



A systematic review of cultural considerations and adaptation of social skills interventions for individuals with autism spectrum disorder

Mattina Davenport^{a,*}, Micah Mazurek^b, Alaysia Brown^c, Elizabeth McCollom^a

^a Department of Educational, School, and Counseling Psychology, University of Missouri, Columbia, MO, USA

^b Department of Human Services, University of Virginia, Charlottesville, VA, USA

^c Department of Human Development and Family Service, University of Missouri, Columbia, MO, USA

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ABSTRACT

Background: There is an increasing need for culturally competent interventions for individuals with ASD. Given the dynamic relationship between culture and social behavior, the effectiveness of social skills interventions may be particularly influenced by the degree to which they are culturally appropriate. The extent to which ASD social skills intervention research has considered the role of culture (either through including diverse samples or by implementing cultural adaptations) is not well understood.

Method: The current study is a systematic review of social skills intervention studies for individuals with ASD. The aims of the current review were to evaluate the extent to which studies have included diverse samples, and the extent to which cultural adaptations have been made to social skills interventions.

Results: Sixty-two percent of studies published since 2010 reported the race, ethnicity, or nationality of participants. Minority populations were notably underrepresented in studies conducted in the United States. Only five studies incorporated cultural adaptations to social skills interventions, and these studies included both surface and deep structure adaptations for diverse populations.

Conclusion: Greater diversity is needed in studies of social skills interventions for children and adolescents with ASD. Although a few studies highlighted the feasibility of incorporating cultural adaptation strategies for ASD interventions, future research is needed to examine the extent to which cultural adaptations enhance the effectiveness of social skills interventions in this population.

1. Introduction

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder that is characterized by persistent impairments in social communication, social interactions, and restricted/repetitive patterns of behavior (APA, 2013). Difficulties in social skills are a core component of the disorder, and may include an absence of social reciprocity, a poor display of eye contact and facial expressions, a lack of nonverbal behaviors and gestures, and difficulty acquiring and maintaining peer relationships. Individuals with ASD commonly have difficulties with exhibiting the appropriate social skills across contexts. As such, a growing number of interventions have

* Corresponding author at: School Psychology, Mizzou Sleep Research Lab, University of Missouri, Columbia, USA.
E-mail address: madvz6@mail.missouri.edu (M. Davenport).

been employed to improve specific social communication and interaction skills for individuals with ASD across the lifespan (White, Keonig, & Schaill, 2007; Reichow & Volkmar, 2009; Stichter, O'Connor, Herzog, Lierheimer, & McGhee, 2012; Wong et al., 2015; Stichter, Herzog, Owens, & Malugen, 2016). The extent to which social skills interventions have accounted for cultural diversity in ASD populations, both nationally and internationally, has not been systematically examined. This is an important consideration, particularly given increasing racial, ethnic and cultural diversity within the United States (US) population (Cherlin, 2010; Colby & Ortman, 2014). A recent examination of National Health Interview Survey (NHIS) data (from 2014 to 2016) indicated that the prevalence of ASD in the US was 1.82% among Hispanic children, 2.49% among non-Hispanic Black children, and 2.48% among those classified as other (as compared to 2.77% among non-Hispanic White Children) (Xu, Strathearn, Liu, & Bao, 2018), highlighting the need for culturally competent practices. For the purpose of this review, the broad term “culture” will be used to refer to the shared identity, behavior, values, and beliefs of members of a particular group or community. More specific terms of “race,” “ethnicity,” and “nationality” will be used to describe particular aspects of cultural identity with international populations and racial/ethnic minority populations within the US.

Diverse groups often demonstrate social skills uniquely in various settings and contexts, highlighting the cultural-specificity of social behavior (Cartledge & Loe, 2001; Jack, Garrod, Yu, Caldara, & Schyns, 2012; Gendron, Roberson, van der Vyver, & Barrett, 2014; Harrison, Long, Tommet, & Jones, 2017). Variability across cultures is well documented in the amount and type of eye contact, facial expressiveness and recognition, interpretations and usage of nonverbal cues and language, types of games and objects used during play, and expression of emotion (Marsh, Elfenbein, & Ambady, 2003; Carter et al., 2005; Yuki, Maddux, & Masuda, 2007; Zebrowitz, Kikuchi, & Fellous, 2010; Elfenbein, 2013; Norbury & Sparks, 2013; Ember & Cunhar, 2015). This cultural variability in social behavior has particular relevance to ASD. In Asian cultures, direct eye contact may be perceived to be rude or disrespectful, meaning that lack of eye contact may not be a meaningful social “red flag” for ASD. Similarly, Chinese children are socialized to inhibit emotional expression (Ho, 1986); as a result, a lack of facial expression may be viewed as socially desirable rather than maladaptive (as in Western cultures). Gesture use also varies significantly across cultures in ways that may directly impact recognition of nonverbal gesture use in ASD. For example, some cultures do not permit index finger pointing as a communicative bid to share attention, making it a less socially-relevant behavior than in Western cultures (Kita, 2009). Regarding early red flags for autism, Latino mothers are less likely than white families to express concerns about social skill difficulties in young children with ASD (Ratto, Reznick & Turner-Brown, 2016; Blacher, Cohen & Azad, 2014). Overall, consideration of potential cross-cultural differences in both demonstration and interpretation of social behaviors is important to understanding social impairment in ASD and in developing culturally-competent interventions.

