

# CULTURAL CONSIDERATIONS IN CAREGIVER NDBIS


## **Cultural Considerations in Caregiver Implemented Naturalistic Developmental Behavioral Interventions: A Scoping Review**


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### **Abstract**

Globally there is an increasing focus on interventions that are culturally relevant for children and families from diverse cultural, racial, and ethnic groups. We conducted a scoping review to evaluate what populations have been included in the caregiver research related to established naturalistic developmental behavioral interventions for children with autism spectrum disorder (ASD). We also evaluated the extent to which these interventions have developed or adapted to be culturally relevant for use with caregivers of children with ASD using the Cultural Adaptation Checklist. 70 studies met the inclusion criteria. Our review noted a paucity of research with diverse populations, and lack of description related to cultural adaptations of these interventions. Descriptions related to cultural adaptations tended to focus the least on persons, goals, and methods. Clinicians and researchers are

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encouraged to engage in cultural adaptations of interventions in consultations with communities in order to enhance interventions for culturally diverse groups.

*Keywords:* Autism Spectrum Disorders, cultural adaptations, cultural adaptation checklist, naturalistic developmental behavioral interventions

## **Cultural Considerations in Caregiver Implemented Naturalistic Developmental Behavioral Interventions: A Scoping Review**

Within the United States autism spectrum disorder<sup>1</sup> (ASD) is estimated to impact 1 in every 44 children (Maenner et al. 2021). While worldwide estimates are lower (i.e., 1 in every 100 children; Zeidan et al. 2022), ASD impacts children worldwide. Children require the support from family members and practitioners to make developmental gains, but children with ASD require evidence-based interventions to support development. Despite the long history of diversity in the United States (Colby & Ortman 2014), South Africa (Dada et al. 2017; Donohue & Bornman 2014), and other countries (Zhang 2019), many existing evidence-based interventions have not been tested and implemented with diverse populations (Wong et al. 2015) with most originally developed for English-speaking families from non-diverse backgrounds (Davenport et al. 2018). As such, barriers are often encountered when implementing these interventions with diverse populations nationally and internationally (Kumpfer et al. 2017). There is an increasing need for interventions that are culturally relevant and subsequent adaptations to existing evidence-based interventions to ensure they are appropriate for children from a wide range of cultural, racial, and ethnic groups and their families.

### **Cultural Adaptation**

Cultural adaptation, defined as systematic modification of evidence-based interventions, is the means by which we can ensure that interventions are accessible, relevant, and effective to the children and families we support while compatible with their cultural values (Bernal et al. 2009; Smith et al. 2011). This is critical when interventions are implemented with families who may differ from the cultural group for whom the intervention was originally developed (Albin et al. 2022). Cultural adaptation should consider the language of the intervention, the content of the intervention, the methods used within the intervention and research, the goals of the intervention, context of the intervention (Bernal et al. 1995), and the cultural beliefs, opinions and knowledge of the persons to whom the intervention will be implemented. For example, if an evidence-based caregiver-mediated intervention is being delivered to Latinx fathers for whom Spanish is their primary language, it is important to provide the intervention in Spanish – while avoiding unnecessary jargon. It is also important for the intervention to be appropriate for the needs

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<sup>1</sup> Although we understand the preference for identity first language among autistic self-advocates, we use person first language throughout this article to reflect the preference of caregivers and the reality that young children have? may not yet developed an autistic identity.

of fathers within Latinx cultures, consider the context in which fathers may engage with their child in the intervention and adjust the content, methods used within the intervention, and goals of the intervention accordingly. Ideally cultural adaptation occurs during intervention planning *and* intervention implementation, is iterative in nature, and involves a variety of stakeholders (Cabassa & Baumann 2013; Lee et al. 2023).

### **Cultural Adaptation Tools**

The need for cultural adaptation of evidence-based interventions has led to the creation of cultural adaptation tools. One such tool is the Cultural Adaptation Checklist (CAC; Lee et al. 2023) which was developed to ensure appropriate cultural adaptation of evidence-based interventions in ASD research (see content of the tool in Figure 1). The CAC was developed by using a foundational framework and reviewing literature to identify indicators and was verified by experts in the field. The CAC comprises two main categories: adaptation of the intervention and implementation of the intervention. These categories are applied across seven dimensions: language, persons, content, goals, methods, context, and process. The authors of the CAC point out the need for partnership between academics/researchers and community members to ensure that adaptations are appropriate. The nature of equal partnerships between community and academics/researchers is pivotal to ensure that adaptations are acceptable to the community. The CAC can be used to appraise the quality of cultural adaptations clinically and within the literature, as is done in this scoping review.

### **Naturalistic Developmental Behavioral Interventions**

Naturalistic Developmental Behavioral Interventions (NDBIs) are one category of evidence-based interventions often utilized with children with ASD and their caregivers (Schreibman et al. 2015). Although a form of caregiver mediated intervention, NDBIs merge developmental and behavioral perspectives and are carried out with partners in naturalistic settings (Schreibman et al. 2015), including caregivers in home settings. Although not an exhaustive list, Schreibman and colleagues (2015) identified nine NDBIs in their seminal article: Early Start Denver Model (ESDM; Dawson et al. 2010), Enhanced Milieu Teaching (EMT; Kaiser & Hester 1994), Incidental Teaching (IT; Hart & Risley 1975), Joint Attention Symbolic Play Engagement and Regulation (JASPER; Kasari et al. 2006), Pivotal Response Training (PRT; Koegel & Koegel 2006), Project ImPACT (Improving Parents As Communication Teachers; Ingersoll & Wainer 2013), Reciprocal Imitation Training (RIT; Ingersoll, 2010), Social Communication/Emotional Regulation/Transactional Support (SCERTS; Prizant et al. 2003), and Early Achievements (Landa et al. 2011).

### **Existing Reviews Related to NDBIs**

Numerous reviews have been conducted related to caregiver mediated intervention (see Dubay, 2022) and caregiver implemented NDBIs. Most caregiver-mediated NDBI reviews have focused on their efficacy (see Baril & Humphreys 2017; Bozkus-Genc & Yucesoy-Ozkan 2016; Pacia et al., 2022; Waddington et al. 2021a; Wang et al. 2022). Others have focused on dosage (Ma et al. 2021), intervention modes (Boisvert & Hall 2014), and training procedures (Lang et al. 2009). Apart from Dubay's review (2022) and a few NDBI focused reviews (see Lang et al. 2009; Lim et al. 2019; Trembath et al. 2019), reports on cultural adaptations are rare. While there have been no previous systematic or scoping reviews on the cultural adaptation of caregiver-implemented interventions specific to NDBI's, the scoping review of cultural adaptation to parent-implemented communication interventions conducted by Albin et al. (2022), included only one NDBI that focused on children with ASD (ESDM; Zhou et al. 2018). Using the Ecological Validity Framework, this study only noted adaptations to content and context.

### **Present Study**

Despite their classification as evidence-based practices (Shreibman et al. 2015), and extensive literature related to many of these NDBIs, the level to which these nine NDBIs (i.e., ESDM, EMT, IT, JASPER, Project ImPACT, RIT, SCERTS, Early Achievements) are appropriate for children and their families from culturally, racially, and ethnically diverse groups has not been explored. However, use of cultural adaptation is likely to support caregiver involvement, engagement, and buy-in (Larson et al., 2020). To fill this gap, we conducted a scoping review of the published peer-reviewed literature for these interventions and evaluated the level to which each has been developed or adapted to be culturally relevant to diverse groups. We posed the following research questions: (a) To what extent have the nine identified NDBIs for children with ASD and their families been implemented with participants from culturally and linguistically diverse groups (e.g., country, ethnicity/racial group, socioeconomic status, language, etc.); (b) In studies that have included diverse populations, to what extent have the nine identified NDBIs been culturally adapted?; and (c) What adaptation strategies (as outlined in the CAC) have been utilized in NDBIs for individuals with ASD and their families?

### **Method**

We conducted a scoping review (Arskey & O'Malley 2005) to address the aforementioned research questions. Our research team consisted of five individuals with doctoral level training/degrees in the areas of special education, child development, and speech language pathology, with training and expertise in autism and behavioral

sciences. Our team had vast experience developing and carrying out NDBIs in a variety of low and high resource countries, across culturally and linguistically diverse groups, and conducting reviews of interventions (including scoping reviews). The protocol was registered with the Open Science Framework and can be found at [blinded for review]. We followed procedures similar to those identified in Davenport et al. (2018) including database, journal, and ancestral searches. Interviews were also conducted with authors of the identified NDBIs to ensure non-published information about cultural adaptations were adequately captured.

### **Search, Screening, and Interview Procedures**

We began by searching five databases: ProQuest (all), EBSCOHost, Web of Science, Scopus, and Africa-wide Information. Then we conducted ancestral searches of all relevant studies and literature reviews that were found in initial searches and conducted journal searches of journals where three or more relevant articles were found in initial searches. This included the following journals: *Autism*, *Autism Research*, *Journal of Autism and Developmental Disorders*, and *Journal of Positive Behavior Interventions*. Search terms comprised the following: *autism spectrum disorder* or *autism* or *autistic* or *ASD AND Early Achievements* or *Early Start Denver Model* or *Enhanced Milieu Teaching* or *Incidental Teaching* or *JASPER* or *Pivotal Response Training* or *Project ImPACT* or *Reciprocal Imitation Training* or *SCERTS*. Given the broad range of terms that can be used for caregivers we did not include search terms related to caregivers, instead we identified relevant articles during screening. [Original searches took place in December 2021 and were then repeated in August 2023 to capture new publications between 2022 and August 2023.](#) Figure 2 illustrates the search process.

Articles were independently screened, using an excel sheet, to ensure they met inclusion criteria. Articles were included if they (a) had caregivers of individuals with ASD as participants; (b) occurred in a home or community setting; (c) were published in a peer-reviewed journal; (d) published in English; and (e) published through August 2023. We included articles regardless of research design, but did not include literature reviews, or dissertations. For relevant literature reviews that were found in searches we conducted an ancestral search to capture any relevant articles that may not have been included in our other searches. For any relevant dissertations found within the original searches we searched for a published article. Screening was carried out independently by two research team members. Any disagreements were discussed until consensus was reached. Screening reliability between research members was calculated by taking the number of agreements divided by the total number of

articles and multiplying by 100 to determine a percentage agreement. Abstract screening agreement was 93% (range = 87%-100%), full text was 85% (range = 84%-92%).

After searches were complete we identified the most commonly listed authors within studies for each NDBI and reached out to them via email to ensure our included studies did not miss any relevant literature and provide additional context related to cultural adaptations that may not be included within the published literature. Within the email correspondence, we shared our included article list for the NDBI, asked the author if they had any additional article recommendations, and requested an interview to gain additional information about cultural or language adaptations. In total six authors were interviewed for five of the interventions. Some authors indicated that they had no knowledge of cultural or language adaptations for the intervention and therefore declined an interview. In other cases authors referred us to other individuals to whom we reached out to conduct an interview. The following broad questions were asked during interviews: *To your knowledge has the intervention had any language adaptations beyond being provided in English?*; *To your knowledge has the intervention had any cultural adaptations?*; and *Is there anything we didn't cover that you think might be relevant?* Follow up questions were asked as needed (e.g., *What did the translation process look like?*; *Please describe the process adapting the intervention for families with cultural and linguistic diversity?*; *Did you make any adjustments to intervention delivery based on cultural context - can you describe?*). Interviews were recorded, transcribed, and notes were taken during each interview. Interviews took an average of 30 min (range = 20-40).

### **Data Extraction and Coding**

Data extraction and coding included three steps. First, we identified and recorded descriptive data (i.e., NDBI, country where study took place, intervention setting, language in home, family income, caregiver age, gender, race/ethnicity, employment, education, child age, gender, race/ethnicity) from each included study. Training, instructions, and examples for each category of extraction were provided to the research team to ensure uniformity in extraction and reporting. Data were recorded in a spreadsheet by one member of the research team and were checked for accuracy by a second team member. If data were not reported within the study, not reported was listed. Disagreements were discussed until consensus was reached.

Next data were coded to capture any relevant details within included articles or interviews related to the CAC. This included the *process, language, persons, content, goals, methods, and context* (see Supplemental file Table 2 for details about each dimension) that occurred during adaptation planning and implementation. Examples

of each of these types of adaptation were gathered inductively within studies and recorded within a spreadsheet for each NDBI so we could observe overarching findings for each NDBI. We also inductively extracted and recorded examples of each adaptation from author interviews within the spreadsheet. Information was extracted and recorded by one member of the research team. Because of the qualitative nature of the information gathered, a second member of the team checked data for accuracy. If information about cultural adaptation was not reported within the study, not reported was listed. Disagreements were discussed until consensus was reached. After all coding was complete each NDBI was looked at collectively to understand the level of cultural adaptation that has taken place for that NDBI.

### **Results**

Results from this scoping review provide important insights into the cultural adaptations of existing NDBIs. Of the 70 articles (references provided in the supplemental file) and 6 authors that were interviewed we gained information to understand the inclusion of culturally and linguistically diverse participants within studies, cultural adaptations of the interventions, and types of adaptation strategies that have been utilized. The supplemental materials provide a list of included articles and a table of the descriptive data from the studies organized by each included NDBI, details related to the CAC for each study can be obtained by contacting the first author. We did not find any relevant articles for Early Achievements or SCERTS because these interventions were not carried out with caregivers in home or community settings. Therefore, no results are provided for those interventions. We provide results for the other NDBIs.

#### **Enhanced Milieu Teaching**

One study was included in the scoping review related to EMT (Alpert & Kaiser 1992). Although several caregiver focused studies were found many were not with children with ASD, or were not carried out in naturalistic settings. In this single case design study no details were provided related to race/ethnicity of caregiver or child participants. Additionally, no information was provided about language in the home, caregiver education, employment, marital status, or family income level.

We reached out to the two authors (representing 100% of the included articles) to conduct interviews to gain additional insights about cultural adaptations, but neither were available and instead provided us with the intervention website to ensure we captured all relevant studies. Given only one study is included for this intervention, the details of cultural adaptation are limited. Within the included study no detail was provided for the

following dimensions: *language, persons, content, goals, methods, or context*. The only mention of adaptation was in the *process* dimension. Alpert and Kaiser (1992) detailed using a handout and video of the intervention to support implementation.

### **Early Start Denver Model**

Twenty-four studies were included in the scoping review related to ESDM. Studies were conducted in Australia, Brazil, Canada, China, Italy, New Zealand, South Africa, Switzerland, and United States. Only some studies reported details related to caregiver or child race/ethnicity, though those that did indicated a range of racial/ethnic identities among participants. Some studies reported family income, caregiver marital status, employment, and education which varied among participants.

