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A 16-Year Review of Participant Diversity in Intervention Research Across a Selection of 12 Special Education Journals

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Abstract

Given the continued changes in demographic diversity of students in the United States, it is important to ensure that participants included in special education research reflect the diversity of the classroom. We examined 16 years of intervention research across 12 special education journals to evaluate the extent to which diverse student populations (e.g., race, ethnicity, disability, sexual orientation, English language learner status) were included in published intervention research. We analyzed 495 intervention articles (9.6%) out of 5,180 total articles. Results revealed that progress has been made in the inclusion of diverse participants in special education intervention research compared with previously conducted reviews, yet some racial and ethnic populations are still underrepresented. We discuss strategies for recruitment and retention of underrepresented diverse populations.

Science is the primary mechanism for bolstering the evidence base within the field of special education, and high-quality research can inform continued improvements of applied practices (Kauffman, Nelson, Simpson, & Mock, 2011). Special education as a field has worked to establish an evidence base of effective practices, demonstrated by rigorous scientific inquiry (Cook & Odom, 2013; Gersten et al., 2005; Horner et al., 2005; Odom et al., 2005). Further, as this library grows, special education has shifted focus toward the generalized use of these quality practices across settings, populations, and contexts (e.g., Castro, Barrera, & Martinez, 2004; Fuchs & Fuchs, 2006; Spencer, Detrich, & Slocum, 2012). This focus has historically been a central tenet to the field and was highlighted in Ysseldyke's (1987) call for data-based papers on service delivery models and the inclusion of underrepresented populations of exceptional students, while he served as the editor for *Exceptional Children*. More recently, there has been an emerging interest in specific interventions and practices that support diverse populations and in understanding for whom and under what conditions evidence-based practices are effective (e.g., Hamayan, Marler, Lopez, & Damico, 2013; Spencer, et al., 2012; Thoma, Agran, & Scott, 2016; van Gardener, Poch, & Jackson, 2017; Watson, 2017; West et al., 2016).

By 2022, the cultural landscape of U.S. classrooms will look quite different than it did at the beginning of the 21st century (Hussar & Bailey, 2013). More students will identify as multiracial (increase of 44%), Latino/a

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(increase of 33%), Asian or Pacific Islander (increase of 20%), and Black (increase of 2%), whereas other student groups, such as White and American Indian, are projected to decrease, 6% and 5%, respectively, in representation. English language learners (ELLs) form another group of diverse students whose population continued to grow (from 8.8% to 9.3%, or by over 300,000 students) between the 2003–2004 and 2013–2014 school years (Genesee, Lindholm-Leary, Saunders, & Christian, 2005; Kena et al., 2016). Other demographic characteristics are less likely to change significantly over time, including gender and poverty status (U.S. Department of Health and Human Services, 2016).

Thus, the changing demographics of U.S. schools are cause for serious concern among special educators because the evidence base that they rely upon to serve these students may not apply to the changing population.

Despite changing demographic trends, prior evidence suggests that students of color have not been adequately represented in special education research in the past (Vasquez et al., 2011) and that many practices currently being promoted to serve diverse students with disabilities have not been validated in the populations they are intended to serve (Klingner & Edwards, 2006). Thus, the changing demographics of U.S. schools are cause for serious concern among special educators because the evidence base that they rely upon to serve these students may not apply to the changing population.

Several previous literature reviews have examined differences in the participation of racial and ethnic groups in special education. For example, Artiles, Trent, and Kuan (1997) and Vasquez et al. (2011) reported on the representation of ethnic-minority students in empirical research published in *Learning Disability Quarterly, Journal of Learning Disabilities, The Journal of Special Education*, and *Exceptional Children* between the years 1972 and 2009. The results of both reviews indicated alarmingly low rates of students of color included in special education research. Artiles and colleagues found that empirical studies that focused on diversity were treated as special issues for journals and posited, "Although topical issues are valued and needed, overreliance on this practice only perpetuates a superficial treatment of the plight of minority students with disabilities because substantive issues are grappled with sporadically" (Artiles et al., 1997, p. 89). Further, the 2011 review conducted by Vasquez and colleagues found that over 87% of the empirical articles included in their review reported no ethnic-minority information about their participants or reported on ethnic-minority status without disaggregating data.

The purpose of this systematic review is twofold. Our first objective was to update the field and provide a snapshot on the extent to which diverse research participants have been included in special education intervention research conducted in school settings between the years 2000 and 2016. We also expanded upon previous research by adopting a more holistic definition of diversity. Previous reviews have shed light on the inclusion of racially and ethnically diverse participants in special education research, yet very little is known about the inclusion of other minority populations (e.g., gender- and sexual-minority youth, youth in poverty). To define diversity, we utilized the definition of *minority populations* from Gibson and Bhachu (1991) as those having

> a subordinate position in a multiethnic society, suffering from the disabilities of prejudice and discrimination, and maintaining a separate group identity. Although individual members of the group may improve their social status, the group itself remains in a subordinate position in terms of its power to shape the dominant value system of the society or to share fully in its rewards. (p. 358)