A growing body of research indicates that simply attempting to involve diverse groups by encouraging participation in standard treatment procedures is a less effective approach, and that interventions are more effective when culturally adapted to meet the specific needs and cultural experiences of diverse subpopulations (Bernal, Jiménez-Chafey, & Domenech Rodríguez, 2009; Hall, Ibaraki, Huang, Marti, & Stice, 2016; Wiltsey Stirman, Gamarra, Bartlett, Calloway, & Gutner, 2017). Considering the heterogeneity among ASD populations (Kalibatseva & Leong, 2014; Burkett, Morris, Manning-Courtney, Anthony, & Shambley-Ebron, 2015; Hewitt et al., 2016; Oshodi et al., 2016; Fong & Lee, 2017), and the use of culturally adapted ASD screening measures (Soto et al., 2015), there is a clear rationale for the use of culturally adapted interventions for individuals with ASD.

1.1. Inclusion of diverse populations in ASD research

Despite the importance of ensuring that interventions are effective for diverse populations (Dyches, Wilder, Sudweeks, Obiakor, & Algozzine, 2004; Tincani, Travers, & Boutot, 2009; Fong & Lee, 2017), in a comprehensive review of evidence-based practices (EBP) for ASD, Wong et al. (2015) found that a lack of participant diversity was a significant limitation in the field. West et al. (2016) sought to address the issue by evaluating the reported participant demographics (e.g., race, ethnicity, and nationality) in studies reviewed by Wong et al. (2015), which were published between 1990 and 2011. Of the 2489 participants in the 408 studies included in Wong et al. (2015), only 770 (31%) of participants had a reported race, ethnicity, or nationality (REN) (West et al., 2016). Pierce et al. (2014), similarly evaluated ethnicity reporting practices across articles published in three major autism-related journals published during even years from 2000 through 2010. They found that 138 (28%) of the 943 articles selected reported participants race or ethnicity, and that sampled populations in ASD studies included approximately 47–90% Caucasian participants (Pierce et al., 2014). Overall, previous reviews have found that ASD studies did not consistently report on participant demographics, making it difficult to determine whether samples were representative of the broader population. Zamora, Williams, Higuera, Wheeler, and Levitt, (2016) found that ASD study samples are more likely to include African Americans than other minority groups, including Latinos.

The Publication Manual of the American Psychological Association (APA, 2010) explicitly calls for authors to report the race/ethnicity of their studies' participants. Although previous studies have found minimal reporting practices for ASD studies prior to APA's directive to report race/ethnicity in 2010 (Pierce et al., 2014; West et al., 2016), it is not clear if more recent ASD research has been compliant with these recommended demographic reporting practices. Information about the demographic characteristics of study participants is necessary in order to understand potential differences in intervention effectiveness across cultural groups. This information is critical for evaluating of external validity, or the extent to which the results of the study can be generalized to other individuals or populations (Bernal & Scharro-del-Río, 2001; Whaley & Davis, 2007). In fact, in order for interventions to be considered evidence-based, they must be evaluated on the populations for which they are intended (Huey & Polo, 2008; Whaley & Davis, 2007). Therefore, it is imperative that studies include diverse samples in order to minimize threats to external validity, and to find out for whom interventions work and under what conditions (Evans, 2010; Mejia, Leijten, Lachman, & Parra-Cardona, 2017). The National Institutes of Health (NIH) requires all grant applications to include ethnic/racial minorities in part to enhance scientific

knowledge of treatment effectiveness across diverse populations (Hohmann & Parron, 1996). Despite the importance of this issue, the extent to which social skills intervention research in ASD has been inclusive of diverse participants has not been previously examined. Given the interplay between culture and social behavior, this is an important topic for consideration.