Although we reached out to three authors (representing 46% of the included studies), none were aware of any cultural adaptations that had been conducted for ESDM and therefore declined an interview. Within the studies there was some evidence of adaptation in all of the CAC dimensions, but details were limited. In the *process* dimension, three studies were detailed as pilot studies for ESDM (Abouzeid et al. 2020; Vismara et al. 2013; Zhang et al. 2019). Abouzeid et al. (2020) mentioned the use of coaching to support individualization of the intervention, input was also sought from community stakeholders and revisions were made based on this feedback. In the *language* dimension, Abouzeid et al. (2020) and Qu et al. (2022) both conducted language translation, but the process that occurred related to translation was not detailed. Participants in Ogilvie and McCrudden (2017) were prompted to share their understanding of key concepts to ensure language was understood, while Waddington et al. (2021b) adjusted terms based on participant understanding.

In the dimension *persons* and *content*, there was some evidence to indicate cultural adaptations. Related to *persons*, researchers partnered with caregivers/coaches (Abouzeid et al. 2020), obtained feedback from stakeholders (Abouzeid et al. 2020; Ogilvie & McCrudden 2017), and engaged in recruitment through state EI or public health programs (Devescovi et al., 2022; Gaines et al., 2022; Rooks-Ellis et al., 2020) and local community based organizations (Abouzeid et al. 2020). Thirteen studies indicated developing rapport with community stakeholders as part of the intervention delivery. Related to *content* three studies considered participant desires related to outcomes (Malucelli et al. 2021; Qu et al., 2022; Waddington et al. 2021b), and six checked in to evaluate participant understanding of, and agreement with, the rationale of the intervention (Abouzeid et al. 2020; Malucelli et al. 2021;

Ogilvie & McCrudden 2017; Rogers et al. 2019; Vismara et al. 2018; Waddington et al., 2022). Three studies were reported as pilots for the intervention (Abouzeid et al. 2020; Vismara et al. 2013; 2019; Zhang et al. 2019).

Studies also provided details about the *goals*, *methods*, and *context*. Ten studies included collaboration with caregiver participants to identify goals. Fourteen studies included established rating scales to assess goals, but the cultural appropriateness of these scales was often not detailed. Two other studies indicated using scales that were culturally appropriate (i.e., authentic assessment, measures normed within cultural context; Rogers et al. 2019; Zhou et al. 2018), and seven measured social validity. Some studies indicated planning for sustainability and retention by providing childcare (Estes et al. 2014), providing home-based therapy (e.g., Ogilvie & McCrudden 2017), scheduling sessions when it was convenient for the family (e.g., Rooks-Ellis et al. 2000), or providing a manual to families (Franz et al., 2022; Liu et al, 2023; Qu et al., 2022). Seven studies used diverse recruitment methods with community agencies, pediatricians, caregiver advocacy groups, hospital clinics, EI programs, public health systems, and websites. Two studies provided equipment as needed to caregivers and six noted that materials were available in accessible modalities. For *context*, telehealth and providing intervention in home/community based settings was utilized.

### **Incidental Teaching**

Three studies were included in the scoping review related to IT. Only one study reported the country in which it was conducted (Japan; Hong et al. 2018). No studies reported information about caregiver race/ethnicity, one study reported child race/ethnicity (Charlop-Christy & Carpenter 2000). None of the studies reported language in the home (although we suspect Japanese in the case of Hong et al. 2018), caregiver education, employment, marital status, or family income level.

Although we reached out to three authors (representing 67% of the included articles) they were not aware of any cultural adaptations that had been conducted for IT and therefore declined to interview. Among the studies there was minimal evidence of adaptations in the dimensions *process*, *persons*, or *context*. Only one study (Hong et al. 2018) indicated engaging with community stakeholders during intervention planning; in this study mothers and behavioral therapists were consulted to determine the target behavior. However, all three studies chose to deliver the intervention in the participant's home. In the dimensions *language* and *content*, minimal information was provided within studies. The study carried out by Hong et al. (2018) included *language* translation to Japanese, but it was not clear if the translation was culturally appropriate or if it included forward and backward translation.

Hsieh et al. (2011) provided a definition of IT to caregivers. Adaptations in the *content* dimension primarily occurred based on information provided by participants about the desired outcomes and the intervention rationale. Adaptation was most evident within studies related to *goals*. Each study used culturally appropriate measures, and two assessed social validity. No details were provided within studies related to *methods*.

### **JASPER**

Two research studies, represented across six articles, were included in the scoping review related to JASPER. One of the studies was reported to be conducted in the United States. Within both studies, child race/ethnicity was reported and included children from Hispanic, Asian/Pacific Islander, Multiracial, White, and African American backgrounds. Caregiver race/ethnicity was reported in one study and included the same race/ethnicity of children. Family income and language used in the home was reported only in Carr et al. (2016), while Kasari et al. (2015) reported caregiver education.

We reached out to two authors (representing 100% of included articles), one of whom completed an interview. Among the included studies there were few details about cultural adaptations, but the author interview provided some information about cultural adaptation that is not detailed within the published literature. In the *process* and *language* dimensions details of adaptations were noted in one study and within the author interview. Carr et al. (2016) ensured they included families from diverse backgrounds and conducted the intervention in the caregiver's preferred language. During the interview the author discussed an advisory board that included community members who bicultural/bilingual, pilot testing of the intervention protocol before formal research began, and intervention translation into Spanish. Although a consensus method was used with advisory board to ensure accurate translation, forward/backward translation was not used. All but one article (Kasari et al. 2015) detailed the dimension *goals*. The behaviors that were measured were relevant across cultures (e.g., caregiver response, engagement, child engagement). Within the interview we learned that social validity was measured although this was not reported in studies.

Studies did not detail the dimensions *persons* and *content*, however the interview with the author provided some insights. An advisory board met monthly and was comprised of community stakeholders and researchers used community based participatory research methods to engage with key stakeholders. Use of terms was determined by the advisory board and a pilot was used to ensure adjustments were appropriate. The dimensions of *method* and *context* were detailed in Carr et al. (2016); sessions were conducted in homes/community settings at times

convenient for families. Within the interview we learned that feedback was obtained from the advisory board to inform delivery, and the intervention was conducted in homes.

### **Pivotal Response Training**

Eighteen articles, representing seventeen studies, were included in the scoping review related to PRT. The studies were carried out in Canada, the Netherlands, and the United States. Within the studies family, the characteristics of the caregiver, and child were reported inconsistently. Nine studies reported child race/ethnicity, while four reported caregiver race/ ethnicity. A few studies reported caregiver marital status, employment, and education. Only three reported family income, and four reported family language, which was predominately English.

We reached out to four authors (representing 61% of included articles), and conducted an interview with one of these authors. Within studies no details were provided for the following dimensions: *process*, *language*, or *persons*. Yet, the author interview provided some details for these dimensions including seeking feedback from the community and caregivers, use of bilingual and bicultural translators, and translation of the intervention into numerous languages (i.e., Chinese, Spanish, Portuguese, Arabic, Greek) by international students involved in the research process. In the dimensions of *content* and *goals*, eight of the studies reported providing choice to families related to goals, routines, and/or materials used within the intervention. All but one study (Symon et al. 2005) detailed the dimension *goals*. The behaviors that were measured were relevant across cultures (e.g., caregiver fidelity of PRT implementation, child communication). Formal measures were also used within three studies, but the appropriateness to the culture of participants was unclear. Social validity measures with caregivers were reported within eight of the studies.

Related to the dimensions *methods* and *context*, within twelve studies all aspects of intervention were carried out in homes or other natural settings. Related to recruitment of participants, two studies mentioned utilizing some diverse methods such as social media, websites, as well as referrals from professionals and agencies. Additionally, within the intervention planning studies were carried out using telepractice (McGarry et al. 2020), caregivers were provided with options related to individual or group delivery (see Minjarez et al. 2013), were supported by an early intervention provider (Smith et al. 2015), or were provided with a self-directed approach (Nefdt et al. 2010).

### **Project ImPACT**

Twelve articles, ten of which reported on interventions studies, were included in the scoping review related to Project ImPACT. The intervention studies were carried out in China, India, the United States, and Zambia. Within the studies, characteristics of the family, caregiver and child were reported. Six studies reported child race/ethnicity, while three reported caregiver race/ethnicity. Most of the studies reported caregiver marital status, all but one reported education, while three reported employment. Five of the articles reported family income, and two reported family language.

We reached out to two authors (representing 58% of included articles), both participated in an interview. Within included studies all CAC dimensions were addressed, and cultural adaptations for these dimensions were further detailed within author interviews. In the area of *process* and *persons* numerous details were provided within studies and author interviews. For example, the adaptation *process* included pilot studies where partnerships with key community stakeholders and feedback was used to guide intervention development and adaptation for a wide range of participants. In the *language* dimension, studies and interviews indicated use of terminology that was accessible for caregivers, asking caregivers to ensure understanding of terms and concepts, and use of translation practices with bilingual/bicultural individuals. Authors indicated that the intervention materials had been translated into Chinese, Dutch, and Spanish, and two studies included translation of materials into Hindi.

*Content*, *goals*, *methods*, and *context* dimensions were also addressed within studies and interviews. Some studies indicated that the *content* followed the strengths, needs and desires of caregivers and that *goals* were identified to address those areas. *Methods* considered feedback from caregivers related to the study design, use of telehealth to ensure accessibility of the intervention, and availability of group and individual formats. Within four of the studies researchers also considered the *context* and specifically partnered with community agencies to meet the needs of caregivers from low income backgrounds (see Pickard et al. 2016; 2019).

### **Reciprocal Imitation Training**

Six studies were included in the scoping review related to RIT. Three studies reported being carried out in the United States. Within the studies family, caregiver, and child characteristics were reported. Two studies reported caregiver and child race/ethnicity and caregiver education and marital status was reported in four studies. No study reported on family income and language.

We reached out to two authors (representing 67% of the included studies), both of whom participated in an interview. Within included studies all CAC dimensions were addressed, and cultural adaptations for these

dimensions were further detailed within interviews. Related to the dimensions *process*, *language*, *persons*, and *content*, although limited information was provided within studies, author interviews provided further detail. Pilots were noted within two studies (Hall et al. 2019; Wainer et al. 2021) using an iterative process and revisions guided by caregiver feedback. Community feedback was actively sought through caregiver interviews and rating scales to understand the acceptability of terms within the intervention. Although translation was not detailed within the included studies the interviews noted that translation to Spanish occurred using bilingual/bicultural individuals. Other translation requests were made for intervention materials, but details about that translation process in these instances were unknown by the authors.

In the dimensions of *goals*, *methods*, and *context* a bit more detail was available within studies and once again authors provided insight into these dimensions through interviews. To measure *goals*, various tools and methods were included such as interviews, fidelity checklists, as well as formal tools. *Methods* and *context* in most studies considered the modality of intervention and aligned this to caregiver preference. Within studies accessibility was ensured by providing parking reimbursement, and carrying out sessions within the home at times convenient to the family. Diverse recruitment methods were used in one study (e.g., clinician/community partner referrals, social media recruitment; Wainer et al. 2021).

### **Discussion**

It is clear from this review that within the literature discussion of cultural adaptation is only beginning to emerge. Some studies provided very little detail of these adaptations within the intervention related to supporting caregivers of children with ASD. Author interviews provided additional insight into cultural adaptations that were not detailed within the published literature, but there is a need for more transparency and inclusion of these details within the published literature. The most common elements that were missing from the cultural adaptation process were *persons*, *goals*, and *methods*. Early Start Denver Model and Project ImPACT were two NDBIs that covered all seven dimensions of the CAC. Although there is still room for additional cultural adaptation within these interventions, we had the most evidence within our scoping review for these interventions.

The limited awareness of the need for cultural adaptation of these NDBIs may be attributed to numerous factors. First, NDBIs utilize both behavioral and naturalistic approaches. While naturalistic approaches focus on unique differences and how to apply intervention in the settings in which children engage every day, behavioral approaches are grounded in a positivist research paradigm which has traditionally focused on the use of objective

measures and universal explanations of cause and effect (Wolf 1978). Universality of views and experiences across people was implied in much of the foundational research (Henrich et al. 2010). Individual or cultural nuances and differences were not emphasized. Culture, as a subjective phenomenon, has traditionally been studied by anthropologists, using qualitative methods such as ethnography – an approach rarely used by behaviorists (Morelli et al. 2018). Additionally, behavioral interventions were developed in contexts where the population who received these interventions was often homogenous – Western, middle class, white, English-speaking families (Henrich et al. 2010). The developers likely came from similar backgrounds and may therefore have reasonably assumed that the interventions were a good fit. However, much has changed in recent years, necessitating that active steps are taken to ensure that interventions are a good fit for a broader group of families. There is a growing awareness of diversity, even within NDBI research. As early as 1978, Wolf made a case for establishing the social validity of applied behavior analysis, recognizing that ‘objective’ effectiveness studies alone will not guarantee that interventions will be taken up by families and experienced as helpful and valuable. While exact definitions of social validity differ (see Snodgrass et al. 2022) some authors link the construct to cultural validity (e.g., Elliott 2017). The need for cultural and linguistic congruence in interventions for young children with disabilities and their families has been noted in other fields as well. Soto and Yu (2014), for example, call for the application of a sociocultural framework when conducting augmentative and alternative communication (AAC) interventions with children who are bilingual.

### **Limitations and Future Research Directions**

Within the studies included in this scoping review numerous limitations were noted. First, many of the included studies provided little detail about family, caregiver, and child characteristics which makes it difficult to understand the populations with which these NDBIs have been studied. There is a continuing need for more transparency and better reporting of participant characteristics within the literature. Journals might consider this as a reporting requirement to support this effort. Second, limited details were provided within much of the existing literature related to cultural adaptation. Author interviews gave a deeper understanding of adaptations that have occurred that were not detailed within the published literature. There is a need for more transparency of cultural adaptation within the literature. It should be noted that while the authors we reached out to for interviews represented authors in most of our included studies, we were unable to reach out to all authors in the 70 included studies due to limited resources and funding for this project. Thirdly, while authors often refer to translations of the interventions, the process of translations are not fully disclosed (i.e., Was forward/backward translation conducted?,

Was linguistic and cultural equivalence addressed?). As a field this is essential so we can better understand what adjustments have been made to support implementation with specific populations. More transparency should be provided into the cultural adaptation process when authors publish intervention research.

Given the vast literature in this area, we only included articles that had caregiver participants, were carried out in natural settings such as homes, were focused on supporting children with ASD, were part of the original nine NDBIs described by Schreibman et al. (2015), and were published before 2022. As such some literature that details cultural adaptations may have been missed, but given the need for culturally relevant interventions for children with ASD and their caregivers this was determined to be the most appropriate approach for the scoping review. Future reviews should explore cultural adaptations for other populations, and literature published after 2021.