In addition to Gibson and Bhachu's (1991) definition, the framework of intersectionality applies and contributes considerably to the mission of this work by giving space for representation of all identities. Crenshaw (1991) established that the experiences of an individual (e.g., a Black woman) “cannot be captured wholly by looking at the race or gender dimension separately” (p. 1244), but instead, the experiences of individuals must be understood at the intersection of these identities. García and Ortiz (2013) note that special education research has become rigid in its methods and categorization of research participants, taking on a unitary approach (i.e., focusing on one demographic variable at a time or on demographic variables separately from each other). Intersectionality approaches encourage researchers to consider the consequences of their decisions critically when deciding what data to collect and how to report those data. One caution is, without careful consideration of both the researchers’ position within the research context and the decided-upon groups included in an analysis, groups that are excluded from representation become invisible (Purdie-Vaughns & Eibach, 2008). Ford (2012) and Harry and Anderson (1997) argued that there is an important and recurring need to examine race within the field of special education, as issues of inequitable treatment and overrepresentation of racial-minority groups in special education continue to arise. In this review, we strive to discuss race but also include other types of marginalized identities (e.g., sexual orientation, poverty) so that they are not invisible.

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The second objective of this review was to report on the efforts made by researchers to recruit and retain diverse research participants. Previous reviews (e.g., Vasquez et al., 2011) have indicated the importance of clear recruitment and retention efforts to ensure participants with diverse backgrounds are included in research. If one of the causes of underrepresentation of diverse students in special education research is due to difficulties recruiting and retaining these populations, as found in previous reviews, then it is important to document systematically the efforts made by researchers to recruit and retain participants.

Overall, our review aimed to address two questions:

1. To what extent have diverse research participants been included in intervention research in 12 widely distributed special education journals?
2. What methods have researchers reported to recruit and retain diverse participants in intervention research?

Method

Search Procedures

We examined 12 peer-reviewed special education journals, between the years 2000 and 2016, to identify articles for inclusion. These 12 journals were selected based on Mastropieri et al.’s (2009) criteria, which partly considered journals’ visibility in the field, professional affiliation with the Council for Exceptional Children (CEC), and impact factor and circulation rates. In this review, eight journals were associated with CEC or a professional organizational representing wide dissemination across the majority of Individuals With Disabilities Education Act (IDEA) disability categories, and four journals were ranked highly within the field of special education. The eight CEC-affiliated journals selected were *Exceptional Children, The Journal of Special Education, Learning Disabilities Research & Practice, Behavioral Disorders, Education and Training in Autism and Developmental Disabilities, Topics in Early Childhood Special Education, Career Development and Transition for Exceptional Individuals*, and *Multiple Voices for Ethnically Diverse Exceptional Learners.* The additional four journals added due to their top status in special education, previous inclusion in the Mastropieri et al. (2009) review, and their focus on the publication of interventions conducted in schools are *Remedial and Special Education* (ranked 8/38 in special education; Clarivate Analytics, 2017), *Journal of Learning Disabilities* (ranked 13/38 in special education; Clarivate Analytics, 2017); *Journal of Emotional Behavioral Disorders* (ranked 10/38 in special education; Clarivate Analytics, 2017), and *Education and Treatment of Children*. Two journals (*Learning Disability Quarterly* and *Journal of Special Education Technology*) were not included in the present review from the original Mastropieri et al. (2009) review. We replaced these two journals with three different journals, each selected to represent subdisciplines: *Topics in Early Childhood Special Education* represented research in early childhood preschool settings, *Career Development and Transition for Exceptional Individuals* represented research in secondary education and transition-age youth, and *Multiple Voices for Ethnically Diverse Exceptional Learners* represented a journal with a specific focus on diversity.

Between the years 2000 and 2016, these 12 special education journals published a total of 5,180 articles. To determine eligibility for inclusion, we initially screened articles for two broad identifiers. First, we read articles' titles and abstracts to ascertain the potential suitability for inclusion in the current review. Second, we read Method sections to determine whether articles met inclusion criteria.

To be included in the corpus, an article had to meet four criteria. It had to (a) describe an intervention (i.e., systematic manipulation or introduction of an independent variable to cause an effect on a dependent variable) using experimental, quasiexperimental, or single-case research design or mixed-methods methodology; (b) include at least one phase of the intervention in a school, preschool, or community setting (if the intervention took place in a community setting, research must have been conducted by an educational professional) in the United States; (c) include at least one participant between the ages of 3 and 21 years who received services under IDEA as a subject; and (d) report student-level data.

Data Extraction

A 43-item electronic coding sheet was used to code variables of interest. The first seven authors, faculty members and advanced doctoral-level students in special education, developed the coding sheet. After development, each author piloted the data sheet by using it to extract data from three selected articles to ensure that the codes captured all relevant data on student diversity across journals (Orwin & Vevea, 2009). Following piloting procedures as recommended by Orwin and Vevea (2009), the authors built consensus for each coded item by discussing the operational definition of each code, relevance of each code for the review, ease of use, and any misunderstandings or misinterpretations. These deliberations led to additions, including the clarification of how diversity in general is coded and the expansion of the intervention setting code to include vocational settings that are often included in secondary transition research. Each study was summarized in terms of (a) journal name, (b) study design, (c) intervention setting, (d) school intervention setting, (e) diversity reporting and categorization in the study, (f) participant characteristics, (g) interventionist characteristics, and (h) intervention characteristics. See the online supplement.

Reliability of Search Process

The first and second authors completed reliability coding in two phases. First, following the identification of articles for inclusion by the primary coders, the first and second authors independently repeated the hand search for two randomly selected years (approximately 20% of all searched years) between 2000 and 2016 for each of the 12 journals using an online random-number generator to select the publication years (reliability coders did not code the journals for which they were primary coders).