1.2. Addressing traditional treatment barriers using cultural adaptation

Most evidence-based interventions (EBIs), including social skills interventions, were originally developed for English-speaking families from racial/ethnic majority backgrounds (Ortiz & Yates, 2008; Bernal, Jiménez-Chafey, & Domenech Rodriguez, 2009). As such, barriers are often encountered when disseminating these interventions to ethnically diverse or international communities (Kumpfer, Magalhães, & Xie, 2017). Barrera, Berkel, and Castro (2017) outlined common barriers addressed by cultural adaptation: difficulties with initial service utilization, adherence to intervention procedures, attendance (e.g., amount of sessions attended), engagement (e.g., in-session participation or use of program skills at home), and retention (e.g., completion of treatment). Nation et al. (2003) determined that intervention program relevance is a direct function of the degree to which a community's norms, cultural beliefs, and practices have been integrated into program content, delivery, and evaluation. Treatment disparities among diverse populations may be reduced if interventions are perceived to be more relevant and applicable from the perspective of ethnically diverse families (Barrera, Castro, Strycker, & Toobert, 2013). The cultural adaptation of evidence-based practices and interventions is an emerging model in the area of special education and disability (Wang & Lam, 2017).

1.3. Conceptualizing cultural adaptation

In the broader intervention field, cultural adaptations are defined as systematically modifying an intervention to consider language, culture, and context in a way that is compatible with an individual's cultural patterns, meanings, and values (Bernal et al., 2009). Kreuter et al. (Kreuter, Lukwago, Bucholtz, Clark, & Sanders-Thompson, 2003; Kreuter & Skinner, 2000) advocated that there may be an established distinction between the often synonymously used terminology “targeted” and “tailored” in cultural adaptation research. “Cultural adaptation” captures the consolidation of two approaches: (a) a targeted universal approach that views an original intervention's content as applicable to all subcultural groups and not in need of alterations, and (b) a tailored culture-specific approach that emphasizes culturally grounded content consisting of the unique values, beliefs, traditions, and practices of a particular subcultural group (Falicov, 2009). More specifically, the term “targeted” refers to an intervention designed for a particular subcultural group based on characteristics common to its members (Kreuter & Skinner 2000). Culturally “tailored” approaches identify cultural factors that influence client outcomes (e.g., religious beliefs, neighborhood contexts, etc.), measure individual differences on those factors, and deliver individualized strategies addressing those factors (Kreuter et al., 2003).

To reduce ambiguity, researchers have begun to explore how to structure specific cultural adaptations in health and behavioral intervention research. Butler and Titus (2015) conceptualized cultural considerations as two broad categories: surface structure and deep structure. Surface structure cultural adaptations include methodologies that match people, or language, to observable racial/ethnic characteristics of the population (Butler & Titus, 2015), while deep structure cultural adaptations include content strategies that incorporate cultural, social, historical, environmental, or psychological aspects that influence the target minority group's behavior (Butler & Titus, 2015; Resnicow, Baranowski, Ahluwalia, & Braithwaite, 1999). Similarly, Kreuter et al. (2003) presented narrow organizational parameters for possible cultural considerations: (a) peripheral strategies that manipulate intervention materials to visually pair them to participants' cultures, (b) linguistic strategies that alter the language of the intervention, (c) evidential strategies that include information highlighting the relevance of the intervention for the participants' ethnic group (e.g., useful for initial buy-in with caregivers or adolescents), (d) constituent-involving strategies that incorporate the past knowledge and experiences of participants, and (e) sociocultural strategies that reinforce the cultural values, beliefs, and behaviors of participants. Within this review, cultural adaptations will be conceptualized as culturally specific approaches that include surface and/or deep structure modifications.

1.4. Current study

In summary, there is an increasing need for culturally competent interventions for individuals with ASD. Given the dynamic relationship between culture and social behavior, the effectiveness of social skills interventions may be particularly influenced by the degree to which they are culturally appropriate. However, the extent to which ASD social skills intervention research has considered the role of culture (either through including diverse samples or by implementing cultural adaptations) is not well understood.

The objective of this systematic review was to address this gap in the literature by specifically examining cultural considerations in research on social skills interventions for individuals with ASD. The systematic review focused on the following key questions: 1) To what extent have social skills interventions for ASD included participants from diverse (e.g., international and minority) racial/ethnic populations?, 2) In studies that have included diverse populations, to what extent have the interventions been culturally adapted?, and 3) What types of surface and deep structure cultural adaptation strategies have been utilized in social skills interventions for individuals with ASD?