While the CAC is a comprehensive tool to evaluate the cultural adaptation process, the manner in which processes were conducted is somewhat harder to capture. Partnerships with stakeholders, for example, may not always equalize power differentials between researchers/ interventionists and community members and/or service recipients. In some instances, it may not be appropriate culturally to question or disagree with professionals, and stakeholders may be reluctant to provide direction and input on interventions (Chu 2018). Also, the desire to receive intervention for their child with ASD may lead families to accept practices that are incongruent with their culture. For example, South African caregivers have reported acceptance of augmentative and alternative communication interventions that were incongruent with their home language, as they perceived it to be a necessary sacrifice to make to receive access to therapeutic and educational services for their child (van Dalen 2019). Similarly, Balton et al. (2019) found that family-based activity settings differ for children in low-income African contexts highlighting that the adaptations of methods should focus on the activities in which interventions will be embedded. Yu (2013) made similar observations about Chinese mothers of children with ASD living in the United States. Such motivations may lead to acquiescence or socially desirable answers when caregivers are asked about the cultural appropriateness of specific interventions. Researchers have an obligation to make adjustments to interventions, not just expect families to adjust to the intervention.

### **Implications for Practice**

Given the limited evidence for many of the NDBIs included within this scoping review we encourage practitioners and researchers to engage in cultural adaptations before implementing interventions with diverse populations to ensure cultural fit of the intervention with that population. The more an intervention is tailored to

match the precise characteristics of the child with ASD and their family the more likely they are to engage in intervention and experience improved outcomes. Clinicians can be aware of ensuring that interventions align with values of children with ASD and their families. The CAC could be a useful tool in this regard, as it encourages professionals to take a systematic approach in the cultural adaptation process.

### **Conclusion**

While it is encouraging that many of the NDBIs have been implemented with families from diverse backgrounds, various studies neglected to report descriptive variables of participants such as language used in the home, socioeconomic status, and ethnicity. This may reflect a belief that such variables have no influence on the degree to which the intervention fits the family's beliefs, routines, interaction patterns and child rearing practices, or may represent a gap in journal descriptive requirements. Future studies should document such variables meticulously, in order to acknowledge important participant factors that may influence intervention effectiveness. Across the different NDBIs, there was emerging evidence of cultural adaptations. This too is encouraging, suggesting that culture is starting to be acknowledged as an important part of the identity of the child and family, that should be affirmed and boosted through the intervention rather than ignored or suppressed. NDBIs are typically intensive interventions that require a lot of time and effort from the family, and their implementation can be invasive, as they require changes in the way caregivers behave towards their children. Unless these new ways of behaving are congruent with cultural practices and beliefs, it is unlikely that these interventions will be maintained. Adapting NDBIs to better fit the culture of participants will increase the potential for long term positive impact of the intervention on children with ASD and their families and reduce the risk of poor intervention fit for diverse and marginalized families and children and those in low resource settings.

### References

- Abouzeid, N., Rivard, M., Mello, C., Mestari, Z., Boulé, M., & Guay, C. (2020). Parent coaching intervention program based on the Early Start Denver Model for children with autism spectrum disorder: Feasibility and acceptability study. *Research in Developmental Disabilities, 105*, 103747. <https://doi.org/10.1016/j.ridd.2020.103747>
- Albin, M., Micsinszki, S., & Phoenix, M. (2022). Cultural adaptation of parent-implemented early communication interventions: A scoping review. *American Journal of Speech-Language Pathology, 31*(5), 2229-2247. [https://doi.org/10.1044/2022\\_AJSLP-21-00286](https://doi.org/10.1044/2022_AJSLP-21-00286)
- Alpert, C. L., & Kaiser, A. P. (1992). Training parents as milieu language teachers. *Journal of Early Intervention, 16*(1), 31-52. <https://doi.org/10.1177/105381519201600104>
- Arksey, H., & O'Malley, L. (2005). Scoping studies: Towards a methodological framework. *International Journal of Social Research Methodology, 8*(1), 19–32. <https://doi.org/10.1080/1364557032000119616>
- Balton, S., Alant, E., & Uys, K. (2019). Family-based activity settings of children in a low-income African context. *African Journal of Disability, 8*(1), 1-14. <https://doi.org/10.4102/ajod.v8i0.364>
- Baril, E. M., & Humphreys, B. P. (2017). An evaluation of the research evidence on the Early Start Denver Model. *Journal of Early Intervention, 39*(4), 321-338. <https://doi.org/10.1177/1053815117722618>
- Bernal, G., Bonilla, J. & Bellido, C. (1995). Ecological validity and cultural sensitivity for outcome research: Issues for cultural adaptation and development of psychosocial treatments with Hispanics. *Journal of Abnormal Child Psychology, 23*, 67–82. <https://doi.org/10.1007/BF01447045>
- Bernal, G., Jiménez-Chafey, M., & Domenech Rodríguez, M. (2009). Cultural adaptation of treatments: A resource for considering culture in evidence-based practice. *Professional Psychology: Research and Practice, 40*(4) 361–368. <http://doi.org/10.1037/a0016401>
- Boisvert, M., & Hall, N. (2014). The use of telehealth in early autism training for parents: A scoping review. *Smart Homecare Technology and Telehealth, 2*, 19-27. <https://doi.org/10.2147/SHTT.S45353>
- Bozkus-Genc, G., & Yucesoy-Ozkan, S. (2016). Meta-analysis of pivotal response training for children with autism spectrum disorder. *Education and Training in Autism and Developmental Disabilities, 51*(1), 13-26.
- Cabassa, L.J., & Baumann, A.A. (2013). A two-way street: Bridging implementation science and cultural adaptations of mental health treatments. *Implementation Science, 8*(1) 90.

<http://doi.org/10.1186/1748-5908-8-90>

Carr, T., Shih, W., Lawton, K., Lord, C., King, B., & Kasari, C. (2016). The relationship between treatment attendance, adherence, and outcome in a caregiver-mediated intervention for low-resourced families of young children with autism spectrum disorder. *Autism, 20*(6), 643-652.

<https://doi.org/10.1177/1362361315598634>

Charlop-Christy, M. H., & Carpenter, M. H. (2000). Modified incidental teaching sessions: A procedure for parents to increase spontaneous speech in their children with autism. *Journal of Positive Behavior*

*Interventions, 2*(2), 98-112. <https://doi.org/10.1177/109830070000200203>

Chu, S. Y. (2018). Perspectives from both sides of the parent–professional partnership: A preliminary study on Taiwan’s early childhood special education services. *International Journal of Disability, Development and Education, 65*(4), 355–372. <https://doi.org/10.1080/1034912X.2017.1403572>

Colby, S. L., & Ortman, J. M. (2014). Projections of the Size and Composition of the U.S. Population: 2014 to 2060, Current Population Reports, P25-1143. Census Bureau.

<https://www.census.gov/content/dam/Census/library/publications/2015/demo/p25-1143.pdf>

Dada, S., Kathard, H., Tönsing, K., & Harty, M. (2017). Severe communication disabilities in South Africa: Challenges and enablers. In *Inclusion, disability and culture* (pp. 169-193). Springer.

Davenport, M., Mazurek, M., Brown, A., & McCollom, E. (2018). A systematic review of cultural considerations and adaptation of social skills interventions for individuals with autism spectrum disorder. *Research in Autism Spectrum Disorders, 52*, 23-33. <https://doi.org/10.1016/j.rasd.2018.05.003>

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>

Devescovi, R., Bresciani, G., Colonna, V., Carrozzi, M., Dissegna, A., Celea, M. A., Cescon, D., Frisari, S.,

Guerrieri, M., Placer, F., Stocchi, M., Terpini, C., & Colombi, C. (2023). Short-Term outcomes of an ESDM intervention in Italian children with autism spectrum disorder following the COVID-19 ;ockdown.

*Children, 10*(4), 691. <https://doi.org/10.3390/children10040691>

Donohue, D., & Bornman, J. (2014). The challenges of realising inclusive education in South Africa. *South African Journal of Education, 34*(2).

- DuBay, M. (2022). Cultural adaptations to parent-mediated autism spectrum disorder interventions for Latin American families: A scoping review. *American Journal of Speech-Language Pathology, 31*(3), 1517-1534. [https://doi.org/10.1044/2022\\_AJSLP-21-00239](https://doi.org/10.1044/2022_AJSLP-21-00239)
- Elliott, S. N. (2017). The social validity of “acceptability of behavioral interventions used in classrooms”: Inferences from longitudinal evidence. *Behavioral Disorders, 43*(1), 269–273. <https://doi.org/10.1177/0198742917739021>
- Estes, A., Vismara, L., Mercado, C., Fitzpatrick, A., Elder, L., Greenson, J., Lord, C., Munson, J., Winter, J., Young, G., Dawson, G., & Rogers, S. (2014). The impact of parent-delivered intervention on parents of very young children with autism. *Journal of Autism and Developmental Disorders, 44*, 353-365. <https://doi.org/10.1007/s10803-013-1874-z>
- Franz, L., Howard, J., Viljoen, M., Sikich, L., Chandrasekhar, T., Kollins, S. H., Lee, L., Ndlovu, M., Sabatos-DeVito, M., Seris, N., Shabalala, N., Spanos, M., de Vries, P. J., & Dawson, G. (2022). Pragmatic adaptations of telehealth-delivered caregiver coaching for children with autism in the context of COVID-19: Perspectives from the United States and South Africa. *Autism, 26*(1), 270-275. <https://doi.org/10.1177/13623613211022>
- Gaines, R., Korneluk, Y., Quigley, D., Chiasson, V., Delehanty, A., & Jacobson, S. (2022). Quickstart for toddlers with autism spectrum disorder: A preliminary report of an adapted community-based early intervention program. *Autism & Developmental Language Impairments, 7*, 23969415221138699. <https://doi.org/10.1177/239694152211386>
- Hall, T. A., Mastel, S., Nickel, R., & Wainer, A. (2019). Parents training parents: Lessons learned from a study of reciprocal imitation training in young children with autism spectrum disorder. *Autism, 23*(6), 1601-1606. <https://doi.org/10.1177/1362361318815643>
- Hart, B., & Risley, T. R. (1975). Incidental teaching of language in the preschool. *Journal of Applied Behavior Analysis, 8*(4), 411-420. <https://doi.org/10.1901/jaba.1975.8-411>
- Henrich, J., Heine, S. J., & Norenzayan, A. (2010). The weirdest people in the world? *Behavioral and Brain Sciences, 33*, 61–135. <https://doi.org/10.2139/ssrn.1601785>
- Hong, E. R., Gong, L., Ganz, J. B., & Neely, L. (2018). Self-paced and video-based learning: parent training and language skills in Japanese children with ASD. *Exceptionality Education International, 28*(2).

<https://doi.org/10.5206/eei.v28i2.7762>

Hsieh, H. H., Wilder, D. A., & Abellon, O. E. (2011). The effects of training on caregiver implementation of incidental teaching. *Journal of Applied Behavior Analysis, 44*(1), 199-203.

<https://doi.org/10.1901/jaba.2011.44-199>

Ingersoll, B. (2010). Brief report: Pilot randomized controlled trial of reciprocal imitation training for teaching elicited and spontaneous imitation to children with autism. *Journal of Autism and Developmental Disorders, 40*, 1154-1160. <https://doi.org/10.1007/s10803-010-0966-2>

Ingersoll, B., & Wainer, A. (2013). Initial efficacy of Project ImPACT: A parent-mediated social communication intervention for young children with ASD. *Journal of Autism and Developmental Disorders, 43*, 2943-2952. <https://doi.org/10.1007/s10803-013-1840-9>

Kaiser, A., & Hester, P. (1994). Generalized effects of enhanced Milieu teaching. *Journal of Speech and Hearing Research, 37*(6), 1320-1340. <https://doi.org/10.1044/jshr.3706.1320>

Kasari, C., Freeman, S., & Paparella, T. (2006). Joint attention and symbolic play in young children with autism: A randomized controlled intervention study. *Journal of Child Psychology and Psychiatry, and Allied Disciplines, 47*(6), 611-620. <https://doi.org/10.1111/j.1469-7610.2005.01567.x>

Kasari, C., Gulsrud, A., Paparella, T., Helleman, G., & Berry, K. (2015). Randomized comparative efficacy study of parent-mediated interventions for toddlers with autism. *Journal of Consulting and Clinical Psychology, 83*(3), 554. <http://doi.org/10.1037/a0039080>

Koegel, R. L., & Koegel, L. K. (2006). *Pivotal response treatments for autism: Communication, social, & academic development*. Brookes.

Kumpfer, K., Magalhães, C., & Xie, J. (2017). Cultural adaptation and implementation of family evidence-based interventions with diverse populations. *Prevention Science, 18*, 649-659.