The first phase of reliability coding resulted in the first two authors coding 938 randomly selected articles to determine reliability of inclusion and exclusion decisions. Each article was assessed against the aforementioned inclusion criteria, and a decision was made regarding article inclusion or exclusion. We then compared a list of articles identified for inclusion to a reference list of articles identified for inclusion by the primary coders. This process revealed that primary and reliability coders disagreed on the inclusion or exclusion of 21 (2%) articles. Disagreements were discussed with primary coders, and authors came to consensus about inclusion or exclusion. In those instances where primary and reliability coders agreed that an article should have been excluded, the corresponding data were deleted. In those instances where agreement was obtained that an initially excluded article should be included, the primary coder for that journal coded the article. Reliability of Phase 1 coding was calculated by dividing the number of articles with agreement on inclusion and exclusion ($n = 912$) by the total number of articles published in each journal across the two randomly selected years ($n = 938$) and multiplied by 100 to obtain a percentage. Using this process, reliability for inclusion and exclusion of articles was 97%.

Phase 2 reliability was also conducted by the first and second authors. Phase 2 reliability consisted of recoding a randomly selected sample of 99 articles (approximately 20% of included articles) for reliability of data extraction. The first or second author then independently completed the hard-copy versions of the coding sheet for each of the 99 articles. We compared the hard-copy coding sheets on a code-by-code basis. Data extraction reliability was determined by dividing the total number of errors between the primary and secondary coders with the total number of items coded (i.e., $n = 43$). An 80% reliability level was established as a criterion rule for requiring recoding. Four out of 99 articles (4%) required recoding, which was conducted by the first or second author. After recoding Phase 2 reliability, the accuracy of data extraction was 95%.

Data Analysis

We computed descriptive statistics (e.g., frequencies) to provide detailed information about the type of research conducted and the participants included in special education intervention research. Furthermore, we analyzed odds ratios (ORs) to determine how similar the inclusion of diverse participants in special education intervention research was to the actual diverse population receiving special education services in the United States. To determine if there were equal distributions between the studies' overall sample and the population, we computed z scores.

We calculated ORs using the following steps. First, using data from the 37th annual report to Congress on IDEA (U.S. Department of Education, 2015), we calculated the population of diverse racial and ethnic students receiving IDEA services by adding youth served from ages 3 to 5 to those served from 6 to 21 years old. Second, we computed z scores using the weighted population size and the participant sample from studies that included race. We used a critical z score value of 1.96 (indicating a set p value of .05 for a two-tailed test) to determine if the participant sample was significantly different from the population served under IDEA. Furthermore, a proportion OR was calculated to determine how likely individuals from a particular racial or ethnic group would be included in special education intervention studies. We used the following equations.

$$z = \frac{\left|p - P_0\right| - \frac{1}{(2n)}}{\sqrt{\frac{P_0 Q_0}{n}}},$$

where n = the sample size, p = proportion of the sample possessing the characteristic of study, P = the underlying proportion in the sample population, and $Q = 1 - P$.

$$\text{OR} = \frac{p_2 / (1 - p_2)}{p_1 / (1 - p_1)},$$

where P_1 = population proportion and P_2 = sample proportion.

Table 1. Journal List and Inclusion Information.

Journal name	Total number of articles published	Number of articles included	Percentage of included articles	Impact factor
Exceptional Children	440	47	10.6	2.796
The Journal of Special Education	357	28	7.8	1.415
Remedial and Special Education	623	42	6.7	2.016
Journal of Learning Disabilities	776	27	3.5	1.643
Learning Disabilities Research & Practice	375	29	7.7	1.220
Journal of Emotional Behavioral Disorder	355	20	5.6	1.951
Education and Treatment of Children	604	75	12.4	0.485
Behavioral Disorders	392	59	15.1	0.429
Education and Training in Autism and Developmental Disorders	593	125	21.1	0.512
Topics in Early Childhood Special Education	337	24	7.1	1.143
Career Development and Transition for Exceptional Individuals	246	20	8.1	-
Multiple Voices for Ethnically Diverse Exceptional Learners	82	1	1.2	-

Results

Characteristics of Intervention Research

Overall, 9.6% of studies ($n = 495$ out of 5,180 articles) across 12 journals were classified as intervention research. Table 1 provides a summary of articles published in each journal that met our inclusion criteria. The majority of studies used single-case research designs ($n = 365$; 73.7%). There were 122 (24.6%) group-design studies and eight studies (1.6%) categorized as other (i.e., mixed methods). The majority of interventions were implemented entirely in the school ($n = 466$; 94.1%). Other studies reported at least one phase of the intervention was conducted in a school setting ($n = 16$; 3.2%), the community ($n = 5$; 1.0%), or another setting ($n = 8$; 1.6%). The studies that implemented interventions in schools were mostly conducted in an inclusive setting ($n = 299$, 60.4%). If not in an inclusive setting, the interventions were conducted in separate classrooms (e.g., self-contained classroom, $n = 137$; 27.7%) or separate schools ($n = 59$; 11.9%).