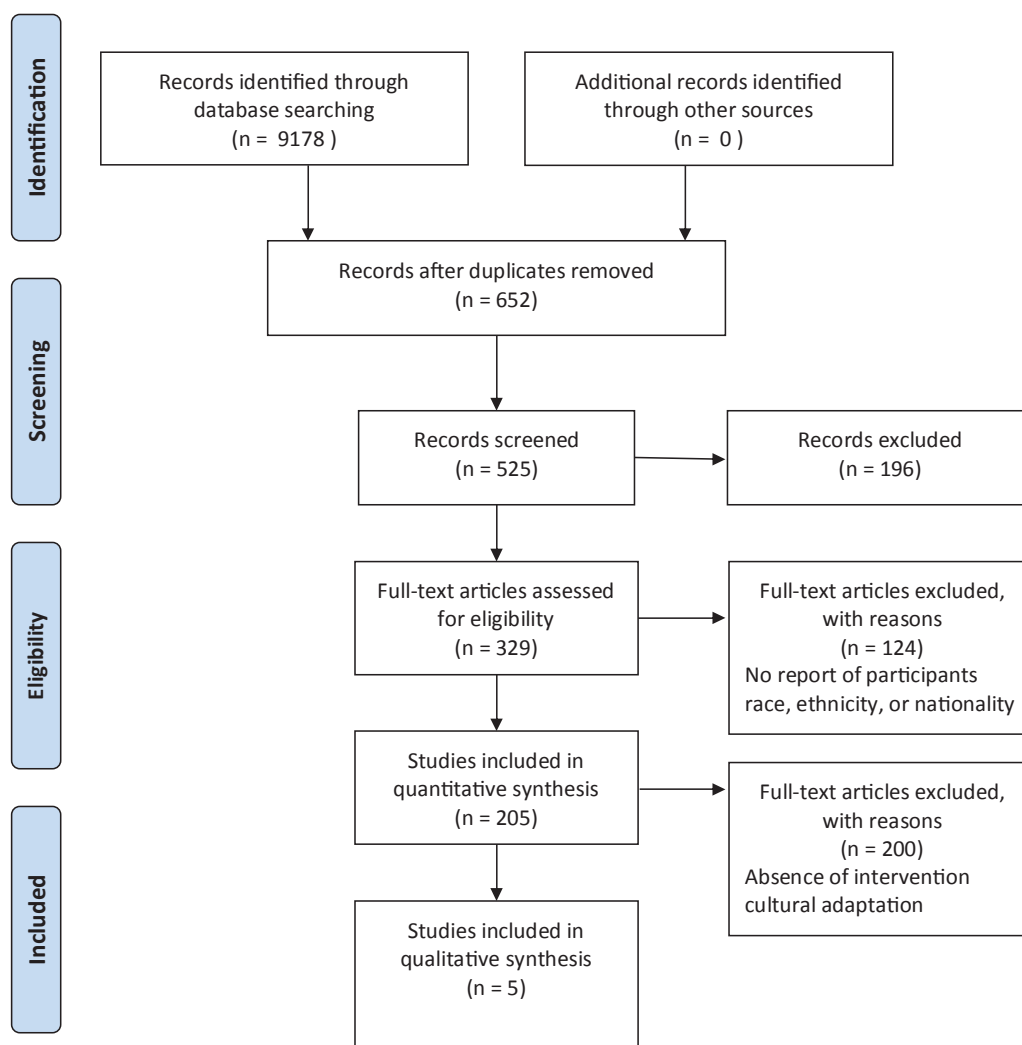


Fig. 1. PRISMA flow diagram.

2. Methods

2.1. Search strategy

This review was based on a search of published social skills research studies from years 2010 through August 2017. The online databases *ERIC*, *PsycINFO*, and *Medline* were searched concurrently for peer-reviewed articles using combined primary and secondary key terms. The search consisted of the following primary diagnostic terms: *autism*, *ASD*, *autistic disorder*, *Asperger*, *pervasive developmental disorder*, and *PDD-NOS*. All primary key terms were combined with the following secondary social terms: *social**, *play**, and *friendship**. In addition, all primary and secondary key terms were combined with the following tertiary treatment terms: *treatment*, *intervention*, *training*, *therapy*, and *instruction*. This initial search of all possible key term combinations yielded 9178 articles for initial abstract screening.

2.2. Selection criteria

Studies were included in the systematic review if they met the following criteria: a) included participants with ASD, b) examined a social skills intervention, and (c) were written in English. 525 articles were selected for further review contingent upon whether the study authors' abstract indicated that the study examined a social skills intervention that was delivered to participants with ASD. A total of 329 articles were identified for further review after excluding duplicates and those not written in English. This process is outlined within Fig. 1.

2.3. Research Question 1: Sample diversity

A total of 329 studies (using inclusion criteria described above) were included in descriptive analyses examining the number of

studies in which race, ethnicity, and/or nationality of participants was reported. The initial screening and extraction of participants' REN was completed by the first author (MD), and the third (AB) and fourth author (EM). Each coded 25% of the studies to ensure accuracy. Inter-rater agreement was calculated by dividing the number of agreements by the number of agreements plus disagreements and multiplying by 100. The authors were each trained to extract and code data using explicit definitions for coding criteria. Average interrater reliability for data extraction of REN was 98%.