<https://doi.org/10.1007/s11121-016-0719-3>

Landa, R., Holman, K., O'Neill, A., & Stuart, E. (2011). Intervention targeting development of socially synchronous engagement in toddlers with autism spectrum disorder: A randomized controlled trial. *Journal of Child Psychology and Psychiatry, 52*(1), 13-21. <https://doi.org/10.1111/j.1469-7610.2010.02288.x>

Lang, R., Machalicek, W., Rispoli, M., & Regester, A. (2009). Training parents to implement communication interventions for children with autism spectrum disorders (ASD): A systematic review. *Evidence-Based*

- Communication Assessment and Intervention*, 3(3), 174-190. <https://doi.org/10.1080/17489530903338861>
- Larson, A., Cycyk, L., Carta, J., Hammer, S. C., Baralt, M., Uchikoshi, Y., An, G. Z., & Wood, C. (2020). A systematic review of language-focused interventions for young children from culturally and linguistically diverse backgrounds. *Early Childhood Research Quarterly*, 50, 157–178. <https://doi.org/10.1016/j.ecresq.2019.06.001>
- Lee, J. D., Meadan, H., Sands, M. M., Terol, A. K., Martin, M. R., & Yoon, C. D. (2023). The Cultural Adaptation Checklist (CAC): quality indicators for cultural adaptation of intervention and practice. *International Journal of Developmental Disabilities*, 1-12. <https://doi.org/10.1080/20473869.2023.2176966>
- Lim, N., O'Reilly, M., Sigafos, J., Ledbetter-Cho, K., & Lancioni, G. (2019). Should heritage languages be incorporated into interventions for bilingual individuals with neurodevelopmental disorders? A systematic review. *Journal of Autism and Developmental Disorders*, 49, 887-912. <https://doi.org/10.1007/s10803-018-3790-8>
- Liu, T., Martinez-Torres, K., Mazzone, J., Camarata, S., & Lense, M. (2023). Brief Report: Telehealth Music-Enhanced Reciprocal Imitation Training in Autism: A Single-Subject Feasibility Study of a Virtual Parent Coaching Intervention. *Journal of Autism and Developmental Disorders*, 1-13. <https://doi.org/10.1007/s10803-023-06053-z>
- Ma, Z., Travers, J. C., Martinez, J. R., Johnson, J. V., & Bross, L. A. (2021). A systematic review of intervention intensity in pivotal response training and scripting research. *Review Journal of Autism and Developmental Disorders*, 1-14. <https://doi.org/10.1007/s40489-021-00296-1>
- Maenner, M., Shaw, K., Bakian, A., Bilder, D., Durkin, M., Elser, A., Furnier, S., Hallas, L., Hall-Lande, J., Hudson, A., Hughes, M., Patrick, M., Pierce, K., Poynter, J., Salinas, A., Shenouda, J., Vehorn, A., Warren, J., Costantino, J...Cogswell, M. (2021). Prevalence and characteristics of autism spectrum disorder among children aged 8 years – autism and developmental disabilities monitoring network, 11 Sites, United States, 2018. *MMWR Surveillance Summary* 2021, 70(No. SS-11):1-16. <http://doi.org/10.15585/mmwr.ss7011a1>
- Malucelli, E. R., Antoniuk, S. A., & Carvalho, N. O. (2021). The effectiveness of early parental coaching in the autism spectrum disorder. *Jornal de Pediatria*, 97, 453-458. <https://doi.org/10.1016/j.jped.2020.09.004>
- McGarry, E., Vernon, T., & Baktha, A. (2020). Brief report: A pilot online pivotal response treatment training program for parents of toddlers with autism spectrum disorder. *Journal of Autism and Developmental*

- Disorders*, 50, 3424-3431. <https://doi.org/10.1007/s10803-019-04100-2>
- Minjarez, M. B., Mercier, E. M., Williams, S. E., & Hardan, A. Y. (2013). Impact of pivotal response training group therapy on stress and empowerment in parents of children with autism. *Journal of Positive Behavior Interventions*, 15(2), 71-78. <https://doi.org/10.1177/1098300712449055>
- Morelli, G., Quinn, N., Chaudhary, N., Vicedo, M., Rosabal-coto, M., Keller, H., Murray, M., Gottlieb, A., & Scheidecker, G. (2018). Ethical challenges of parenting interventions in low- to middle-income countries. *Journal of Cross-Cultural Psychology*, 49(1), 5–24. <https://doi.org/10.1177/0022022117746241>
- Nefdt, N., Koegel, R., Singer, G., & Gerber, M. (2010). The use of a self-directed learning program to provide introductory training in pivotal response treatment to parents of children with autism. *Journal of Positive Behavior Interventions*, 12(1), 23-32. <https://doi.org/10.1177/1098300709334796>
- Ogilvie, E., & McCrudden, M. T. (2017). Evaluating the social validity of the early start Denver model: A convergent mixed methods study. *Journal of Autism and Developmental Disorders*, 47, 2899-2910. <https://doi.org/10.1007/s10803-017-3214-1>
- Pacia, C., Holloway, J., Gunning, C., & Lee, H. (2021). A systematic review of family-mediated social communication interventions for young children with autism. *Review Journal of Autism and Developmental Disorders*, 1-27. <https://doi.org/10.1007/s40489-021-00249-8>
- Pickard, K. E., Kilgore, A. N., & Ingersoll, B. R. (2016). Using community partnerships to better understand the barriers to using an evidence-based, parent-mediated intervention for autism spectrum disorder in a medicaid system. *American Journal of Community Psychology*, 57(3-4), 391-403. <https://doi.org/10.1002/ajcp.12050>
- Pickard, K., Rowless, S., & Ingersoll, B. (2019). Understanding the impact of adaptations to a parent-mediated intervention on parents' ratings of perceived barriers, program attributes, and intent to use. *Autism*, 23(2), 338-349. <https://doi.org/10.1177/1362361317744078>
- Prizant, B. M., Wetherby, A. M., Rubin, E., & Laurent, A. C. (2003). The SCERTS model: A transactional, family-centered approach to enhancing communication and socioemotional abilities of children with autism spectrum disorder. *Infants & Young Children*, 16(4), 296-316. <http://doi.org/10.1097/00001163-200310000-00004>
- Qu, L., Chen, H., Miller, H., Miller, A., Colombi, C., Chen, W., & Ulrich, D. A. (2022). Assessing the satisfaction

- and acceptability of an online parent coaching intervention: A mixed-methods approach. *Frontiers in Psychology*, *13*, 859145. <https://doi.org/10.3389/fpsyg.2022.859145>
- Rogers, S. J., Estes, A., Vismara, L., Munson, J., Zierhut, C., Greenson, J., Dawson, G., Rocha, M., Sugar, C., Senturk, D., Whelan, F., & Talbott, M. (2019). Enhancing low-intensity coaching in parent implemented Early Start Denver Model intervention for early autism: A randomized comparison treatment trial. *Journal of Autism and Developmental Disorders*, *49*, 632-646. <https://doi.org/10.1007/s10803-018-3740-5>
- Rooks-Ellis, D. L., Howorth, S. K., Boulette, S., Kunze, M., & Sulinski, E. (2020). Effects of a parent training using telehealth: Equity and access to early intervention for rural families. *Journal of Childhood, Education & Society*, *1*(2), 141-166. <https://doi.org/10.37291/2717638X.20201242>
- Schreibman, L., Dawson, G., Stahmer, A., Landa, R., Rogers, S., McGee, G., Kasari, C., Ingersoll, B., Kaiser, A., Bruinsma, Y., McNerney, E., Wetherby, A., & Halladay, A. (2015). Naturalistic developmental behavioral interventions: Empirically validated treatments for autism spectrum disorder. *Journal of Autism and Developmental Disorders*, *45*, 2411-2428. <https://doi.org/10.1007/s10803-015-2407-8>
- Smith, T., Domenech Rodríguez, M.M., & Bernal, G. (2011). Culture. *Journal of Clinical Psychology*, *67*, 166–175. <http://doi.org/10.1002/jclp.20757>
- Smith, I. M., Flanagan, H. E., Garon, N., & Bryson, S. E. (2015). Effectiveness of community-based early intervention based on Pivotal Response Treatment. *Journal of Autism and Developmental Disorders*, *45*(6), 1858–1872. <https://doi.org/10.1007/s10803-014-2345-x>
- Snodgrass, M., Chung, M., Kretzer, J., Biggs, E. (2022). Rigorous assessment of social validity: A scoping review of a 40-year conversation. *Remedial and Special Education*, *43*(2), 114-130. <https://doi.org/10.1177/0741932521101725>
- Soto, G., & Yu, B. (2014). Considerations for the provision of services to bilingual children who use augmentative and alternative communication. *Augmentative and Alternative Communication*, *30*(1), 83-92. <https://doi.org/10.3109/07434618.2013.878751>
- Symon, J. (2005). Expanding interventions for children with autism: Parents as trainers. *Journal of Positive Behavior Interventions*, *7*(3), 159-173. <https://doi.org/10.1177/10983007050070030501>
- Trembath, D., Gurm, M., Scheerer, N., Trevisan, D., Paynter, J., Bohadana, G., Roberts, J., & Iarocci, G. (2019). Systematic review of factors that may influence the outcomes and generalizability of parent-mediated

- interventions for young children with autism spectrum disorder. *Autism Research*, 12(9), 1304–1321. <https://doi.org/10.1002/aur.2168>
- van Dalen, N. (2019). *South African parents' perceptions on their language choices and practices with regard to their children who make use of augmentative and alternative communication (AAC) and are raised in multilingual environments*. [Master's thesis, University of Pretoria]. <http://hdl.handle.net/2263/72115>
- Vismara, L., McCormick, C., Shields, R., & Hessler, D. (2019). Extending the parent-delivered early start Denver model to young children with fragile X syndrome. *Journal of Autism and Developmental Disorders*, 49, 1250-1266. <https://doi.org/10.1007/s10803-018-3833-1>
- Vismara, L. A., McCormick, C. E., Wagner, A. L., Monlux, K., Nadhan, A., & Young, G. S. (2018). Telehealth parent training in the Early Start Denver Model: Results from a randomized controlled study. *Focus on Autism and Other Developmental Disabilities*, 33(2), 67-79. <https://doi.org/10.1177/1088357616651064>
- Vismara, L. A., McCormick, C., Young, G. S., Nadhan, A., & Monlux, K. (2013). Preliminary findings of a telehealth approach to parent training in autism. *Journal of Autism and Developmental Disorders*, 43, 2953-2969. <https://doi.org/10.1007/s10803-013-1841-8>
- Waddington, H., Curtis, S., van Noorden, L., Sigafos, J., van der Meer, L., & Whitehouse, A. (2022). Evaluation of Low-intensity Therapist-Delivered Intervention in Addition to Parent Coaching for Young Children with Autism Spectrum Disorder. *International Journal of Disability, Development and Education*, 1-21. <https://doi.org/10.1080/1034912X.2022.2120601>
- Waddington, H., Reynolds, J., Macaskill, E., Curtis, S., Taylor, L., & Whitehouse, A. (2021a). The effects of JASPER intervention for children with autism spectrum disorder: A systematic review. *Autism*, 25(8), 2370-2385. <https://doi.org/10.1177/1363613211019162>
- Waddington, H., van der Meer, L., & Sigafos, J. (2021b). Supporting parents in the use of the early start Denver model as an intervention program for their young children with autism spectrum disorder. *International Journal of Developmental Disabilities*, 67(1), 23-36. <https://doi.org/10.1080/20473869.2019.1585694>
- Waddington, H., van der Meer, L., Sigafos, J., & Bowden, C. J. (2020). Mothers' perceptions of a home-based training program based on the Early Start Denver Model. *Advances in Neurodevelopmental Disorders*, 4, 122-133. <https://doi.org/10.1007/s41252-019-00146-6>
- Wainer, A. L., Arnold, Z. E., Leonczyk, C., & Valluripalli Soorya, L. (2021). Examining a stepped-care telehealth

- program for parents of young children with autism: a proof-of-concept trial. *Molecular Autism*, 12(1), 32. <https://doi.org/10.1186/s13229-021-00443-9>
- Wang, Z., Loh, S., Tian, J., & Chen, Q. (2022). A meta-analysis of the effect of the early start Denver model in children with autism spectrum disorder. *International Journal of Developmental Disabilities*, 68(5), 587-597. <https://doi.org/10.1080/20473869.2020.1870419>
- Wong, C., Odom, S., Hume, K., Cox, A., Fettig, A., Kucharczyk, S., Brock, M., Plavnick, J., Fleury, V., & Schultz, T. (2015). Evidence-based practices for children, youth, and young adults with autism spectrum disorder: A comprehensive review. *Journal of Autism and Developmental Disorders*, 45(7), 1951–1966. <https://doi.org/10.1007/s10803-014-2351-z>
- 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. <https://doi.org/10.1901/jaba.1978.11-203>
- 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. [https://doi.org/10.1044/1058-0360\(2012/10-0078\)](https://doi.org/10.1044/1058-0360(2012/10-0078))
- Zeidan, J., Fombonne, E., Scora, J., Ibrahim, A., Durkin, M., Saxena, S., Yusuf, A., Shih, A., & Elsabbagh, M. (2022). Global prevalence of autism: A systematic review update. *Autism Research*, 15(5), 778–790. <https://doi.org/10.1002/aur.2696>
- Zhang, Y., Xu, Q., Lu, P., & Xu, X. (2019). Skill training for parents with ASD children in China. *Pediatric Medicine*, 2(47), 1-8. <https://doi.org/10.21037/pm.2019.08.02>
- Zhou, B., Xu, Q., Li, H., Zhang, Y., Wang, Y., Rogers, S. J., & Xu, X. (2018). Effects of parent-implemented early start Denver model intervention on Chinese Toddlers with autism spectrum disorder: A non-randomized controlled trial. *Autism Research*, 11(4), 654-666. <https://doi.org/10.1002/aur.1917>