Overall, 46.3% of interventions focused on academic outcomes (i.e., reading, math, writing, science, social studies, and health or physical education), 18.3% focused on behavioral outcomes (e.g., reduction of challenging behaviors, self-management for on-task behavior), 12.7% focused on social communication outcomes (e.g., social skills, and augmentative and alternative communication), 12.6% focused on nonacademic outcomes (e.g., life skills, self-determination, vocational training and education), and 10.1% focused on "other," which included preacademic skills, gross or fine motor skills, test-taking accuracy, and general academics (e.g., completion of assignments). Special education interventions most commonly targeted reading ($n = 121$; 22.4%). Figure 1 illustrates the frequency of intervention targets across studies ($n = 540$). Some interventions targeted more than one skill or goal, which explains why the frequency count is greater than 495.

Characteristics of Participants

Among the articles examined, students with disabilities who participated in the treatment groups ($n = 6{,}663$) accounted for approximately

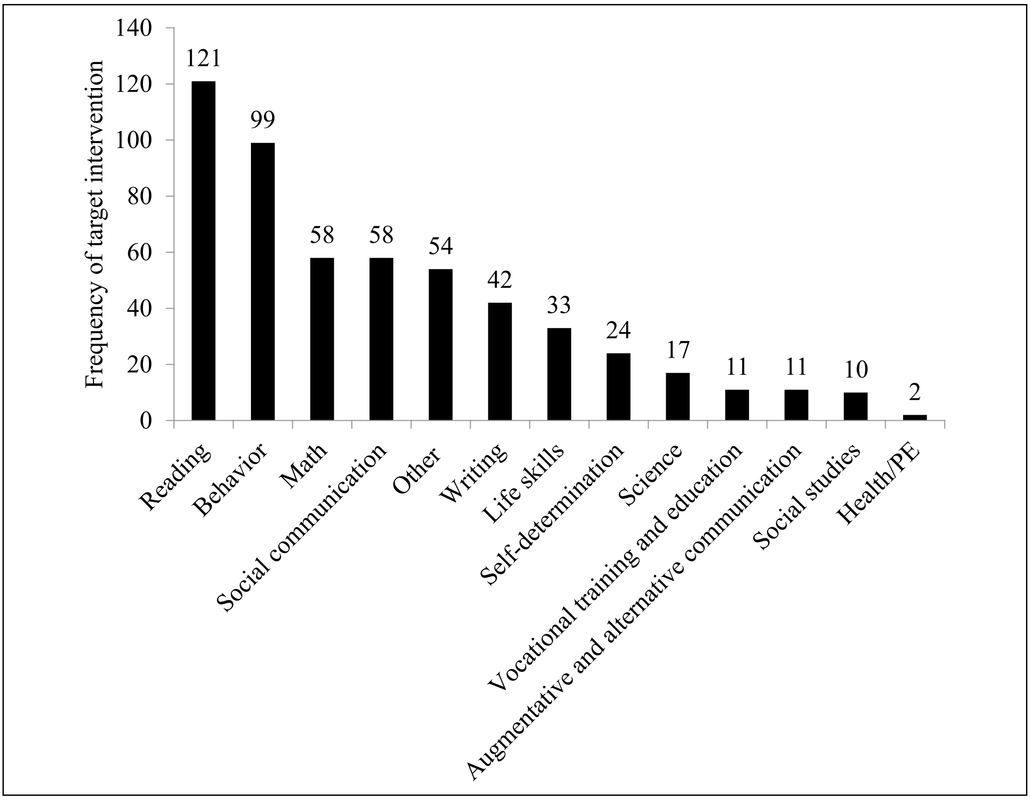

Figure 1. The frequency of studies with target interventions included in special education intervention research.

37% of students overall (e.g., all students in either control or treatment conditions; N = 17,901). Results reported in this section are based on these 6,663 students. The majority of studies included detailed diversity information (i.e., two or more pieces of demographic information on intervention participants other than disability category) about the student participants (n = 426; 86.1%). Fifty-four (10.9%) of included studies provided limited diversity information (i.e., only disaggregated information on disability category was reported). The other studies (n =15, 3.0%) utilized broader demographic information to describe their sample (e.g., they reported on the high proportion of diversity in the urban setting, or participants were normed on the population). Table 2 reports all demographics in more detail.

Disability. Overall, students with learning disabilities (n = 2,662; 39.9%) were included most frequently. This was followed by students categorized with intellectual disability (ID; n = 1,048; 15.7%), emotional and behavioral disorders (EBD; n = 697; 10.5%), autism spectrum disorders (ASD; n = 404; 6.0%), and other health impairment (OHI; n = 362; 5.4%). Figure 2 illustrates the frequency of students by disability category. The *not reported* category (n = 624) includes studies that reported students in special education without identifying student disability category. The *other* category (n = 443) includes students with an identified disability, but reporting made it difficult to identify which disability category the student fell under (e.g., studies that reported youth who received a special education diagnosis for a developmental delay but were currently being reevaluated for a different special education diagnosis).

Age. Because some studies reported average age or grade level for participants, we could

Table 2. Student Participant Demographics of All Included Studies.