2.4. Research Question 2: Cultural adaptation

Additional inclusion criteria were applied to examine the cultural adaptation practices of studies meeting the inclusion criteria for Research Question 1. Two hundred and five studies were included for further review at this stage because they reported race, ethnicity, or nationality of participants. For this portion of coding, the third and fourth authors were each trained with one article and then independently scanned the full text of 25% of the remaining studies that reported REN. Average interrater reliability for extraction of cultural adaptation data was initially 84%. Differences were resolved by consensus after re-examining the studies, yielding a final interrater reliability of 100%.

2.5. Research Question 3: Types of cultural adaptation

Additional inclusion criteria were applied to examine specific types of cultural adaptation practices of the studies meeting the inclusion criteria of Research Question 2. Studies were excluded from this portion of the review if they included minority or international participants, but did not modify intervention procedures to account for subcultural differences within the diverse sample of participants (e.g., language-adapted social skills measures only). For this portion of coding, the first, third, and fourth author each coded and extracted data from 100% of the culturally adapted articles. Interrater reliability for data extraction of the cultural adaptation structure type was averaged to be 96%, and with differences resolved by a consensus after re-examining the studies it was 100%.

2.6. Data extraction process

The following data were extracted from the included studies: race, ethnicity, nationality, setting of intervention, sample demographic characteristics, sample size, descriptive information about social skills interventions, descriptions of the type of cultural adaptations that were implemented, and whether the cultural adaptation improved study outcomes (e.g., social abilities, engagement, retention, etc.).

2.7. Quality assessment

The authors used quality assessment indicators to evaluate each of the studies in Table 2. The first author developed a data sheet that comprised items specific to rating single case design, quantitative, and qualitative studies. The authors used What Works Clearinghouse (WWC, 2014) to assess the quality of single-case design studies, and quantitative/qualitative studies were assessed for quality using the indicators provided within the Standard Quality Assessment Criteria for Evaluating Primary Research Papers (Kmet, Lee, & Cook, 2004). The third and fourth authors completed quality assessments for all five studies to ensure accuracy. The interrater agreement was 92% for the studies that were rated. All discrepancies in ratings were discussed and reexamined by the authors. The included studies (N = 3) were good methodological quality (score of 70–80%) and one study was of high/strong methodological quality (score of 80% or greater) based upon quantitative and qualitative study parameters adapted from Kmet et al. (2004). Two single case design studies were of moderate methodological quality based upon WWC (2014) standards.

3. Results

A total of 329 studies were reviewed to understand the current cultural diversity in social skills intervention research for individuals with ASD. The social skills intervention studies included participants from both international and ethnic minority populations.

3.1. Inclusion of diverse participants

With consideration to our first research question, it was found that a relatively large percentage (n = 205; 62.3%) of social skills studies published since 2010 have reported the race, ethnicity, or nationality of participants. Fig. 2 illustrates the race/ethnicity reporting of diverse participants by year, and shows an increasing trend for studies reporting racial/ethnic demographics and including those who are from racial/ethnic minority populations within the United States versus international populations. The diversity of the sample populations described within the 205 studies reporting race, ethnicity, or nationality was further examined. For studies conducted domestically within United States (79 studies), the race/ethnicity of the 2456 participants included was as follows: Caucasian/White (72.1%), African/Black (6.2%), Hispanic/Latino (7.7%), Middle Eastern (0.1%), Asian (2.7%), Native American (0.1%), two or more races (2.8%), and other (8.3%). For studies conducted outside the US (45 studies), the race, ethnicity and/or nationality of the 1423 participants included were as follows: White European (72.9%), Brazilian (4.7%), Israeli (10%) Turkish

