (2002) states ABA service delivery should be treated as a two-way street between the behavior analyst and their stakeholders. It should include cultural contingencies and values that contribute to an effective relationship and intervention. As we increase cultural awareness, expectations for clients to conform to the behavior analyst's cultural and scientific perspective may decrease (Fong et al., 2016). Therefore, enhancing diversity curricula during BCBA training and supervision as well for professionals and providers in general can be helpful.

There is a required diversity and ethics training to practice psychology at all professional levels: in graduate schools, during internship and fellowship, and as professionals. Currently, cultural diversity training is not a requirement for preparation for the BCBA exam, although the importance of considering diversity is stressed within the ethics guidelines, as cited in the introduction. However, as the population continues to grow and diversify, the likelihood of behavior analysts being exposed to multicultural families as well as serving them effectively will likely be impacted by the cultural responsiveness of those practitioners. Similar to how the BACB requires specific CEU's in ethics and supervision, the board should also encourage the field to attend ongoing training in cultural responsiveness as well. For instance, selection of language during functional analyses could influence the occurrence of problem behaviors; therefore, BCBA's should be required to read literature that informs the importance of cultural and linguistic responsiveness when determining the function of problem behaviors.

Fong et al. (2016) recommend mindfulness training to enhance diversity training. Mindfulness training consists of training to notice and tact one's own attending behavior and bringing one's own attending behavior under the stimulus control of present moment stimuli, both public and private (Fletcher & Hayes, 2005). Practicing mindfulness during discussions surrounding diversity may allow trainees to pay attention to and tact their private events, some of which may be uncomfortable and unknowingly culturally biased. For example, when discussing diversity, a trainee might notice oneself have a thought (*i.e.*, private intraverbal) that people of one

particular ethnic background work harder than those from another background. Recognizing one's own biases may allow the opportunity to also attend to one's values, such as the private verbal stimulus, "I care about equality." Careful attending to one's own verbal behavior, both private and public, likely constitutes what Skinner described as speaker-as-own-listener responding and may allow the opportunity for self-editing, and therefore acting more in correspondence with one's values (Skinner, 1957). This in turn can help build a more positive relationship with others that are different from us. Training dedicated to teaching mindfulness of any biases, consisting of private events such as thoughts, feelings, and reactions to multicultural situations, may therefore help establish the foundations for behavioral repertoires of engaging issues of cultural diversity from a place of openness and curiosity, rather than one of judgment.

### Efforts by Professional Organizations

Substantial efforts have been made by the Behavior Analyst Certification Board in international dissemination, not least of which by developing versions of the certification exam in other languages. The professional associations that protect the science and practice of ABA, including the Association for Behavior Analysis, International, and the Association of Professional Behavior Analysts, likely also have a larger part to play in addressing multilingual diversity in the field. Many efforts at supporting multilingual ABA could be assisted by professional associations, for example, online resources such as training and books should be translated into many more languages. Market forces likely influence such developments but financial support for translation from professional associations might be a useful way to spur development where financial incentives may be insufficient or inapparent. In addition, online videos for training parents and teachers in the principles and procedures of ABA are critically needed in multiple languages. Professionals in the field of ABA could also do well to partner with professionals from medicine and psychology to disseminate the use of existing ASD diagnostic measures and translate them into other languages and culturally adapted versions, to increase access to ASD diagnoses in communities who speak languages other than English. Of course, diagnostic instruments cannot be merely translated without psychometric research validating the translated version, so such work will likely progress very slowly. As technology continues to develop, it seems potentially plausible to create an electronic platform that could connect multilingual students and BCBA's to engage in discussion and mentorship.

Grants and awards that foster efforts relevant to diversity and multilingualism in ABA could be developed and supported by professional organizations. For example, the Society for the Advancement of Behavior Analysis offers a small award for International Dissemination of Behavior Analysis. In

addition, the Association for Contextual Behavioral Science created the Developing Nations Scholarship to support training and professional development for behavior scientists from developing nations. An encouraging recent development was the 2019 creation of the Society for the Experimental Analysis of Behavior Graduate Student Diversity Scholarship, a small grant founded to provide financial support to a graduate student coming from an underrepresented group, for example, underrepresented racial or ethnic group, people with disabilities, or people from an LGBTQ+ background. While these awards are excellent beginnings, much more could presumably be done by behavior analysts to help foster ABA in multilingual contexts.

### Conclusion

In conclusion, American culture is undergoing a time of substantial evolution with regard to the issues of diversity and multiculturalism and the small section of American culture that is comprised of the ASD and ABA communities are no exception. Now, more than ever, is the time for greater attention to the issue of multilingual diversity within ABA treatment for ASD. Greater attention, research, resources, and development efforts directed to this issue will not only help bring great equity and justice to multicultural families, but also build a richer, more varied, and vibrant future for the great science of ABA that we know and love.