Variable	*n*	%
Gender		
Male	4,186	67.0
Female	2,062	33.0
Transgender	0	0.0
Number of studies that did not report gender	56	11.3
Race-ethnicity		
White	2,644	54.5
Black or African American	1,281	26.4
Latino/a	622	12.8
Ethnic minority	109	2.2
American Indian or Alaskan Native	65	1.3
Asian American	56	1.2
Multiracial	34	0.7
Unknown	35	0.7
Middle Eastern	3	0.1
Number of studies that did not report race-ethnicity	223	45.1
Number of participants by age range		
3 to 5 years	170	12.5
6 to 8 years	210	15.4
9 to 11 years	253	18.6
12 to 14 years	403	29.6
15 to 21 years	326	23.9
Number of studies that did not report age	44	8.9
Number of participants by grade level[a]		
Prekindergarten	142	9.0
Kindergarten to second grade	310	19.7
Third to fifth grade	317	20.1
Sixth to eighth grade	490	31.1
Ninth to 12th grade and transition	176	11.2
Not specified	140	8.8
Number of participants reported as an English language learner	157	3.2
Number of studies reporting primary home language		
Spanish	11	2.2
English	4	0.8
Korean	2	0.4
Polish	1	0.2
Arabic	1	0.2
Not reported	476	96.2
Number of studies reporting socioeconomic status		
Income reported	6	1.2
Free and reduced lunch is reported	47	9.5
Assumed low income	5	1.0
Not reported	437	88.3

[a] Indicates number of participants in a range of grades if age was not reported in the study.

not determine overall average age or grade level of participants. Age (i.e., reported as age or grade level) was reported in 451 studies (91.1%). Of the studies that reported exact age, there were a total of 1,362 students with an average age of 11.1 years.

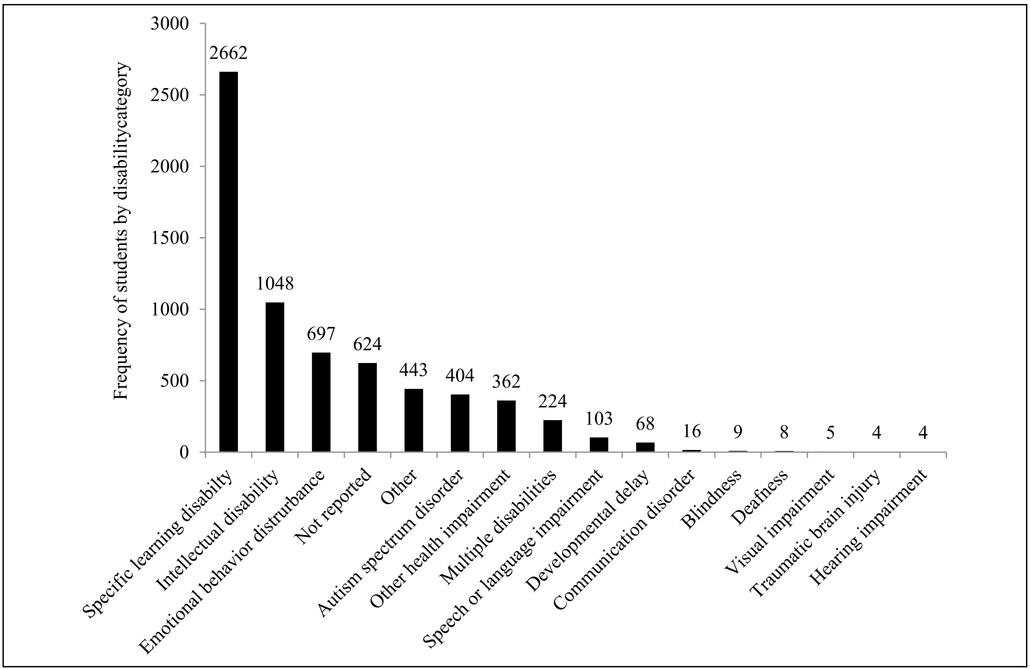

Figure 2. The frequency of participants with disabilities included in special education intervention research by Individuals With Disabilities Education Act disability categories.

Gender identity and sexual orientation. Gender was reported in 439 studies (88.7%). In total, from the studies that reported gender, there were 4,186 (67%) males and 2,062 (33%) females with disabilities. No studies reported if their participants identified as transgender. In addition, the sexual orientation of students was not reported in any of the coded articles.

ELLs and home language. Out of 495 studies included in this review, ELL status was reported in 39 studies (7.8%), and primary home language was reported in 19 studies (3.8%). In total, there were 157 ELL students (3.2%) included in the intervention research we reviewed.

Socioeconomic status. Socioeconomic status was reported in 58 (11.7%) of the studies. Of the 58 studies, six reported an indication of income and five were assumed low income (determined by contextual descriptions from the article). Forty-seven of the 58 studies used a proxy for income (i.e., free and reduced-price lunch), of which, on average, 63% of students were reported to be of low income.

Race and ethnicity. Race-ethnicity was reported in 271 studies (54.7%), indicating that almost half (n = 224, 45.3%) of included studies did not report on race. A total of 4,849 out of the 6,663 (72.8%) participants in intervention research had a reported race. In the studies that reported race-ethnicity, there were 2,644 White participants (54.5%), 1,281 Black or African American participants (26.4%), 622 Latino/a participants (12.8%), 65 American Indian participants (1.3%), 56 Asian American participants (1.2%), 34 multiracial participants (0.7%), and 3 Middle Eastern participants (0.06%); 109 participants were labeled *ethnic minorities* (2.2%), and 35 participants were labeled *unknown* (0.7%).

OR analysis was conducted using the reported racial demographic information in the included studies. Results of the OR analysis indicated that the ratio of race included in this review was statistically significantly different from that of the population receiving special education services under IDEA. Students identifying as American Indian (OR = 1.00) were the one exception, as their ratio of participation in research was not significantly

Table 3. *Z* Scores and Odds Ratios for Race and Ethnicity of Participants Included in Interventions.