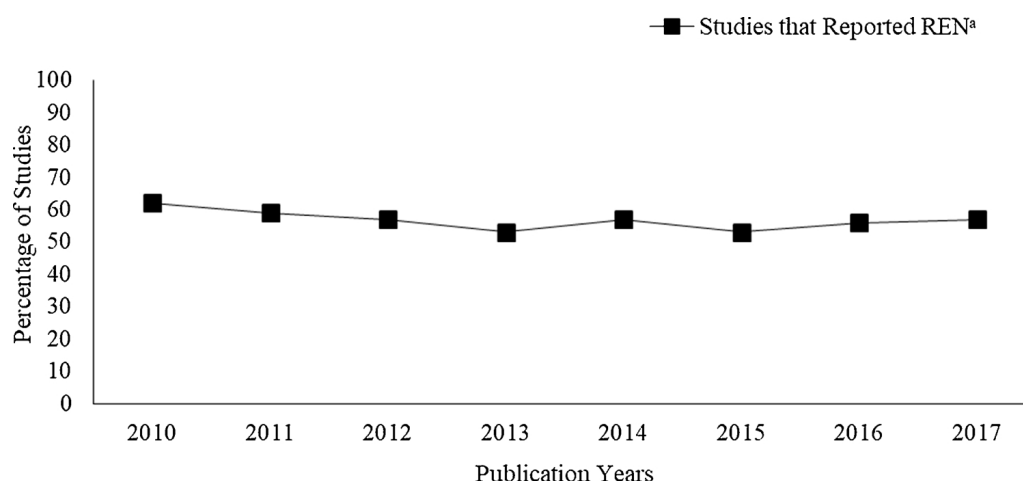


Fig. 2. Graph showing the percentage of studies that reported various forms of REN out of the total number of studies reviewed across a seven year period. ^aSquares indicate the total number of studies that reported REN demographics in their study both within the US and abroad.

(1.3%), Chinese (5.3%), Korean (3.4%), Japanese (2.4%), Bangli/Indian (.7%), and Taiwanese (3%). See [Table 1](#).

3.2. Cultural adaptation of social skills interventions

In relation to cultural adaption, only 5 studies were determined to meet criteria for inclusion. [Table 2](#) provides descriptive information for these studies and highlights the assessed quality and primary limitations. Only one study conducted in the United States reported cultural adaptations. Specifically, [Kim \(2016\)](#) culturally modified a social skills intervention that included video modeling for three Korean American children with ASD. The remaining studies were conducted outside the United States. In a study conducted in Korea, [Yoo et al. \(2014\)](#) modified the Program for the Education and Enrichment of Relation Skills (PEERS) curriculum for 47 adolescents with ASD in Korean. [Lee et al. \(2016\)](#) modified a social skills group structured curriculum, targeting social communication, for 33 adolescents with ASD in China. In a study conducted in Canada, [Cheremshynski, Lucyshyn, and Olson, \(2013\)](#) culturally modified a positive behavior supports plan for one Japanese Canadian mother and child dyad. [Blake et al. \(2017\)](#) culturally modified a parent mediated applied behavior analytic intervention for 10 parent and child dyads in Bangladesh.

All of the five culturally adapted studies explicitly described both surface and deep structure adaptations. Specific surface and deep structure modifications are described in detail in [Table 3](#) to highlight the themed differences described by [Butler and Titus \(2015\)](#).

4. Discussion

This comprehensive review had three goals: (1) to examine the extent to which participants from diverse populations with ASD have been included in social skills intervention research, (2) to evaluate the extent to which interventions have been culturally adapted, and (3) to review the cultural adaptation strategies that have been utilized in social skills interventions for individuals with ASD. With regard to the first goal, it appears that considerable progress has been made in researchers' ethnic minority reporting practices. Specifically, we found that 62.3% of articles published between 2010 and 2017 reported REN, as compared to 28% of studies published between 2000 and 2010 ([Pierce et al., 2014](#)). However, this improvement was accompanied by a continued disproportionate sampling of primarily White/Caucasian children and families (approximately 72% of participants). Further, there is evidence that diverse groups are being sampled domestically and internationally, yet inconsistency remains in recent sampling

Table 1
Sample Diversity in Social Skills Intervention Studies for Individuals with ASD.

Race	Percentage of Domestic Participants N (% of total) n = 2456	Percentage of International Participants N (% of total) n = 1423
Caucasian/White	1771 (72.1)	1038 (72.9)
African American/Black	153 (6.2)	1 (.07)
Latino/Hispanic	188 (7.7)	69 (4.9)
Middle Eastern	3 (0.1)	161 (11.3)
Asian	65 (2.7)	154 (10.8)
Native American	3 (0.1)	0 (0)
Two or More Races	68 (2.8)	0 (0)
Other	205 (8.3)	0 (0)

Note: International participants refers to those participants in studies conducted outside of the United States; Domestic participants refers to participants in studies conducted within the United States.

Table 2
Study Characteristics and Quality Assessment Results.