### Compliance with Ethical Standards

**Conflict of Interest Statement** The authors declare they have no conflict of interest.

**Informed Consent Statement** This paper did not involve research with human subjects.

### References

- Altman, S., Stephens, G., & Yates, A. (2011). The Invisible Uninsured: Non-Citizens and Access to Health Care Coverage Under the Affordable Care Act. *Pub. Int. L. Rep.*, 17, 230.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington, VA: American Psychiatric Publishing.
- Baio, J., Wiggins, L., Christensen, D. L., et al. (2018). Prevalence of Autism Spectrum Disorder Among Children Aged 8 Years — Autism and Developmental Disabilities Monitoring Network, 11 Sites, United States, 2014. *MMWR Surveill Summ*, 67(SS-6), 1–23. <https://doi.org/10.15585/mmwr.ss6706a1>.
- Baker, C. (2011). *Foundations of Bilingual Education and Bilingualism* (5th ed.). Bristol: Multilingual Matters.
- Barbera, M. L. (2007). *The verbal behavior approach: How to teach children with autism and related disorders*. Jessica Kingsley Publishers.

- Behavior Analyst Certification Board. (2014). *Professional and ethical compliance code for behavior analysts*. Littleton, CO: Author.
- Bolling, M. Y. (2002). Research and representation: a conundrum for behavior analysts. *Behavior and Social Issues, 12*, 19–28.
- Carr, E. G., & Durand, V. M. (1985). Reducing behavior problems through functional communication training. *Journal of Applied Behavior Analysis, 18*(2), 111–126.
- Cook, P., Cook, M., Tran, L., & Tu, W. (1997). Children enabling change: A multicultural, participatory, community-based rehabilitation research project involving Chinese children with disabilities and their families. In *Child and Youth Care Forum* (Vol. 26, No. 3, pp. 205–219). Kluwer Academic Publishers–Human Sciences Press.
- Cooper, J. O., Heron, T. E., & Heward, W. L. (2007). *Applied behavior analysis*. Upper Saddle River, NJ: Prentice Hall.
- Daley, T. C. (2002). The need for cross-cultural research on the pervasive developmental disorders. *Transcultural Psychiatry, 39*(4), 531–550.
- Dalmay, Y. C. P., Wacker, D. P., Harding, J. W., Berg, W. K., Schieltz, K. M., Lee, J. F., et al. (2011). A preliminary evaluation of functional communication training effectiveness and language preference when Spanish and English are manipulated. *Journal of Behavioral Education, 20*(4), 233–251.
- Drysdale, H., van der Meer, L., & Kagohara, D. (2015). Children with autism spectrum disorder from bilingual families: A systematic review. *Review Journal of Autism and Developmental Disorders, 2*(1), 26–38.
- Dyches, T. T., Wilder, L. K., Sudweeks, R. R., Obiakor, F. E., & Algozzine, B. (2004). Multicultural issues in autism. *Journal of Autism and Developmental Disorders, 34*(2), 211–222.
- Fiorile, C. A., & Greer, R. D. (2007). The induction of naming in children with no prior tact responses as a function of multiple exemplar histories of instruction. *The Analysis of Verbal Behavior, 23*(1), 71–87.
- Fletcher, L., & Hayes, S. C. (2005). Relational frame theory, acceptance and commitment therapy, and a functional analytic definition of mindfulness. *Journal of Rational-Emotive and Cognitive-Behavior Therapy, 23*(4), 315–336.
- Fong, E. H., Catagnus, R. M., Brodhead, M. T., Quigley, S., & Field, S. (2016). Developing the cultural awareness skills of behavior analysts. *Behavior Analysis in Practice, 9*(1), 84–94.
- Fong, E. H., Ficklin, S., & Lee, H. Y. (2017). Increasing cultural understanding and diversity in applied behavior analysis. *Behavior Analysis: Research and Practice, 17*(2), 103.
- Greer, R. D., Stolfi, L., Chavez-Brown, M., & Rivera-Valdes, C. (2005). The emergence of the listener to speaker component of naming in children as a function of multiple exemplar instruction. *The Analysis of Verbal Behavior, 21*(1), 123–134.
- Hambly, C., & Fombonne, E. (2012). The impact of bilingual environments on language development in children with autism spectrum disorders. *Journal of Autism and Developmental Disorders, 42*(7), 1342–1352.
- Institute of International Education. (2016). "International Students by Academic Level, 2014/15 - 2015/16." *Open Doors Report on International Educational Exchange*. Retrieved from <http://www.iie.org/opendoors>.
- Kay-Raining Bird, E., Lamond, E., & Holden, J. (2012). Survey of bilingualism in autism spectrum disorders. *International Journal of Language & Communication Disorders, 47*(1), 52–64.
- Kitzhaber, S. (2012). Interventions for Multicultural Children with Autism. Retrieved from Sophia, the St. Catherine University repository website: [https://sophia.stkate.edu/msw\\_papers/118](https://sophia.stkate.edu/msw_papers/118).
- Lang, R., Rispoli, M., Sigafoos, J., Lancioni, G., Andrews, A., & Ortega, L. (2011). Effects of language of instruction on response accuracy and challenging behavior in a child with autism. *Journal of Behavioral Education, 20*(4), 252–259.