Variable	Total youth receiving special education services under IDEA (ages 3–21)	Percentage of total youth population	Number of participants in sample who reported race	Percentage of participants in sample	*Z* score	Odds ratio
Race	6,464,096					
AI	86,307	1.34	65	1.34	- 0.06	1.00
AS	155,650	2.41	56	1.15	5.68	0.47
AA	1,191,817	18.44	1,281	26.42	14.23	1.59
LA	1,469,282	22.73	622	12.82	16.50	0.50
NH	19,520	0.30	NA	NA	NA	NA
WH	3,356,256	51.92	2,644	54.53	3.61	1.11
2+	185,265	2.87	34	0.70	9.00	0.24

Note. AI = American Indian; AS = Asian American; AA = Black or African American; LA = Latino/a, NA=Not Available; NH = Native Hawaiian; WH = White; and 2+ = multiracial.

different from their representation in special education services ($z = -0.06, p > .05$). Participants of certain racial and ethnic groups were more likely to be included in special education intervention research, including Black or African American (OR = 1.59) and White (OR = 1.11). By contrast, participants of other racial and ethnic groups were less likely to be represented in special education intervention research, including Asian American (OR = 0.47), Latino/a (OR = 0.50), and multiracial (OR = 0.24). Results are presented in Table 3.

Recruitment and Retention Practices

In addition to exploring the inclusion of diverse students in special education intervention research, a second goal of our review was to examine how authors reported their recruitment and retention strategies of student participants. A total of 218 studies (44%) did not report any explicit recruitment strategies, and 277 studies (56%) reported one or more specific recruitment strategies. Most often, studies that did report recruitment strategies used purposive sampling. Those studies selected students for a particular characteristic, such as a specific disability (e.g., n = 137; 27.7%). The second-most-used strategy was teacher referral (n = 113; 22.8%), followed by "other" strategy (e.g., administrator recommended, or identified through schoolwide data; n = 20; 4.0%), schoolwide participation (n = 16; 3.2%), convenience sampling (n = 4; 0.8%), advertisements (n = 2; 0.4%), and last, direct contact from researchers (n = 1; 0.2%).

Similarly, almost all of the included studies (473; 95.6%) did not report strategies for the retention of student participants. The most commonly used strategy to support the continuation of research was giving teachers training and materials (n = 10; 2.0%), but this strategy targeted teachers implementing interventions rather than student participants. Additional retention efforts included the provision of free time for students following an intervention session (n = 5; 1.0%), check-ins and reminders from researchers (n = 3; 0.6%), monetary incentives (n = 2, 0.4%), and academic support (n = 1; 0.2%).

Discussion

Efforts to include diverse participants in special education research are increasingly important to reflect the changing population characteristics. Increased inclusion of diverse participants is also necessary to understand intervention effectiveness for different groups. Historically, diversity has been an area of attention for *Exceptional Children*, as Ysseldyke (1987) called for research that addressed the specific concerns of ethnic and multicultural students after finding no articles in his 3-year tenure as editor.

The current review of 12 prominent special education journals found that although there are still areas of need surrounding the reporting, recruiting, and retention of diverse participants, progress has been made since Ysseldyke's call in 1987. Compared with previous reviews, progress has been made in the engagement of diverse participants in intervention research, with the caveat that the improvement is based on data provided in the articles that provided detailed demographic information. That caveat is crucial as we acknowledge there was substantial lack in reporting of demographic information overall.

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Characteristics of Intervention Research

We found that 73.7% of intervention studies utilized single-case design. Reporting standards for single-case design suggest describing research participants in great detail (Gast & Ledford, 2009). If the trend of utilizing single-case design for intervention research continues, it indicates a potential to incorporate comprehensive demographics factors of the included participants (Horner et al., 2005). In a previous review, Mastropieri et al. (2009) found that approximately 65% of published studies focused on academics and 30% focused on social skills or social communication. Within the 12 selected journals for this review, we found the largest portion of intervention research was also academically focused (46.3%), followed by behavior (18.3%), social communication (12.7%), and nonacademic skill development (12.6%).

Participant Characteristics

We found that the most common disability categories represented were specific learning disability (SLD; 19.9%), followed by ID (15.7%), EBD (10.5%), ASD (6.0%), and OHI (5.4%). These findings may be expected, as there are more students receiving special education services for learning disabilities under IDEA (approximately 35%) than any other category (U.S. Department of Education, 2015). According to the 37th annual report to Congress, the second-most-served population is students with speech or language impairment (SLP; approximately 21%), followed by OHI (12%), ASD (8%), ID (6%), EBD (5%), and developmental delay (4%). However, our findings show incongruence among some disability categories when compared with the overall population. For example, some disability categories had smaller percentages of inclusion in special education intervention research, based on the journals selected and articles reviewed, as compared with data from the annual report to Congress, including students with SLP (1.5%), OHI (5.4%), and ASD (6.0%). In contrast, some disability categories showed larger percentages of inclusion, based on the journals selected, as compared with data from the annual report to Congress, including students with ID (15.7%) and EBD (10.4%).