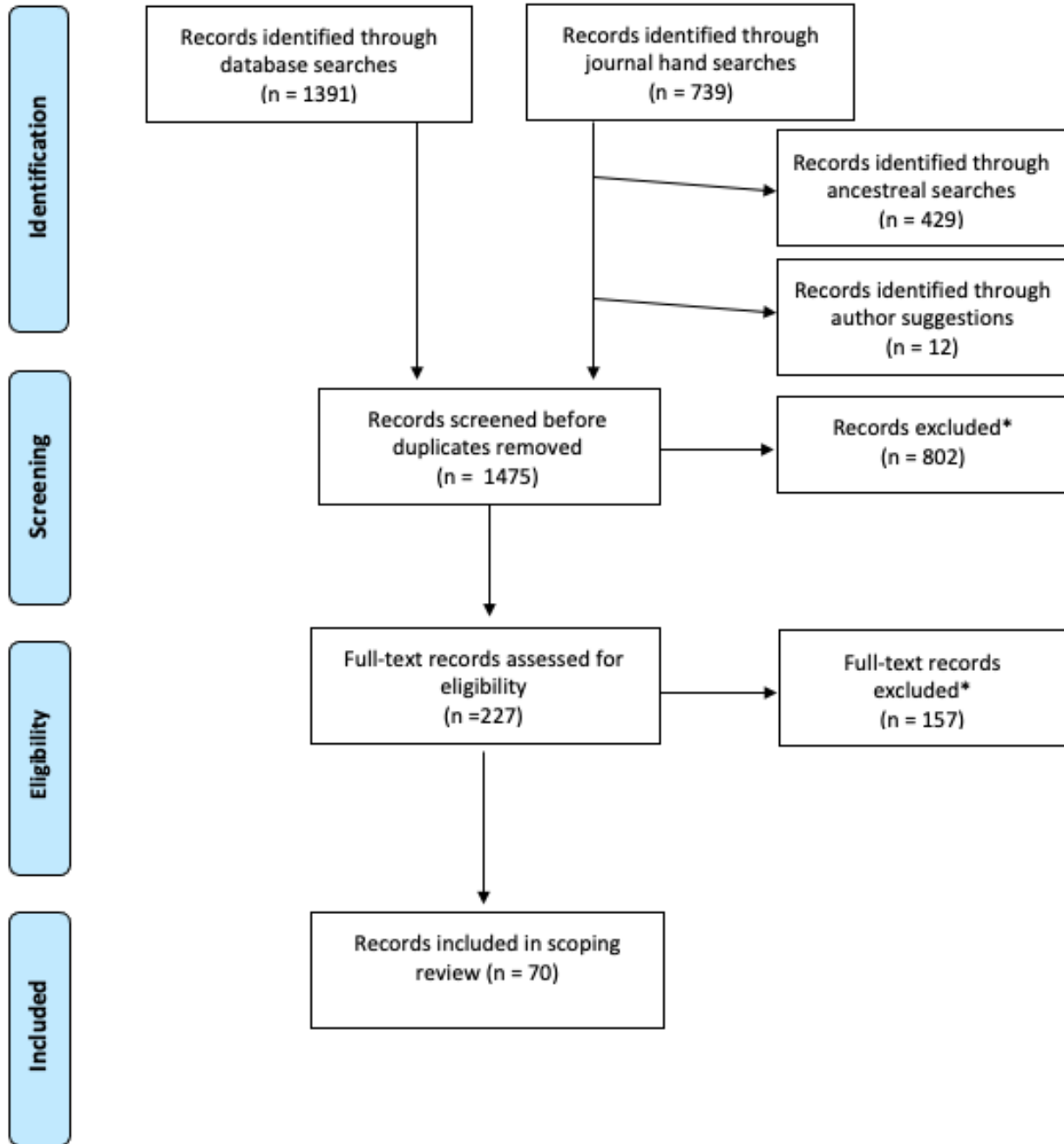
**Figure 1**

*Cultural Adaptation Checklist Content (Lee et al., 2023)*

<b>CAC Dimension</b>	<b>Adaptation of Intervention</b>	<b>Implementation of Intervention</b>
<b>Process</b>	<ul style="list-style-type: none"> <li>Partnered with/engaged community stakeholders in adaptation process</li> <li>Piloted and revised intervention components based on community stakeholders' feedback with multiple iterations</li> </ul>	<ul style="list-style-type: none"> <li>Learned about community; individualized intervention</li> <li>Gained access/built relationships with community members</li> <li>Actively sought feedback from community stakeholders; made revisions to the intervention as needed</li> </ul>
<b>Language</b>	<ul style="list-style-type: none"> <li>Translated all intervention materials using forward translation by bilingual/bicultural persons</li> <li>Translated all intervention materials using both forward and back translation by bilingual/bicultural persons</li> <li>Verified translation using consensus of community stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>Implemented the intervention using familiar terminology, local dialects, and culture-specific terms for participants</li> <li>Evaluated participants' understanding and acceptability of concepts and terms during the intervention and revised as needed</li> </ul>
<b>Persons</b>	<ul style="list-style-type: none"> <li>Partnered with community stakeholders throughout the iterative adaptation for continued recommendations</li> <li>Obtained access to the community and built trusting relationships with community members</li> </ul>	<ul style="list-style-type: none"> <li>Partnered with community stakeholders throughout the iterative implementation for continued recommendations</li> <li>Developed rapport with community stakeholders and partnered with them in intervention delivery</li> </ul>
<b>Content</b>	<ul style="list-style-type: none"> <li>Included information related to strengths/needs/desired outcomes of participants throughout adaptation</li> <li>Piloted interventions with the intended participants and made changes based on their input related to the intervention</li> <li>Showed understanding of target community members' strengths, values, and traditions related to the content</li> <li>Changed complex terms to accessible ones; avoided jargon</li> </ul>	<ul style="list-style-type: none"> <li>Incorporated content that had cultural significance to the community throughout the intervention</li> <li>Checked in with participants to evaluate their understanding of, and agreement with the rationale of the intervention</li> </ul>
<b>Goals</b>	<ul style="list-style-type: none"> <li>Partnered with community to identify intervention goals</li> <li>Individualized intervention goals to align with values/expectations of community</li> </ul>	<ul style="list-style-type: none"> <li>Used culturally appropriate measures to assess outcomes</li> <li>Assessed social validity of goals, procedures, and outcomes that are addressed and achieved</li> </ul>
<b>Methods</b>	<ul style="list-style-type: none"> <li>Planned intervention delivery based on participant preference</li> <li>Planned for sustainability to ensure participants retained access to resources upon completion of the study</li> <li>Communicated with the participants using their preferred mode of communication throughout the study as reminders</li> </ul>	<ul style="list-style-type: none"> <li>Ensured accessibility of recruitment and intervention delivery</li> <li>Used intervention delivery modality preferred by the participants</li> <li>Used diverse methods for recruitment with community stakeholders' involvement</li> </ul>
<b>Context</b>	<ul style="list-style-type: none"> <li>Partnered with community stakeholders to identify the specific social, economic, political context of the participants</li> <li>Ensured research team was familiar with community's culture/resources prior to intervention adaptation and implementation</li> <li>Learned about and made adjustment based on the current events in the community that may impact participants</li> </ul>	<ul style="list-style-type: none"> <li>Chose appropriate environment for intervention delivery (e.g., community centers, homes)</li> <li>Used diverse methods for retention (e.g., providing childcare, training after working hours, providing transportation)</li> </ul>

**Figure 2**

*Prisma Diagram of Search Process*



*Note.* Studies were excluded if they did not explore an included NDBI, were not focused on individuals with ASD, a review of the literature, dissertations, not published in English, published after August 2023, did not include a parent participant, or not conducted in a home/community environment.

Supplemental File

**Table 1**

*Descriptive Data from Included Studies Organized by NDBI*

Article	Country	Setting	Family Language	Family income	Caregiver Characteristics						Child Characteristics			
					Age (yrs)	Gender (F/M)	Race/Ethnicity	Marital Status	Employment	Education	Age (yrs)	Gender (F/M)	Race/Ethnicity	
Enhanced Milieu Teaching														
Alpert & Kaiser, 1992	NR	School, clinic, home	NR	NR	NR	6/0	NR	NR	NR	NR	NR	NR	0/6	NR
Early Start Denver Model														
Abouzeid et al., 2020	Canada	Community	5 French, 4 English, 1 English/French	NR	NR	10/3	NR	NR	NR	NR	NR	2.0-3.8	2/8	NR
Cucinotta et al., 2022	Italy	Community	NR	NR	NR	NR	NR	NR	NR	NR	NR	1.6-3.8	17/73	NR
Devescovi et al., 2022	Italy	Clinic, home	NR	NR	NR	18/18	16 Italian/2 other	NR	29 Employed, 2 Unemployed, 5 NR	11 MS, 11 HS, 11 Bachelor, 3 NR	M = 2.5	2/16	12 Italian, 6 NR	
Estes et al., 2014	US	Home	NR	NR	NR	42/2	NR	NR	NR	12 HS, 16 Bachelor, 14 Graduate	M = 1.5	12/3	5 Asian, 2 Black, 7 Hispanic, 7 Multi-racial, 30 White	
Franz et al., 2022	US, SA	Home	NR	19 < \$50k, 35 \$50≥\$99k, 29 > \$100K	M = 31.4 (group 1); 33.5 (group 2)	77/5	NR	NR	NR	27 HS, 33 Bachelor; 19 Graduate	M = 1.7 (group 1); 1.7 (group 2)	20/62	8 Asian, 2 Black, 15 Hispanic, 12 Multiracial, 60 White	
Gaines et al., 2022	Canada	Home	57 English, 5 French, 8 Bilingual (English/French)	NR	NR	NR (89 families)	NR	82 couples were married	82 Employed, 7 Unemployed	82 mothers/76 fathers with college or higher	M = 2.3	23/66	NR	
Grogan et al., 2023	Australia	Clinic, home	NR	NR	M = 38.1	30/1	24 Asian/7 NR	NR	10 Employed, 21 NR	28 Bachelor or higher, 3 NR	M = 4.2	13/18	NR	
Liu et al., 2023	NR	Virtual, home	NR	NR	M = 34.7 (NR for 1 mother)	4/0	NR	NR	3 Employed, 1 Unemployed	1 HS, 1 Trade, 1 Bachelor, 1 Graduate	M = 3.7	0/4	1 Black, 1 Hispanic, 2 Multiracial	
Malucelli et al., 2021	Brazil	Home	NR	NR	NR	NR	NR	NR	NR	NR	M = 3 (IV)	NR	NR	
Ogilvie & McCrudden, 2017	NR	Home	NR	NR	NR	4/1	NR	3 Married, 1 Single	1 Employed, 3 Unemployed	1 Bachelor, 2 education NR	<5 years old	0/4	NR	
Qu et al., 2022	China	Virtual, home	Chinese	2 <\$460, 2 \$460-\$770, 8 \$770-\$1540, 13 \$1540-3080, 7 > \$3080	NR	28/4	NR	NR	17 Employed, 15 Unemployed	2 HS or below, 10 some College, 15 Bachelor, 5 Graduate	M = 3.2	5/27	NR	
Rogers et al., 2019	US	Clinic, home	English	NR	NR	NR	2 Asian, 3 Black, 4 Hispanic, 7 Multi-racial, 20 White, 15 NR	NR	NR	4 HS, 23 Bachelor, 11 Graduate, 6 NR	M = 2	13/31	NR	
Rooks-Ellis et al., 2020	NR	Home	NR	4 < \$50K, 6 > \$50K	6 (25-34), 3 (35-44), 1 (55+)	9/1	1 Hispanic, 1 Native American, 8 White	NR	6 Employed, 3 Unemployed, 1 NR	1 HS, 5 College, 3 Bachelor, 1 Graduate	M = 2.5	4/6	1 Hispanic, 1 Native	

Article	Country	Setting	Family Language	Family income	Caregiver Characteristics			Child Characteristics					
					Age (yrs)	Gender (F/M)	Race/Ethnicity	Marital Status	Employment	Education	Age (yrs)	Gender (F/M)	Race/Ethnicity
Seo et al., 2022	NZ	Community, home	3 English, 1 Bilingual (English/Samoan)	NR	NR	3/1	NR	4 Married	3 Employed, 1 Unemployed	1 HS, 1 Bachelor, 2 Master	M = 3.4	0/4	American, 8 White 2 White/Maori, 1 Samoan/Maori, 1 White
Vismara et al., 2013	US, Canada	Virtual, home	NR	1 < \$50K, 3 \$50-75K, 4 > \$100K	NR	7/1	NR	8 Married	6 Employed, 2 Unemployed	4 Bachelor, 4 Master	M = 2	NR	2 Hispanic, 6 White
Vismara et al., 2018	US	Virtual, home	NR	8 < \$75K, 6 > \$75K	NR	11/3	NR	NR	6 Employed, 8 Unemployed	2 College, 6 Bachelor, 6 Graduate	M = 3	3/11	1 Hispanic, 13 White
Vismara et al., 2019	NR	Clinic, home	NR	NR	32, 32, 43, 44	4/0	NR	4 Married	3 Employed, 1 Unemployed	1 HS, 2 Bachelor's, 1 Graduate	25, 27, 28, 40 months	1/3	1 Black, 1 Hispanic, 2 White
Waddington et al., 2021	NZ	Home	3 English, 1 English/Cambodian, 1 English/ Tamil	NR	NR	5/0	Cambodian, 2 NZ European, 1 Indian, 1 Maori	5 Married/partner	2 Employed, 3 Unemployed	3 HS, 1 Bachelor's, 1 Master's	2, 2, 3, 4, 4	0/5	Cambodian, 2 NZ European, 1 Indian, 1 Maori
Waddington et al., 2020a <sup>a</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-
Waddington et al., 2020b <sup>a</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-
Waddington et al., 2022 <sup>b</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-
Wood de Wilde et al., 2023	SW	Virtual, home	2 Albanian, 2 Arabic, 1 Bengali, 7 English, 3 Filipino, 34 French, 1 Fula, 11 Hungarian, 1 Italian, 1 Korean, 1 Polish, 6 Portuguese, 1 Russian, 8 Spanish, 1 Wolof	18 < 60k, 15 60-140k, 15 > 140k	NR	NR	NR – Country of origin reported instead	40 Married, 8 Single	NR	6 Elementary, 20 HS, 19 College	NR	7/41	NR
Zhang et al., 2019	China	Clinic, home	NR	NR	NR	NR	NR	NR	NR	24 HS/vocational, 86 College	6 (1.5 -2), 33 (2-3), 12 (3-4), 4 (4-5)	NR	NR
Zhou et al., 2018	China	Clinic, home	NR	1 50-100K (Yen), 10 100-200K, 9 200-500K, 2 > 500K	NR	Gender NR (23 total)	NR	NR	NR	Fathers: 1 HS, 15 Bachelor, 7 Graduate Mothers: 4 HS, 15 Bachelor, 4 Graduate	1.5-2.5 (treatment group)	2/21 (treatment group)	NR
<b>Incidental Teaching</b>													
Charlop-Christy & Carpenter, 2000	NR	Home	2 English, 1 Hindi/English	NR	NR	NR	NR	NR	NR	NR	6, 6, 9	0/3	Hispanic, Indian, White,

Article	Country	Setting	Family Language	Family income	Caregiver Characteristics						Child Characteristics		
					Age (yrs)	Gender (F/M)	Race/Ethnicity	Marital Status	Employment	Education	Age (yrs)	Gender (F/M)	Race/Ethnicity
Hong et al., 2018	Japan	Home	NR	NR	NR	NR	NR	NR	NR	NR	4, 4	1/1	NR
Hsieh et al., 2011	NR	Home	NR	NR	24, 32, 41	2/1	NR	NR	NR	NR	8, 8, 10	2/1	NR
<b>JASPER</b>													
Carr et al., 2016	NR	Home	16 English, 2 Other, 12 NR	5 high, 12 low	NR	NR	NR	NR	NR	NR	2 - 5	NR	9 White, 10 Non-White, 11 NR
Gulrud et al., 2016	-	-	-	-	-	-	-	-	-	-	-	-	-
Harrop et al., 2017 <sup>c</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-
Kasari et al., 2015	US	Home	NR	NR	M = 36.9	43/0	4 Asian, 3 Hispanic, 9 Multi-racial, 27 White	NR	NR	M = 17 years	M = 3	8/35	4 Asian, 3 Hispanic, 9 Multi-racial, 27 White
Schlink et al., 2021 <sup>c</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-
Shire et al., 2016 <sup>c</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>Pivotal Response Training</b>													
Bradshaw et al., 2017	NR	Home, community	NR	NR	NR	NR	NR	NR	NR	NR	15, 17 21	0/3	3 White
Buckley et al., 2014	NR	Home	NR	NR	NR	1/0	NR	NR	NR	NR	6	0/1	
Coolican et al., 2010	NR	Clinic, home	NR	NR	NR	5/3	NR	NR	NR	NR	2-5	1/7	NR
Duifhuis et al., 2017	NL	Home	NR	NR	NR	NR	NR	NR	NR	NR	3-8	NR	NR
Gengoux et al., 2015	NR	Clinic, home	NR	NR	NR	NR	NR	NR	NR	NR	2- 6	6/19	NR
Gengoux et al., 2019	NR	Home	NR	NR	NR	34/9	NR	NR	NR	M = 36 years	M = 4	5/38	24 Asian, 1 Biracial, 2 Hispanic, 2 Native American, 12 White, 2 other
Hupp & Rietman, 2000	NR	Clinic, home	NR	NR	NR	1/1	NR	NR	NR	NR	8	0/1	NR
Koegel et al., 1996	NR	Home	NR	NR	NR	NR	NR	NR	NR	NR	3, 3, 4, 5, 6, 6, 6	2/5	NR
Koegel et al., 2002	US	Clinic, home	English	Middle to upper middle	NR	2/5	NR	8 Married, 1 Single	NR	1 HS, 2 Associate, 4 Bachelor, 2 MD	3, 4, 4, 4, 5	3/2	NR
McGarry et al., 2020	NR	Home	NR	NR	NR	8/3	NR	10 Married, 1 Single	NR	5 Bachelor, 6 Master or higher,	M = 3	3/8	2 Asian, 4 Hispanic Latino, 1 Multiracial, 3 White, 1 Other