Study	N	Age	Ethnicity/ Nationality	Intervention Approach	Design	# of sessions and/or duration	Target Skills	Quality Assessment ^a
Kim (2016)	3	6–9	Korean	Video Modeling	Single Case Design: Multiple Baseline	23 sessions	Play and social communication skills	Moderate There were not at least 5 points per condition.
Yoo et al. (2014)	47	12–18	American Korean	Social Skills Group	Randomized Control Trial	14 sessions/ weeks	Parent reported Social skills	Strong 92% (22/24) Blinding of participants was not reported. Blinding of investigators was not reported.
Lee et al. (2016)	33	12–15	Chinese	Social Skills Groups	Pre/Post	12 sessions	Social communication skills	Moderate 75% (18/24) Analytic method partially described. Participants not randomly assigned. Partial discussion of limitations and confounders.
Cheremshynski et al. (2013)	1	5	Japanese- Canadian	Positive Behavior Supports	Single Case Design: Reversal/ Qualitative	16 sessions	Social communication skills	Moderate There were not at least 5 points per condition. Moderate 70% (14/20) Qualitative data collection methods were only partially described. Data analysis was not clearly described. Also, there was no use of verification procedures to establish credibility.
Blake et al. (2017)	10	7–9	Bengali	Parent-Mediated ABA	Qualitative	2.5 weeks	Parents implementation for training appropriate friendship and social communication skills	Moderate 70% (14/20) Qualitative data collection methods were only partially described. Data analysis was partially described. Also, there was no use of verification procedures to establish credibility. There was no reflexivity of the account.

^a Quality was assessed using criteria from What Works Clearinghouse (for single-case design) or Standard Quality Assessment Criteria for Evaluating Primary Research Papers (for randomized controlled trial, pre- post-, and qualitative design).

Table 3
Culturally Adapted Social Skills Interventions for Individuals with ASD.

Study Authors	Surface Structure Considerations	Deep Structure Considerations
Kim (2016)	Researchers adapted the language of video modeling clips based upon the predominant language used by participants' parents. In addition, language selection and usage was allowed to be flexible during generalized in-home probes.	Researchers used content matching local social scenarios within materials.
Yoo et al. (2014)	Researchers translated the English PEERS treatment manual and materials into Korean.	Researchers collected survey data with 477 middle school students to identify culturally relevant material that coincides with the culture of teens in Korea. Several content areas were adapted to include culturally and linguistically appropriate experiences and jargon of Korean teens.
Lee et al. (2016)	Researchers adapted the intervention to include idioms and used the Cantonese language.	Researchers embedded local Chinese adolescent social experiences within the content and role plays.
Cheremshynski et al. (2013)	The researcher/interventionist sought consultation from a Japanese interpreter, and learned how to deliver common Japanese phrases while training the mother.	Researchers used the cultural assessment tool to gather data to facilitate the provision of culturally responsive practices. The positive reinforcement plan and behavioral management strategies were tailored to enhance the appropriateness to the mother's blend of Japanese and Canadian culture.
Blake et al. (2017)	Images were changed to reflect the ethnicity of the population and the culture. The materials were first developed and adapted in English, translated into Bangla and then further edited and refined by the native clinician in Bangla.	Investigators practiced using behavioral strategies with children with ASD in naturalistic settings utilizing no technology or toys since such items were scarce in Gaibandha. All examples were modified to be culturally and SES relevant. For example, a picture of a father and a child was replaced with a picture of a mother and a child to be consistent with cultural family dynamics in which mothers are the primary caregivers of children. Images of toys or items that a family would likely not be able to afford were removed and all pictures showed women wearing religiously appropriate attire (i.e. changing pictures of women wearing jeans to women wearing saris).

practices of various ethnic groups in the United States and abroad. With regard to our second goal, very few studies have explicitly reported the use of cultural adaptation practices to social skills interventions with diverse individuals with ASD. Only five such studies were identified, only one of which was conducted in the United States. Lastly, some promising cultural adaptation strategies were identified in the few studies that reported such practices. These strategies were developed based on knowledge of theory or prior literature, informal and formal assessment of feedback related to the preference of cultural factors, as well as consultants' knowledge of the community in which subgroups were sampled.

This study highlights the need for continued efforts to increase diversity of study samples in ASD research. Approximately 38% of studies since 2010 did not even report on the race, ethnicity or nationality of their study samples. Thus, we are unable to determine the extent to which these studies included culturally representative samples. Among studies reporting REN, further examination of sample diversity reveals notable under-representation in US studies of most minority groups. For example, only 6.2% of participants across studies were African American/Black, although 13.3% of US population identifies as African American/Black (US Census Bureau, 2017). Even more striking, only 7.7% of participants were Latino/Hispanic, as compared to 17.8% of the US population (US Census Bureau, 2017). Regarding representation of diverse participants in international research, it is difficult to draw conclusions about the larger body of research on this topic from the current study. Our inclusion criteria required that manuscripts be written in English. Therefore, the extent to which international studies published in other languages representing more diverse populations cannot be determined.