Overall mean age of participants in the previous review of research by Mastropieri et al. (2009) was approximately 10.9 years, which is consistent with findings from this review (average age 11.1 years). Although other participant demographics were not reported in the previously conducted reviews (e.g., Vasquez et al., 2011), population demographics were used to draw comparisons. The U.S. Department of Education does not mandate states to collect child-count data by gender, yet estimates from studies (e.g., Coutinho & Oswald, 2005) suggest that our findings (2:1 ratio of males to females, calculated from the articles that reported gender) are representative of the ratio of males to females receiving special education services. For example, ORs calculated for gender for ID, SLD, EBD, and ASD could reach as high as 4:1, indicating males may be 4 times more likely to be identified in those categories relative to females (Coutinho & Oswald, 2005; Werling & Geschwind, 2013). As males are more likely to be diagnosed with particular disabilities, this may contribute a partial explanation for our findings.

There were no studies that met our inclusion criteria that reported the sexual orientation of participants. There is no one best way to collect this information, but researchers can begin by adding sexual orientation and gender identity demographic data into their studies. As with all data, participant responses should be kept confidential and voluntary and should never negatively impact potential study participants. Researchers may encounter questions about confidentiality or sensitivity of information by research review boards, but these questions may be quickly answered by the need to further investigate and support this population.

Although there is no one age that a student may "come out," there is research to support that youth of all ages who do not express a heteronormative or cisgender identity are at greater risk of victimization in school (Kosciw, Greytak, Palmer, & Boesen, 2014) as well as suicidal ideation (King, Merrin, Espelage, Grant, & Bub, 2018). In addition, youth who identify as lesbian, gay, bisexual, transgender, queer or questioning (LGBTQ) are known to be at risk of more distal negative outcomes (e.g., depression, dropping out of high school; Kosciw et al., 2014), and youth with disabilities experience unique experiences due to their identities around ability status and sexuality (Kahn & Lindstrom, 2015). Like other vulnerable populations that experience negative outcomes, when researchers collect and utilize demographic variables to categorize participants (e.g., gender, race), we advocate that sexual orientation and gender identity also be included. That said, it will be important for researchers to consider at what developmental stage or age it is appropriate to collect this information, rather than considering if this information is worthy of collecting and perpetuating invisibility of LGBTQ students in research. Simply stated, we need to start collecting data on sexual orientation and gender identity when appropriate.

Another subpopulation that has received increasing attention in special education research is students who have been identified as ELLs. In the 2013–2014 school year, it was approximated that 4.5 million school-age children were considered ELLs (Kena et al., 2016). Students who are labeled as ELL have traditionally been overrepresented in special education and are likely to be identified with learning disability or ID (Samson & Lesaux, 2009; Sullivan, 2011). Students classified as ELL may need additional time and support to transition to the dominant language, and this can lead to misdiagnosis of learning disabilities or misallocation to special education (Ford, 2012).

Despite these trends, the results of this review suggest less representation of ELLs in special education intervention research (determined by the 12 selected journals) as compared with population statistics. This could partially be explained by one of this review's inclusion criteria: student received services under IDEA. Potentially, students labeled as ELL were considered at risk for a disability or aggregated in general education demographic information, which excluded them from this review. Relatedly, there was a relatively low rate of reporting on home language in the included studies. According to recent data, school-age children growing up in households where a language other than English is spoken has increased from 10% to 21% of the population since 1980 (Aud et al., 2011). This is an example of changing demographics and something important to be mindful of within the field of special education.

Another diverse group of students that is often not discussed is students impacted by poverty. In 2014, there were 10.7 million school-age children in families living in poverty, representing approximately 20% of the population (Kena et al., 2016). Students living in poverty are at risk of lower academic performance and school completion (Ross et al., 2012). There is also greater risk for students living in poverty to be referred to special education services (O'Connor & Fernandez, 2006). A large majority of the 57 studies that reported on socioeconomic status used free and reduced-priced lunch as a proxy for socioeconomic status. Because students in poverty are more vulnerable for negative outcomes, understanding how poverty affects intervention outcomes for students with disabilities would be a positive addition to the research base.

There has been considerably more reporting on disability and race than other participant characteristics. Findings from the 271 articles (54.7%) that reported race suggest that some racial groups are equally or more likely to be represented in special education intervention research (e.g., American Indian, Black or African American, and White students). This signifies some overall improvement in reporting or inclusion of some racially diverse participants. Despite these gains in representation, results of this review indicate some disparities remain in special education intervention research, including participants who are Asian American, Latino/a, and multiracial.

The underrepresentation of diverse populations in special education research is a systemic issue that perpetuates the invisibility and silence of marginalized students within education

This literature review was also limited by the unitary nature of reporting on participant demographics (i.e., singular demographic characteristics rather than intersectional demographics) that was found in the intervention research examined. We attempted to expand the visibility of diverse participants by comprehensively reporting demographic information that may not typically be reported by researchers. This allows us to establish baseline information to help expand our understanding of who is involved in intervention research and start a conversation on the need to recognize those who continue to be invisible.

The underrepresentation of diverse populations in special education research is a systemic issue that perpetuates the invisibility and silence of marginalized students within education. Careful consideration and reporting of intersectional identities can help begin breaking down the status quo of unitary reporting and promote a more complex understanding of within-group diversity (e.g., ELLs of different racial and ethnic backgrounds from different socioeconomic status). As Artiles (2003) notes, there has been a silence created by the research community around ethnic, racial, class, gender, and linguistic difference, which has been affirmed by this analysis of 12 special education journals.