- Lim, N., & Charlop, M. H. (2018). Effects of English versus heritage language on play in bilingually exposed children with autism spectrum disorder. *Behavioral Interventions, 33*(4), 339–351.
- Liptak, G. S., Stuart, T., & Auinger, P. (2006). Health care utilization and expenditures for children with autism: data from US national samples. *Journal of autism and developmental disorders, 36*(7), 871–879.
- Lovaas, I. O. (1987). Behavioral treatment and normal educational and intellectual functioning in young autistic children. *Journal of Consulting and Clinical Psychology, 55*, 3–9.
- Matsumoto, D. (2001). *The handbook of culture and psychology*. London: Oxford University Press.
- Morrier, M. J., Hess, K. L., & Heflin, L. J. (2008). Ethnic Disproportionality in Students with Autism Spectrum Disorders. *Multicultural education, 16*(1), 31–38.
- Mueller, T. G., Singer, G. H., & Grace, E. J. (2004). The individuals with disabilities education act and California's proposition 227: Implications for English language learners with special needs. *Bilingual Research Journal, 28*(2), 231–251.
- National Autism Center. (2009). *National Standards Report - Addressing the need for evidence-based practice guidelines for Autism Spectrum Disorders*. Massachusetts: National Autism Center.
- Ohashi, J. K., Mirenda, P., Marinova-Todd, S., Hambly, C., Fombonne, E., Sztamari, P., et al. (2012). Comparing early language development in monolingual-and bilingual-exposed young children with autism spectrum disorders. *Research in Autism Spectrum Disorders, 6*(2), 890–897.
- Perozzi, J. A., & Sanchez, M. L. C. (1992). The effect of instruction in L1 on receptive acquisition of L2 for bilingual children with language delay. *Language, Speech, and Hearing Services in Schools, 23*(4), 348–352.
- Ravindran, N., & Myers, B. J. (2012). Cultural influences on perceptions of health, illness, and disability: A review and focus on autism. *Journal of Child and Family Studies, 21*(2), 311–319.
- Rispoli, M., O'Reilly, M., Lang, R., Sigafoos, J., Mulloy, A., Aguilar, J., & Singer, G. (2011). Effects of language of implementation on functional analysis outcomes. *Journal of Behavioral Education, 20*(4), 224–232.
- Salend, S. J., & Taylor, L. S. (2002). Cultural perspectives: Missing pieces in the functional assessment process. *Intervention in School and Clinic, 38*(2), 104–112.
- Sen, E., & Yurtsever, S. (2007). Difficulties experienced by families with disabled children. *Journal for Specialists in Pediatric Nursing, 12*(4), 238–252.
- Skinner, B. F. (1957). *Verbal behavior*. CT: Appleton-Century-Crofts.
- Skinner, B. F. (1972). *Beyond freedom and dignity*. New York: Bantam Books.
- Sugai, G., O'Keeffe, B. V., & Fallon, L. M. (2012). A contextual consideration of culture and school-wide positive behavior support. *Journal of Positive Behavior Interventions, 14*(4), 197–208.
- Tanaka-Matsumi, J., Seiden, D. Y., & Lam, K. N. (1996). The Culturally Informed Functional Assessment (CIFA) Interview: A strategy for cross-cultural behavioral practice. *Cognitive and Behavioral Practice, 3*(2), 215–233.
- Thordardottir, E. (2010). Towards evidence-based practice in language intervention for bilingual children. *Journal of Communication Disorders, 43*, 523–537.
- Thordardottir, E. T., Weismer, S. E., & Smith, M. E. (1997). Vocabulary learning in bilingual and monolingual clinical intervention. *Child Language Teaching and Therapy, 13*(3), 215–227.
- Tiger, J. H., Hanley, G. P., & Bruzek, J. (2008). Functional communication training: A review and practical guide. *Behavior Analysis in Practice, 1*(1), 16–23.
- US Census Bureau (2017). American community survey 1 year estimates: R1601. Percent of people 5 years and over who speak a

- language other than English at home. Retrieved January 6, 2019 from <http://factfinder.census.gov>.
- Werts, M. G., Wolery, M., Holcombe, A., & Frederick, C. (1993). Effects of instructive feedback related and unrelated to the target behaviors. *Exceptionality, 4*(2), 81-95.
- Wolf, M. M. (1978). Social validity: The case for subjective measurement or How applied behavior analysis is finding its heart. *Journal of applied behavior analysis, 11*(2), 203-214.
- Yu, B. (2013). Issues in bilingualism and heritage language maintenance: Perspectives of minority-language mothers of children with autism spectrum disorders. *American Journal of Speech-Language Pathology, 22*, 10-24.
- Zhang, C., & Bennett, T. (2003). Facilitating the meaningful participation of culturally and linguistically diverse families in the IFSP and IEP process. *Focus on Autism and Other Developmental Disabilities, 18*(51), 51-59.

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