Article	Country	Setting	Family Language	Family income	Caregiver Characteristics							Child Characteristics		
					Age (yrs)	Gender (F/M)	Race/Ethnicity	Marital Status	Employment	Education	Age (yrs)	Gender (F/M)	Race/Ethnicity	
Minjarez et al., 2011	US	Home	NR	NR	NR	15/9	NR	NR	NR	NR	M = 4	0/17	5 Asian, 5 East Indian, 2 Hispanic, 6 White	
Minjarez et al., 2012 <sup>d</sup>	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nefdt et al., 2010	NR	Home	NR	\$15–75K	M = 36	88%/18%	NR	88% Married	52% Unemployed, 37% Full time, 11% Part time	15% Graduate, 51% Bachelor, 29% College, 4% HS	M = 3	7%/93%	Caucasian-81%,	
Popovic et al., 2020	NR	Home	NR	NR	2 35-44, 1 45-54	3/0	3 White	NR	NR	1 Bachelor, 2 College	4, 4, 4	0/3	3 White	
Smith et al., 2015	Canada	Home	70 English, 1 other	21 under \$20K, 18 \$20-50K, 23 \$50-\$80K, 8 over \$80K	NR	NR	1 Indian, 70 White	57 Married, 8 Single, 6 Divorced	NR	7 HS, 14 Vocational, 13 College, 26 Bachelor, 10 Graduate	M = .75	17/101	NR	
Symon, 2005	US	Clinic, home, community	English	NR	NR	3/0	White	NR	NR	All Bachelor/Master	3, 5, 3	0/3	1 Asian, 2 White	
Vernon et al., 2012	NR	Home	English	NR	30, 33, 35	2/1	2 Hispanic 1 White	3 Married	NR	NR	4, 2, 3	0/2	2 Hispanic 1 White	
Verschuur et al., 2019	NL	Clinic, home	NR	NR	M = 44	9/4	NR	11 Married/partner, 2 Not married	6 Unemployed, 4 Full time, 1 Part time	7 HS, 6 Professional	M = 11	3/10	NR	
<b>Project ImPACT</b>														
Ingersoll & Wainer, 2013a	NR	School, home	NR	NR	NR	20/3	NR	17 Married, 6 Not married	NR	1 some HS, 3, HS, 8 College, 9 Bachelor, 1 Master	M = 3.8	3/21	20 White, 2 Black, 2 Multiracial	
Ingersoll & Wainer, 2013b	NR	Clinic, home	NR	NR	NR	8/0	NR	NR	3 Unemployed, 2 Part time, 3 Full time	1 HS, 4 some college, 2 bachelor's, 1 graduate	44, 44, 44, 46, 52, 54, 63, & 80 months	1/7	1 Black, 2 Hispanic, 6 White	
Ingersoll et al., 2016	US	Home	NR	NR	NR	12/1	NR	8% married	46% not employed	54 < College degree	19 - 73 months	39% female	8% minority	
Li et al., 2022	China	Home	NR	NR	Inclusion criteria 20-50	NR	NR	NR	NR	NR	Inclusion criteria 2-6	NR	NR	
Pickard et al., 2023	US	Community, home	NR	NR	NR	25/0	NR	NR	NR	2 some HS, 8 HS/GED, 4 Associate, 8 some college, 1 Bachelor, 3 Master	M = 2.1	9/16	11 Black, 6 Hispanic, 3 Multiracial, 11 White	
Pickard, Kilgore, & Ingersoll, 2016	US	NA	NR	6 under \$10K, 1 \$10K-\$15K, 5	M = 35	14/2	10 Black, 3 Multi-racial, 3 White	7 Married/partner, 9 Single	NR	2 less than HS, 9 HS, 3 some	M = 4.5	4/12	NR	

Article	Country	Setting	Family Language	Family income	Caregiver Characteristics							Child Characteristics		
					Age (yrs)	Gender (F/M)	Race/Ethnicity	Marital Status	Employment	Education	Age (yrs)	Gender (F/M)	Race/Ethnicity	
Pickard, Wainer et al., 2016	NR	Virtual, home	NR	\$15K-\$20K, 4 \$20K-\$30K NR	NR	27/1	2 Black, 3 Biracial, 23 White	21 Married/ partner, 7 Single	NR	college, 2 Bachelor's 2 HS, 10 College, 11 Bachelor, 4 Graduate	M = 3.5	6/22	NR	
Pickard et al., 2019	US	NA	NR	12 < \$20K, 6 \$20-30K, 6 \$30- 40K, 10 \$40- 50K, 5 \$50-60K, 5 \$60-70K, 7 > \$70K, 1 NR	M = 33	43/9	1 Asian, 8 Black, 5 Hispanic, 2 Multi- racial, 36 White	10 Married/ partner, 42 Single	NR	2 less than HS, 7 HS, 19 College, 14 Bachelor, 9 Graduate, Others NR	M = 4	NR	1 Asian, 8 Black, 5 Hispanic, 2 Multiracial, 36 White	
Pierucci et al., 2023	Zambia	Clinic, home	5 English only, 5 English + local language, 1 Nyanja	Mean = 35,875 Zambian Kwacha	M = 45	15/1 3 NR	NR	13 Married, 2 Single, 1 Widowed, 2 Divorced, 1 NR NR	9 Employed, 10 Unemployed	2 Elementary, 2 HS, 14 College, 1 NR	M = 7.9	4/16	NR	
Russell & Ingersoll, 2021	NR	Home	NR	NR	NR	16/1	NR	NR	NR	5 College, 12 Bachelor or more	M = 3.8	6/11	13 White, 4 Other	
Sengupta et al., 2020	NR	Clinic, home	NR	12 < \$15K, 13 \$15-30K, 6 \$30- 50K, 26 >\$50K,	M = 34	57/0	NR	NR	NR	25 Graduate, 21 Bachelor, 4 HS, 2 less than HS, 4 NR	M = 3.5	9/48	NR	
Sengupta et al., 2021	India	Virtual, home	Hindi/English	NR	M= 34	12/0	NR	All Married	NR	Bachelor or more	M = 4	NR	NR	
<b>Reciprocal Imitation Training</b>														
Hall et al., 2019	NR	Home	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR
Penney & Schwartz, 2019	NR	Home	NR	NR	NR	2/1	3 White	2 Married	2 Unemployed, 1 Employed	NR	4.0, 5.0, 5.5,	1/2	3 White	
Wainer & Ingersoll, 2013	US	Virtual, home	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	NR	
Wainer & Ingersoll, 2015	US	Virtual, home	NR	NR	NR	5/0	2 Asian, 1 Multi- racial, 1 White, 1 Hispanic	5 Married/ partner	3 Employed, 2 Unemployed	4 Grad degrees, 1 college/special training	29-59 months	NR	NR	
Wainer et al., 2021	US	Clinic, home	NR	NR	NR	10/0	NR	8 Married/ partner, 2 Single	6 Employed	1 Some HS, 2 HS, 3 College, 4 Graduate	M = 3	0/8	1 Asian, 4 Black, 4 Hispanic, 1 Multiracial	
Zahglawan & Ostrosky, 2016	NR	Home	NR	NR	NR	2/1	NR	2 Married	2 Unemployed	NR	37, 60 months	0/2	NR	

Note. <sup>a</sup>participants are the same as Waddington et al., 2021; <sup>b</sup>participants are the same as Seo et al., 2022; <sup>c</sup>participants are the same as Kasari et al., 2015; <sup>d</sup>participants are the same as Minarjez et al., 2011; HS = High school; IV = Intervention; MD = Medical degree; MS = Middle School; NA = Not applicable (not an intervention study); NL = Netherlands; NR = Not reported; NZ = New Zealand; SA = South Africa; SW = Switzerland; US = United States

**Table 2***Cultural Adaptation Checklist (CAC) Data from Included Studies and Interviews Organized by NDBI*

Article/ interview	CAC Dimension*						
	Process	Language	Persons	Content	Goals	Methods	Context
Enhanced Milieu Teaching							
Alpert & Kaiser, 1992	Video examples, handout describing intervention;	NR	NR	NR	NR	NR	NR
Early Start Denver Model							
Abouzeid et al., 2020	Phase based approach - modifications/adaptations made after a previous phase to ensure contextual fit	The program was translated in a previous phase.	Researchers partnered with coaches from existing assessment program in the community. Parents collaborated in setting individualized objectives and developing an intervention plan	Previous adaptations following the first pilot as well as parent iterative input during program implementation may have addressed the content, but not specifically reported	Acceptability of the intervention was evaluated post training.	NR	Intervention delivered in community centers
Cucinotta et al., 2022	NR	NR	NR	NR	NR	NR	NR
Devescovi et al., 2022	NR	NR	Program delivered through existing public health system	NR	NR	Intervention delivery adjusted to respond to COVID restrictions	Intervention delivery adjusted to respond to COVID restrictions
Estes et al., 2014	NR	NR	Therapist and parent collaborated in goal setting	NR	Therapist and parent collaborated in goal setting	Diverse recruitment methods, and childcare provided to enable parent participation	Childcare provided where needed to enable parent to participate
Franz et al., 2022	NR	NR	The team members were from South Africa and familiar with the context and cultures.	NR	NR	Program was adjusted to be delivered asynchronously via WhatsApp due to data costs	Program was adjusted to be delivered asynchronously via WhatsApp due to data costs
Gaines et al., 2022	Program delivered through existing early intervention mechanisms	NR	Program delivered through existing early intervention mechanisms	NR	Parents rated the process of care	Manual provided to caregivers, ensuring sustained access to intervention materials	Intervention delivered in home setting
Grogan et al., 2023	NR	NR	NR	NR	NR	NR	NR
Liu et al., 2023	NR	NR	NR	NR	NR	Manual provided to caregivers, ensuring sustained access to intervention materials	NR
Malucelli et al., 2021	NR	NR	Individual parent meeting conducted to discuss difficulties and goal setting	Parents made videos and professionals gave individual feedback to address learning needs of parents	Social validity assessed	NR	NR
Ogilvie & McCrudden, 2017	Feedback obtained from participants on social validity of intervention	NR	Parents had role of providing feedback in qualitative and quantitative phases of the study	Parental perceptions of the aims, procedures, and outcomes of the intervention collected	Social validity assessed	Home-based, but unclear if this was preferred	Intervention delivered in home setting
Qu et al., 2022	One member of the research team was native to the language and culture of participants	Translation and back-translation by persons not part of the study	NR	Utilized a family capacity-building approach	Social validity assessed	Various methods aligned to participants' needs	Team member matched cultural and language make up of participants
Rogers et al., 2019	NR	NR	NR	NR	Social validity assessed	NR	Clinic and home settings
Rooks-Ellis et al., 2020	Intervention was offered as it aligned to the existing service model	NR	NR	NR	Social validity assessed	Parental schedules were considered	Telehealth offered option for rural families to take part in intervention
Seo et al., 2022	NR	NR	NR	NR	Social validity assessed	NR	Intervention took place in home or community center based on family preference

Article/ interview	CAC Dimension*						
	Process	Language	Persons	Content	Goals	Methods	Context
Vismara et al., 2013	Program was piloted with 12 families, feedback sought from families	NR	Parent feedback was used to direct intervention activities	Pilot of content, feedback sought from families	NR	Equipment needed to take part in telehealth sessions was made available to parents	Sessions were scheduled at times most convenient for parent and children
Vismara et al., 2018	NR	NR	Collaboration between therapists and parent to evaluate sessions and plan further implementation	During each session, parents reflected on relevance of training topics to their learning needs	NR	NR	NA
Vismara et al., 2019	NR	NR	Parent feedback was used to direct intervention activities	NR	NR	Parents could conduct sessions at the center or via telehealth	Parents could conduct sessions at the center or via telehealth
Waddington et al., 2021	NR	Wording was simplified for one mother with English as a second language.	Goals chosen based on parent and therapist collaboration	Goals were jointly identified, training was adapted to parent language needs	NR	Home-based, but unclear if this was preferred	Intervention delivered in home setting
Waddington et al., 2020a <sup>a</sup>	NR	NR	NR	NR	NR	Home-based, but unclear if this was preferred	Intervention delivered in home setting
Waddington et al., 2020b <sup>a</sup>	NR	NR	NR	NR	Social validity assessed	Home-based, but unclear if this was preferred	Intervention delivered in home setting
Waddington et al., 2022 <sup>b</sup>	NR	NR	NR	NR	NR	Home-based, but unclear if this was preferred	Intervention delivered in home setting
Wood de Wilde et al., 2023	NR	NR	NR	NR	NR	Intervention delivery adjusted to respond to COVID restrictions	Intervention delivery adjusted to respond to COVID restrictions
Zhang et al., 2019	Pilot study, results suggested that program showed promise for target group	NR	Trainer encouraged parents to find solutions	NR	NR	NR	NR
Zhou et al., 2018	NR	NR	NR	No – following the child’s lead does not fit with the parenting style in most Chinese families	Griffiths scale used to measure outcomes was validated for the population	NR	NR
<b>Incidental Teaching</b>							
Charlop-Christy & Carpenter, 2000	NR	Target phrases selected based on therapist evaluation, unclear if conducted in native language of participants	NR	NR	Satisfaction questionnaire completed by participants each week after treatment	NR	Intervention delivered in home setting
Hong et al., 2018	Target behaviors selected based on participant/therapist input	Intervention in Japanese	Target behaviors selected based on participant/therapist input (not iterative)	Target behaviors selected based on participant/therapist input, provided rationale for relevance of intervention for child	Target behavior selected based on participant/therapist input, satisfaction questionnaire completed by participants	Participant recruitment at the university clinic where services were already being delivered	Intervention delivered in home setting
Hsieh et al., 2011	NR	Participants given definition of incidental teaching	NR	Participant selection of target responses for child	Measured fidelity of implementation by participants	NR	Intervention delivered in home setting
<b>JASPER</b>							
Interview	Advisory board meeting with stakeholders	Translation in Spanish	Advisory board meeting with stakeholders	Most appropriate terms determined	Yes, through a pilot	Feedback from participants	Intervention delivered in home setting
Carr et al., 2016	NR	Intervention offered in Korean if preferred by caregivers	NR	NR	NR	Partial – family schedules accommodated	NR
Gulsrud et al., 2016	NR	NR	NR	NR	NR	NR	NR
Harrop et al., 2017 <sup>c</sup>	NR	NR	NR	NR	NR	NR	NR
Kasari et al., 2015	NR	NR	NR	NR	NR	NR	NR