Recruitment and Retention Practices

Unfortunately, procedures describing the retention of student participants were rarely discussed (not reported in 95.5% of studies). The studies that reported any student recruitment procedures mostly utilized purposeful sampling (i.e., participants were selected due to a particular disability diagnosis, academic problem, or behavioral concern). To sufficiently represent diverse participants in research and increase the validity of interventions, researchers should carefully consider how to target diverse students before and during study recruitment. Procedurally, the ability to replicate studies appropriate for diverse populations is hindered by the lack of reporting on recruitment and retention efforts. The ability to replicate studies is essential to identification of evidence-based practices in special education. As mentioned before, it is crucial to understand which interventions are effective as well as for whom (Klinger & Edwards, 2006).

Review Limitations

There are a few limitations to note about this review. First, this review aimed to be representative of research in special education by reviewing articles from 12 prominent special education journals. That said, our journal selection and selection criteria have an impact on the findings we presented. We also acknowledge that some specialty journals that focus on specific disabilities and other educational research journals that include youth with disabilities were not included, which could have also biased our results. Of note, a large portion of youth with disabilities receives IDEA services for speech or language impairment, which was not captured in this review. However, we are encouraged that organizations such as the American Speech-Language-Hearing Association have produced their own literature reviews specifically for this population (e.g., Baker & McLeod, 2011). Second, caution should be used when interpreting the generalizability of results. Although we suggest improvement has been made from previously conducted reviews, due to inconsistency and lack of reporting on student participant characteristics across articles and selected journals, only an incomplete image of the current landscape of inclusion in intervention research can be presented. Third, there are limitations to how we calculated reliability. We utilized interobserver agreement rather than interrater reliability for each coded variable, resulting in an inability to calculate kappa. That said, we did not anecdotally notice persistent problems with the coding document across coders. Fourth, we understand that there are multiple definitions of diversity, and the lens that was used for this review is one of many when discussing diversity issues in education. Last, this review focused on experimental research, which excluded other forms of research articles that could have included diverse participants.

Implications for Research and Practice

Addressing the need to ensure adequate representation of diverse students in special education intervention research begins with the recognition of current limitations and the need to systematically address those needs by (a) recruiting diverse participants into new projects, (b) retaining diverse participants once recruited, and (c) reporting on the presence of diverse participants in the dissemination of results.

Recruiting diverse participants. Recruiting diverse student participants may begin with asking research questions that are complex and determining whether an intervention is effective for the intersectional identities (e.g., a student who identifies as a Black female, is middle class, and is labeled with a learning disability) that are found in the classroom (Warner, 2008). Some strategies that have worked to recruit diverse participants, outside of the school context, include using community-based organizations as intermediaries between researchers and potential research participants, and personalized advance-notification letters. Documents that are culturally adapted to the target community have been found to be effective for participants typically underrepresented in research (e.g., African American, Latino/a, and American Indian; Yancey, Ortega, & Kumanyika, 2006). Barnett, Aguilar, Brittner, and Bonuck (2012) also suggest strategies such as obtaining multiple forms of contact information from participants, offering incentives, sending reminders prior to participation dates, giving participants magnets and business cards with researcher contact information, and partnering with familiar faces and bilingual staff in clinics to help build rapport with participants.

Retention of diverse participants. Researchers who have been successful with recruiting and retaining Latino/a families and participants in research have utilized cultural principles to guide them, such as recognizing the importance of and respecting family structure, using formal language and individualized communication during recruitment, and offering supports for time and effort in research (e.g., providing transportation, monetary incentives; Miranda, Azocar, Organista, Muñoz, & Lieberman, 1996). George, Duran, and Norris (2014), in a systematic review of health-related research, found strategies that improved participation for Asian Americans, including (a) if there was cultural congruence between research personnel and the population being studied, (b) research was conducted in an altruistic manner with concern for the participant, (c) participation was convenient, and (d) there was little to no risk or cost to the participant.

Further, as we consider the continued recruitment and retention of American Indian participants, researchers can ensure that a tribe's culture and traditions are respected, tribal liaisons are included in the entire research process, researchers go through all formal research reviews required by the tribe, and research benefits go beyond the researcher to include something that can be helpful to the tribe long after the researcher has left (Hodge, Weinmann, and Roubideaux, 2000; Mail, Conner, & Conner, 2006). Villarruel, Jemmott, Jemmott, and Eakin (2006) also recommend working with schools to help incentivize students to participate by providing community service credits for research (if applicable to the school) but also by providing a direct benefit of credit completion toward graduation requirements. It is also important to understand the heterogeneity within groups of participants and the intersectional identities they hold. This includes race and ethnicity but also ELL status, gender, and sexual orientation.

Future dissemination. Those training future academics should continue efforts to sensitize and educate *all* future scientists to be responsive to the needs of diverse populations (Klingner et al., 2005; Patton, Williams, Floyd, & Cobb, 2003). Critical judgments about what types of diverse demographic data collected should be made based on the research questions being asked, relevance to the study sample, and generalizability of findings. One challenge quantitatively focused researchers might have is the overwhelming number of identity groups that could potentially be incorporated in analyses that utilize an intersectional approach (Warner, 2008). With this challenge, researchers must carefully consider how groupings are formed and how comparisons are made.

Conclusion

We examined the diversity of participants included in 16 years of intervention research within 12 prominent special education journals. We found some increase in racial representation in intervention studies since similar reviews have been conducted. Yet, there are still dramatic rates of little to no reporting on most participant demographic data. We should not be discouraged but use this as an opportunity to begin comprehensively collecting data that capture the array of diversity and, maybe more importantly, the intersectional identities that all of our participants hold.

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