Social skills interventions are designed to improve key impairments in ASD (e.g., the quality of social interaction and social communication), and it is important that diverse minority and international experiences are incorporated in empirical evaluations of these practices, as has been recommended and described in the broader intervention literature focused on evidence-based practice and cultural adaptation practices (Bernal et al., 2009; Hall et al., 2016). With the cultural variability in social norms and behavior, it is even more important for social skills intervention research to be conducted with diverse samples in order to inform the development of modifications that may be necessary.

Overall, the findings demonstrate insufficient attention to cultural adaptations in social skills intervention research among individuals with ASD. Of those studies that were culturally adapted, only one study was modified for an ethnic minority population, and only four studies modified interventions for international populations. Despite the paucity of research related to culturally adapted social skills interventions for individuals with ASD, the studies that do exist highlight the feasibility of integrating surface and deep structure cultural adaptations in social skills interventions. However, none of the current studies were designed to examine the comparative effectiveness of culturally adapted interventions and the original interventions from which they were derived (e.g., Yoo et al., 2014). This highlights the current need for evaluation research that compares social skills interventions that are culturally adapted to those that are not. This type of research would enable the examination of whether specific adaptations augment or enhance the effectiveness of social skill interventions in minority and international populations with ASD.

The current review highlights the importance of understanding the needs and desires of client populations prior to implementing social skills instruction. It is important that modifications be made to interventions in order to accommodate the unique needs of

clients as much as possible. Informal data gathering tools (e.g., Chen, Downing, & Peckham-Hardin, 2002) can be utilized to facilitate the process of ensuring that client feedback (including that of individuals with ASD and their families) is incorporated into tailored interventions. Researchers and clinicians are encouraged to carefully consider the role of culture in designing, implementing, and evaluating interventions for diverse populations.

5. Implications

There still is a need for improvement in REN reporting practices and for greater inclusion of diverse populations in ASD research. The extent to which research samples are representative of the larger population is essential for the field. This is also necessary in order to understand the effectiveness of intervention approaches among culturally diverse groups. Future research should seek to include greater representation from individuals across cultural, linguistic, racial, and ethnic groups. It is also important to note that ethnic minority groups are heterogeneous. As such, there remains a need to report and acknowledge intragroup differences when reporting minority populations who are classified as Black and Latino. Many studies categorized individuals using broad categories (e.g., Other Minority, Black, or Latino/Hispanic); however, this does not account for the variability in how the individuals within these group categories individually identify. A more nuanced examination of individual differences in racial/ethnic identity would be helpful in future social skills research.

The current study highlights the operationalized cultural modifications and informal data gathering strategies that can be incorporated within evidenced-based social skills interventions. The body of evidence supporting the effectiveness of interventions for children with autism is growing (Wong et al., 2015). More research should explore the effectiveness of these empirically supported practices and interventions when they are culturally adapted to meet the needs of diverse groups and settings (e.g., Yoo et al., 2014; Kim, 2016; Lee et al., 2016; Blake et al., 2017). In addition, the current studies incorporated cultural experiences of participants through informal interviews, by surveying local peer groups, and one study integrated parental feedback (e.g., Cheremshynski et al., 2013). Future research may need to explore incorporating parental feedback regarding what specific approaches to social skill acquisition and generalization may be the most relevant for their culture.

6. Limitations and conclusions

There are a few methodological limitations that should be acknowledged. Social communication is a known impairment in populations with ASD, but the current review did not include “communication” as a secondary search term when applying search strategies. This decision was made because the term “communication” was deemed too broad for the current scope of the review (as we did not intend to target speech or language therapy interventions), and because the more relevant construct was captured by using “social” as a secondary search term. However, this decision may have potentially excluded relevant studies and interventions within the current review. In addition, the exclusion of studies not written in English may have yielded biased results in relation to the number of international studies that have provided cultural adaptations to social skills interventions for individuals with ASD.

Due to the large number of studies not reporting participant REN, we did not contact the authors of these studies to clarify whether or not their studies included ethnically diverse participants. Therefore, we cannot determine the extent to which diverse participants were included in these studies, despite a lack of reporting REN demographic data. It should also be noted that only one study was classified as having strong methodological quality, indicating a need for more rigorous study designs. Well-controlled studies using large and representative samples will be helpful in order to enhance knowledge and clinical practice in this area.

The results of this systematic review highlight a need for additional research on the diverse experiences of racial/ethnic minority children and adolescents with ASD. Although a handful of studies have implemented culturally adapted social skill interventions, much more research is needed to examine the direct impact of these adaptations on treatment outcomes. It is vital that cultural adaptations in social skills interventions are rigorously evaluated in order to enhance the evidence base for ASD interventions and practice (Lau, 2006; Wang & Lam, 2017).

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