Article/ interview	CAC Dimension*						
	Process	Language	Persons	Content	Goals	Methods	Context
Schlink et al., 2021 <sup>c</sup>	NR	NR	NR	NR	NR	NR	NR
Shire et al., 2016 <sup>c</sup>	NR	NR	NR	NR	NR	NR	NR
<b>Pivotal Response Training</b>							
Interview” LK	Feedback from community was prioritized and used to refine intervention	Translations in Chinese, Spanish, Portuguese, Arabic, & Greek by international students	NR	NR	NR	Used feedback from caregivers	NR
Bradshaw et al., 2017	NR	NR	NR	Clinician and parent collaboratively decided on a target social-communicative behaviors	Assessed social validity of goals through parent satisfaction questionnaires	NR	Intervention delivered in home or other natural setting (e.g., the park)
Buckley et al., 2014	NR	NR	NR	Provided support to family in areas they felt was most needed	Assessed social validity of goals through informal feedback of parents	NA – case study	Intervention delivered in home setting
Coolican et al., 2010	NA	NA	NA	NR	Assessed social validity of goals through parent satisfaction questionnaires	NR	For generalization purposes last session took place in home
Duifhuis et al., 2017	NR	NR	NR	NR	NR	NR	NR
Gengoux et al., 2015	NR	NR	NR	NR	NR	NR	NR
Gengoux et al., 2019	NA	NA	NA	NR	NR	NR	Some sessions conducted in homes
Hupp & Rietman, 2000	NR	NR	NR	NR	Some parent identified goals	NR	Most sessions took place in homes
Koegel et al., 1996	NR	NR	NR	NR	Parent and IEP indentified goals	NR	Intervention undertaken during dinnertime in home
Koegel et al., 2002	NA	NA	NA	NR	Some parent identified goals	NR	Some sessions took place in community settings and natural child play environments
McGarry et al., 2020	NR	NR	NR	NR	Parent identified goals and parental satisfaction with intervention assessed via satisfaction questionnaires	Recruitment through social media, intervention web based to accomodate diversity of families’ schedules	Online delivery of intervention
Minjarez et al., 2011	NR	NR	NR	NR	Some parent identified goals	Parents given choice to participate in group or individual sessions	NR
Minjarez et al., 2012 <sup>d</sup>	NR	NR	NR	NR	Some parent identified goals	Parents given choice to participate in group or individual sessions	NR
Nefdt et al., 2010	NR	NR	NR	NR	Assessed social validity of goals through parent satisfaction questionnaires	Self-directed learning approach for introductory training	NR
Popovic et al., 2020	NR	NR	NR	NR	Social validity questionnaire administered at end of study	Recruitment through use of flyers	Some sessions conducted in homes
Smith et al., 2015	NR	NR	NR	NR	Parent and childcare provider identified goals	Individualized treatment plan incorporating parent training and one on one early intervention for children	Sessions conducted at home or preschool based on family preference

Article/ interview	CAC Dimension*						
	Process	Language	Persons	Content	Goals	Methods	Context
Symon, 2005	NR	NR	NR	NR	NR	NR	Some sessions conducted in community settings
Vernon et al., 2012	NR	NR	NR	NR	NR	NR	Sessions took place in homes and community settings
Verschuur et al., 2019	NR	NR	NR	NR	All parents completed social validity questionnaires	NR	Some sessions conducted in homes
<b>Project ImPACT</b>							
Interviews	NR	Translation in Spanish, Chinese, & Dutch	University staff	NR	NR	Community members were engaged	NR
Ingersoll & Wainer, 2013a	Parent and teacher feedback	NR	Parents	NR	NR	Parent and teacher feedback	Classroom
Ingersoll & Wainer, 2013b	Iterative process with parents, teachers, and service providers	NR	Parents, teachers, and service providers	NR	NR	NR	Some generalization sessions in the home
Ingersoll et al., 2016	NR	NR	NR	NR	NR	NR	Telehealth approach
Li et al., 2022	NR	Materials translated in Mandarin	NR	NR	Coaching within intervention	Manuals in Mandarin, chat groups and online intervention	NR
Pickard et al., 2023	Roger's Diffusion of Innovations to guide community partnership	NR	Community agencies	NR	Coaching within intervention	NR	Through EI providers
Pickard, Kilgore, & Ingersoll, 2016	Roger's Diffusion of Innovations to guide community partnership	NR	Community members	Conducted feasibility study informed future studies	Reported in previous paper	Travel to research site	NA
Pickard, Wainer et al., 2016	Parents as key stakeholder	NR	Parents	NR	NR	NR	NR
Pickard et al., 2019	Roger's Diffusion of Innovations to guide community partnership	Materials at 8 <sup>th</sup> grade level, reduced number of terms	Community agencies	Reported in previous paper	Reported in previous paper	Online participation	NR
Pierucci et al., 2023	NR	NR	Team members from Zambia	NR	Yes, satisfaction survey	NR	Hospital and natural settings
Russell & Ingersoll, 2021	NR	NR	NR	NR	Yes, parent asked reflection questions	Online (telehealth)	Online method which previous research found appropriate
Sengupta et al., 2020	Parent engagement through rating and focus groups	Translated into Hindi	6 families in a pilot	Local social and economic context taken into account, included information parents requested	Parent ratings and focus group	NR	Local and socio-economic context
Sengupta et al., 2021	Parent engagement through rating and focus groups	Translated into Hindi	6 families in a pilot	Local social and economic context taken into account, included information parents requested	Parent ratings and focus group	Group format for delivery online	Local and socio-economic context
<b>Reciprocal Imitation Training</b>							
Interviews	NR	Direct translation into Spanish using native speakers, verified by community members	Engaged community members in debriefing sessions to refine intervention process	NR	NR	NR	NR
Hall et al., 2019	Piloted study requesting feedback to identify barriers and perspectives	N/A	NR	Piloted intervention with interded participants	NR	NR	Online workshop

Article/ interview	CAC Dimension*						
	Process	Language	Persons	Content	Goals	Methods	Context
Penney & Schwartz, 2019	Partnered with community stakeholders in planning process	NA	Parent input obtained on toys and materials during planning, encouraged to share ideas during intervention	NR	NR	Parking reimbursement provided	Intervention delivered in home setting
Wainer & Ingersoll, 2013	NR	NR	Parents given additional support from a coach in order to achieve treatment fidelity	Piloted content before implementation	NR	NR	Online sessions only
Wainer & Ingersoll, 2015	NR	NR	NR	Parents completed exit assessments about intervention and delivery method	NR	NR	Online sessions only
Wainer et al., 2021	Piloted intervention to ensure acceptability and usability	NR	NR	Collaborative and iterative process with pilot participants to ensure acceptability and usability	NR	Recruitment via clinicians, community partners, and social media postings	Online sessions only
Zahglawan & Ostrosky, 2016	NR	NR	NR	NR	NR	NR	Intervention delivered in home setting

*Note.* \*CAC dimensions were defined and coded based on Lee et al. (2023) and questions posed within the CAC checklist. Dimensions were defined as follows: Process – how interventions are adapted and implemented using an iterative process; Language – use of culturally appropriate and sensitive language when planning and delivering intervention; Persons – Roles and relationships between all parties (e.g., research team, participants, community stakeholders); Content – incorporating cultural knowledge in the intervention as it relates to values and traditions; Goals – Compatibility and appropriateness of goals and outcomes for the community members; Methods – Incorporating cultural knowledge into planning, procedures, and implementation of treatment; Context – How social, economic, and political contexts are incorporated to support cultural sensitivity of the intervention; NA = Not applicable (not an intervention study); NR = Not reported.

## Articles Included in the Scoping Review

- Abouzeid, N., Rivard, M., Mello, C., Mestari, Z., Boulé, M., & Guay, C. (2020). Parent coaching intervention program based on the Early Start Denver Model for children with autism spectrum disorder: Feasibility and acceptability study. *Research in Developmental Disabilities, 105*, 103747. <https://doi.org/10.1016/j.ridd.2020.103747>
- Alpert, C. L., & Kaiser, A. P. (1992). Training parents as milieu language teachers. *Journal of Early Intervention, 16*(1), 31-52. <https://doi.org/10.1177/10538151920160010>
- Bradshaw, J., Koegel, L. K., & Koegel, R. L. (2017). Improving functional language and social motivation with a parent-mediated intervention for toddlers with autism spectrum disorder. *Journal of Autism and Developmental Disorders, 47*, 2443-2458. <https://doi.org/10.1007/s10803-017-3155-8>
- Buckley, T. W., Ente, A. P., & Ruef, M. B. (2014). Improving a family's overall quality of life through parent training in pivotal response treatment. *Journal of Positive Behavior Interventions, 16*(1), 60-63. <https://doi.org/10.1177/1098300713483177>
- Carr, T., Shih, W., Lawton, K., Lord, C., King, B., & Kasari, C. (2016). The relationship between treatment attendance, adherence, and outcome in a caregiver-mediated intervention for low-resourced families of young children with autism spectrum disorder. *Autism, 20*(6), 643-652. <https://doi.org/10.1177/1362361315598634>
- Charlop-Christy, M. H., & Carpenter, M. H. (2000). Modified incidental teaching sessions: A procedure for parents to increase spontaneous speech in their children with autism. *Journal of Positive Behavior Interventions, 2*(2), 98-112. <https://doi.org/10.1177/109830070000200203>
- Coolican, J., Smith, I. M., & Bryson, S. E. (2010). Brief parent training in pivotal response treatment for preschoolers with autism. *Journal of Child Psychology and Psychiatry, 51*(12), 1321-1330. <https://doi.org/10.1111/j.1469-7610.2010.02326.x>
- Cucinotta, F., Vetri, L., Ruta, L., Turriziani, L., Benedetto, L., Ingrassia, M., Maggio, R., Germano, E., Alquino, A., Siracusano, Roccella, M. & Gagliano, A. (2022). Impact of three kinds of early interventions on developmental profile in toddlers with autism spectrum disorder. *Journal of Clinical Medicine, 11*(18), 5424. <https://doi.org/10.3390/jcm11185424>
- Devescovi, R., Bresciani, G., Colonna, V., Carrozzi, M., Dissegna, A., Celea, M. A., Cescon, D., Frisari, S., Guerrieri, M., Placer, F., Stocchi, M., Terpini, C., & Colombi, C. (2023). Short-Term outcomes of an ESDM intervention in Italian children with autism spectrum disorder following the COVID-19 ;ockdown. *Children, 10*(4), 691. <https://doi.org/10.3390/children10040691>
- Duifhuis, E. A., Den Boer, J. C., Doornbos, A., Buitelaar, J. K., Oosterling, I. J., & Klip, H. (2017). The effect of pivotal response treatment in children with autism spectrum disorders: A non-randomized study with a blinded outcome measure. *Journal of Autism and Developmental Disorders, 47*, 231-242. <https://doi.org/10.1007/s10803-016-2916-0>
- Estes, A., Vismara, L., Mercado, C., Fitzpatrick, A., Elder, L., Greenson, J., Lord, C., Munson, J., Winter, J., Young, G., Dawson, G., & Rogers, S. (2014). The impact of parent-delivered intervention on parents of very young children with autism. *Journal of Autism and Developmental Disorders, 44*, 353-365. <https://doi.org/10.1007/s10803-013-1874-z>
- Franz, L., Howard, J., Viljoen, M., Sikich, L., Chandrasekhar, T., Kollins, S. H., Lee, L., Ndlovu, M., Sabatos-DeVito, M., Seris, N., Shabalala, N., Spanos, M., de Vries, P. J., & Dawson, G. (2022). Pragmatic adaptations of telehealth-delivered caregiver coaching for children with autism in the context of COVID-19: Perspectives from the United States and South Africa. *Autism, 26*(1), 270-275. <https://doi.org/10.1177/13623613211022>
- Gaines, R., Korneluk, Y., Quigley, D., Chiasson, V., Delehanty, A., & Jacobson, S. (2022). Quickstart for toddlers with autism spectrum disorder: A preliminary report of an adapted community-based early intervention program. *Autism & Developmental Language Impairments, 7*, 23969415221138699. <https://doi.org/10.1177/239694152211386>
- Gengoux, G., Abrams, D., Schuck, R., Millan, M., Libove, R., Ardel, C., Phillips, A., Fox, M., Fraiser, T., & Hardan, A. (2019). A pivotal response treatment package for children with autism spectrum disorder: An RCT. *Pediatrics, 144*(3). <https://doi.org/10.1542/peds.2019-0178>
- Gengoux, G., Berquist, K., Salzman, E., Schapp, S., Phillips, J., Frazier, T., Minarjez, M., & Hardan, A. (2015). Pivotal response treatment parent training for autism: Findings from a 3-month follow-up evaluation. *Journal of Autism and Developmental Disorders, 45*, 2889-2898. <https://doi.org/10.1007/s10803-015-2452-3>
- Grogan, P., Yaari, M., Jellet, R., Unwin, K., & Dissanayake, C. (2023). Parent resolution of diagnosis and

- intervention fidelity in a parent-delivered intervention for pre-school children with autism: A mixed methods study. *Research in Autism Spectrum Disorders*, 101, 102102. <https://doi.org/10.1016/j.rasd.2023.102102>
- Gulsrud, A. C., Hellemann, G., Shire, S., & Kasari, C. (2016). Isolating active ingredients in a parent-mediated social communication intervention for toddlers with autism spectrum disorder. *Journal of Child Psychology and Psychiatry*, 57(5), 606-613. <https://doi.org/10.1111/jcpp.12481>
- Hall, T. A., Mastel, S., Nickel, R., & Wainer, A. (2019). Parents training parents: Lessons learned from a study of reciprocal imitation training in young children with autism spectrum disorder. *Autism*, 23(6), 1601-1606. <https://doi.org/10.1177/1362361318815643>
- Harrop, C., Gulsrud, A., Shih, W., Hovsepyan, L., & Kasari, C. (2017). The impact of caregiver-mediated JASPER on child restricted and repetitive behaviors and caregiver responses. *Autism Research*, 10(5), 983-992. <https://doi.org/10.1002/aur.1732>
- Hong, E. R., Gong, L., Ganz, J. B., & Neely, L. (2018). Self-paced and video-based learning: Parent training and language skills in Japanese children with ASD. *Exceptionality Education International*, 28(2). <https://doi.org/10.5206/eei.v28i2.7762>
- Hsieh, H. H., Wilder, D. A., & Abellon, O. E. (2011). The effects of training on caregiver implementation of incidental teaching. *Journal of Applied Behavior Analysis*, 44(1), 199-203. <https://doi.org/10.1901/jaba.2011.44-199>
- Hupp, S. D., & Reitman, D. (2000). Parent-assisted modification of pivotal social skills for a child diagnosed with PDD: A clinical replication. *Journal of Positive Behavior Interventions*, 2(3), 183-188. <https://doi.org/10.1177/109830070000200308>
- Ingersoll, B., & Wainer, A. (2013). Initial efficacy of Project ImPACT: A parent-mediated social communication intervention for young children with ASD. *Journal of Autism and Developmental Disorders*, 43(12), 2943-2952. <https://doi.org/10.1007/s10803-013-1840-9>
- Ingersoll, B. R., & Wainer, A. L. (2013). Pilot study of a school-based parent training program for preschoolers with ASD. *Autism*, 17(4), 434-448. <https://doi.org/10.1177/1362361311427155>
- Ingersoll, B., Wainer, A. L., Berger, N. I., Pickard, K. E., & Bonter, N. (2016). Comparison of a self-directed and therapist-assisted telehealth parent-mediated intervention for children with ASD: A pilot RCT. *Journal of Autism and Developmental Disorders*, 46(7), 2275-2284. <https://doi.org/10.1007/s10803-016-2755-z>
- Kasari, C., Gulsrud, A., Paparella, T., Hellemann, G., & Berry, K. (2015). Randomized comparative efficacy study of parent-mediated interventions for toddlers with autism. *Journal of Consulting and Clinical Psychology*, 83(3), 554. <http://doi.org/10.1037/a0039080>
- Koegel, R. L., Bimbela, A., & Schreibman, L. (1996). Collateral effects of parent training on family interactions. *Journal of Autism and Developmental Disorders*, 26(3), 347-359. <https://doi.org/10.1007/BF02172479>
- Koegel, R. L., Symon, J. B., & Kern Koegel, L. (2002). Parent education for families of children with autism living in geographically distant areas. *Journal of Positive Behavior Interventions*, 4(2), 88-103. <https://doi.org/10.1177/109830070200400204>
- Li, F., Wu, D., Ren, F., Shen, L., Xue, M., Yu, J., Zhang, L., Tang, Y., Liu, Z., Tao, M., Zhao, L., Jiang, L., Xu, M., & Li, F. (2022). Effectiveness of online-delivered project ImPACT for Children with ASD and their parents: A pilot study during the COVID-19 Pandemic. *Frontiers in Psychiatry*, 13, 806149. <https://doi.org/10.3389/fpsy.2022.806149>
- Liu, T., Martinez-Torres, K., Mazzone, J., Camarata, S., & Lense, M. (2023). Brief Report: Telehealth Music-Enhanced Reciprocal Imitation Training in Autism: A Single-Subject Feasibility Study of a Virtual Parent Coaching Intervention. *Journal of Autism and Developmental Disorders*, 1-13. <https://doi.org/10.1007/s10803-023-06053-z>
- Malucelli, E. R., Antoniuk, S. A., & Carvalho, N. O. (2021). The effectiveness of early parental coaching in the autism spectrum disorder. *Jornal de Pediatria*, 97, 453-458. <https://doi.org/10.1016/j.jped.2020.09.004>
- McGarry, E., Vernon, T., & Baktha, A. (2020). Brief report: A pilot online pivotal response treatment training program for parents of toddlers with autism spectrum disorder. *Journal of Autism and Developmental Disorders*, 50, 3424-3431. <https://doi.org/10.1007/s10803-019-04100-2>
- Minjarez, M. B., Williams, S. E., Mercier, E. M., & Hardan, A. Y. (2011). Pivotal response group treatment program for parents of children with autism. *Journal of Autism and Developmental Disorders*, 41, 92-101. <https://doi.org/10.1007/s10803-010-1027-6>
- Minjarez, M. B., Mercier, E. M., Williams, S. E., & Hardan, A. Y. (2013). Impact of pivotal response training group therapy on stress and empowerment in parents of children with autism. *Journal of Positive Behavior*

- Interventions*, 15(2), 71-78. <https://doi.org/10.1177/1098300712449055>
- Nefdt, N., Koegel, R., Singer, G., & Gerber, M. (2010). The use of a self-directed learning program to provide introductory training in pivotal response treatment to parents of children with autism. *Journal of Positive Behavior Interventions*, 12(1), 23-32. <https://doi.org/10.1177/1098300709334796>
- Ogilvie, E., & McCrudden, M. T. (2017). Evaluating the social validity of the early start Denver model: A convergent mixed methods study. *Journal of Autism and Developmental Disorders*, 47, 2899-2910. <https://doi.org/10.1007/s10803-017-3214-1>
- Penney, A., & Schwartz, I. (2019). Effects of coaching on the fidelity of parent implementation of reciprocal imitation training. *Autism*, 23(6), 1497-1507. <https://doi.org/10.1177/1362361318816688>
- Pickard, K., Hendrix, N., Guerra, K., Brane, N., & Islam, N. (2023). Examining provider decisions around the delivery and adaptation of a parent-mediated intervention within an Early Intervention system. *Autism*, 27(8), 2384-2396. <https://doi.org/10.1177/1362361323116214>
- Pickard, K. E., Kilgore, A. N., & Ingersoll, B. R. (2016). Using community partnerships to better understand the barriers to using an evidence-based, parent-mediated intervention for autism spectrum disorder in a Medicaid system. *American Journal of Community Psychology*, 57(3-4), 391-403. <https://doi.org/10.1002/ajcp.12050>
- Pickard, K., Rowless, S., & Ingersoll, B. (2019). Understanding the impact of adaptations to a parent-mediated intervention on parents' ratings of perceived barriers, program attributes, and intent to use. *Autism*, 23(2), 338-349. <https://doi.org/10.1177/1362361317744078>
- Pickard, K. E., Wainer, A. L., Bailey, K. M., & Ingersoll, B. R. (2016). A mixed-method evaluation of the feasibility and acceptability of a telehealth-based parent-mediated intervention for children with autism spectrum disorder. *Autism*, 20(7), 845-855. <https://doi.org/10.1177/1362361315614496>
- Pierucci, J. M., Aquino, G. A., Pearson, A., Perez, M., Mwanza-Kabaghe, S., Sichimba, F., & Mooya, H. (2023). Parent-mediated intervention training for caregivers of children with developmental differences in Zambia. *Research in Developmental Disabilities*, 132, 104373. <https://doi.org/10.1016/j.ridd.2022.104373>
- Popovic, S. C., Starr, E. M., & Koegel, L. K. (2020). Teaching initiated question asking to children with autism spectrum disorder through a short-term parent-mediated program. *Journal of Autism and Developmental Disorders*, 50, 3728-3738. <https://doi.org/10.1007/s10803-020-04426-2>
- Qu, L., Chen, H., Miller, H., Miller, A., Colombi, C., Chen, W., & Ulrich, D. A. (2022). Assessing the satisfaction and acceptability of an online parent coaching intervention: A mixed-methods approach. *Frontiers in Psychology*, 13, 859145. <https://doi.org/10.3389/fpsyg.2022.859145>
- Rogers, S. J., Estes, A., Vismara, L., Munson, J., Zierhut, C., Greenon, J., Dawson, G., Rocha, M., Sugar, C., Senturk, D., Whelan, F., & Talbott, M. (2019). Enhancing low-intensity coaching in parent implemented Early Start Denver Model intervention for early autism: A randomized comparison treatment trial. *Journal of Autism and Developmental Disorders*, 49, 632-646. <https://doi.org/10.1007/s10803-018-3740-5>
- Rooks-Ellis, D. L., Howorth, S. K., Boulette, S., Kunze, M., & Sulinski, E. (2020). Effects of a parent training using telehealth: Equity and access to early intervention for rural families. *Journal of Childhood, Education & Society*, 1(2), 141-166. <https://doi.org/10.37291/2717638X.20201242>
- Russell, K. M., & Ingersoll, B. (2021). Factors related to parental therapeutic self-efficacy in a parent-mediated intervention for children with autism spectrum disorder: A mixed methods study. *Autism*, 25(4), 971-981. <https://doi.org/10.1177/136236132097423>
- Schlink, A., Williams, J., Pizzano, M., Gulsrud, A., & Kasari, C. (2022). Parenting stress in caregiver-mediated interventions for toddlers with autism: An application of quantile regression mixed models. *Autism Research*, 15(2), 353-365. <https://doi.org/10.1002/aur.2637>
- Sengupta, K., Javeri, A., Mascarenhas, C., Khaparde, O., & Mahadik, S. (2021). Feasibility and acceptability of a synchronous online parent-mediated early intervention for children with autism in a low resource setting during COVID-19 pandemic. *International Journal of Disability, Development and Education*, 1-17. <https://doi.org/10.1080/1034912X.2021.1937957>
- Sengupta, K., Mahadik, S., & Kapoor, G. (2020). Globalizing project ImPACT: Feasibility, acceptability and preliminary outcomes of a parent-mediated social communication intervention for autism adapted to the Indian context. *Research in Autism Spectrum Disorders*, 76, 101585. <https://doi.org/j.rasd/2020/101585>
- Seo, J., France, K., McLay, L., & Waddington, H. (2022). Parents' Perceptions of Coaching and Low-Intensity Therapy for Young Children on the Autism Spectrum. *Advances in Neurodevelopmental Disorders*, 6, 65-75. <https://doi.org/10.1007/s41252-021-00233-7>
- Shire, S. Y., Gulsrud, A., & Kasari, C. (2016). Increasing responsive parent-child interactions and joint engagement:

- Comparing the influence of parent-mediated intervention and parent psychoeducation. *Journal of Autism and Developmental Disorders*, 46, 1737-1747. <https://doi.org/10.1007/s10803-016-2702-z>
- Smith, I. M., Flanagan, H. E., Garon, N., & Bryson, S. E. (2015). Effectiveness of community-based early intervention based on Pivotal Response Treatment. *Journal of Autism and Developmental Disorders*, 45(6), 1858–1872. <https://doi.org/10.1007/s10803-014-2345-x>
- Symon, J. B. (2005). Expanding interventions for children with autism: Parents as trainers. *Journal of Positive Behavior Interventions*, 7(3), 159-173. <https://doi.org/10.1177/10983007050070030501>
- Vernon, T. W., Koegel, R. L., Dauterman, H., & Stolen, K. (2012). An early social engagement intervention for young children with autism and their parents. *Journal of Autism and Developmental Disorders*, 42, 2702-2717. <https://doi.org/10.1007/s10803-012-1535-7>
- Verschuur, R., Huskens, B., & Didden, R. (2019). Effectiveness of parent education in pivotal response treatment on pivotal and collateral responses. *Journal of Autism and Developmental Disorders*, 49, 3477-3493. <https://doi.org/10.1007/s10803-019-04061-6>
- Vismara, L. A., McCormick, C. E., Shields, R., & Hessel, D. (2019). Extending the parent-delivered Early Start Denver Model to young children with fragile X syndrome. *Journal of Autism and Developmental Disorders*, 49, 1250-1266. <https://doi.org/10.1007/s10803-018-3833-1>
- Vismara, L. A., McCormick, C. E., Wagner, A. L., Monlux, K., Nadhan, A., & Young, G. S. (2018). Telehealth parent training in the Early Start Denver Model: Results from a randomized controlled study. *Focus on Autism and Other Developmental Disabilities*, 33(2), 67-79. <https://doi.org/10.1177/1088357616651064>
- Vismara, L. A., McCormick, C., Young, G. S., Nadhan, A., & Monlux, K. (2013). Preliminary findings of a telehealth approach to parent training in autism. *Journal of Autism and Developmental Disorders*, 43, 2953-2969. <https://doi.org/10.1007/s10803-013-1841-8>
- Waddington, H., Curtis, S., van Noorden, L., Sigafos, J., van der Meer, L., & Whitehouse, A. (2022). Evaluation of Low-intensity Therapist-Delivered Intervention in Addition to Parent Coaching for Young Children with Autism Spectrum Disorder. *International Journal of Disability, Development and Education*, 1-21. <https://doi.org/10.1080/1034912X.2022.2120601>
- Waddington, H., van der Meer, L., & Sigafos, J. (2021). Supporting parents in the use of the early start Denver model as an intervention program for their young children with autism spectrum disorder. *International Journal of Developmental Disabilities*, 67(1), 23-36. <https://doi.org/10.1080/20473869.2019.1585694>
- Waddington, H., van der Meer, L., Sigafos, J., & Bowden, C. J. (2020). Mothers' perceptions of a home-based training program based on the Early Start Denver Model. *Advances in Neurodevelopmental Disorders*, 4, 122-133. <https://doi.org/10.1007/s41252-019-00146-6>
- Waddington, H., van der Meer, L., Sigafos, J., & Whitehouse, A. (2020). Examining parent use of specific intervention techniques during a 12-week training program based on the Early Start Denver Model. *Autism*, 24(2), 484-498. <https://doi.org/10.1177/136236131987649>
- Wainer, A. L., Arnold, Z. E., Leonczyk, C., & Valluripalli Soorya, L. (2021). Examining a stepped-care telehealth program for parents of young children with autism: a proof-of-concept trial. *Molecular Autism*, 12(1), 32. <https://doi.org/10.1186/s13229-021-00443-9>
- Wainer, A. L., & Ingersoll, B. R. (2013). Disseminating ASD interventions: A pilot study of a distance learning program for parents and professionals. *Journal of Autism and Developmental Disorders*, 43, 11-24. <https://doi.org/10.1007/s10803-012-1538-4>
- Wainer, A. L., & Ingersoll, B. R. (2015). Increasing access to an ASD imitation intervention via a telehealth parent training program. *Journal of autism and developmental disorders*, 45, 3877-3890. <https://doi.org/10.1007/s10803-014-2186-7>
- Wood de Wilde, H., Kojovic, N., Robertson, C., Karr, C., Akman, L., Caccia, F., Costes, A., Etienne, M., Franchini, M., Gentaz, E., & Schaer, M. (2023). Remote Intensive Intervention for Young Children on the Autism Spectrum During COVID-19: the Experience of Caregivers and Service Providers. *Advances in Neurodevelopmental Disorders*, 1-17. <https://doi.org/10.1007/s41252-023-00339-0>
- Zaghlawan, H. Y., & Ostrosky, M. M. (2016). A parent-implemented intervention to improve imitation skills by children with autism: A pilot study. *Early Childhood Education Journal*, 44, 671-680. <https://doi.org/10.1007/s10643-015-0753-y>
- Zhang, Y., Xu, Q., Lu, P., & Xu, X. (2019). Skill training for parents with ASD children in China. *Pediatric Medicine*, 2(47), 1-8. <https://doi.org/10.21037/pm.2019.08.02>
- Zhou, B., Xu, Q., Li, H., Zhang, Y., Wang, Y., Rogers, S. J., & Xu, X. (2018). Effects of parent-implemented early start Denver model intervention on Chinese toddlers with autism spectrum disorder: A non-randomized controlled trial. *Autism Research*, 11(4), 654-666. <https://doi.org/10.1002/aur.1917>