Inclusion

An Examination of Autism and Inclusion Knowledge in a Sample of New York Educators

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Corresponding Author:	Kelly Buchanan Binghamton University Vestal, NY UNITED STATES
First Author:	Kelly Buchanan, MA
Order of Authors:	Kelly Buchanan, MA
	Candace Mulcahy, PhD
	Jennifer Gillis Mattson, PhD
Manuscript Region of Origin:	UNITED STATES
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Author Note

We have no known conflicts of interest to disclose.

Abstract

Educators are highly likely to serve autistic students in general education environments, and previous research has suggested insufficient autism knowledge and low levels of self-efficacy among educators. This study examined educator autism knowledge and self-efficacy in a sample of 385 New York educators to assess current autism knowledge in this population and to examine how knowledge and self-efficacy predict teacher knowledge of evidence-based practices for supporting autistic students in inclusive environments on an open-ended vignette task. Autism knowledge and self-efficacy were high in this sample and were positively related to the number of evidence-based practices nominated. Next steps are shared for assessing implementation of evidence-based strategies and identifying training needs related to teaching autistic students in inclusive settings.

An Examination of Autism and Inclusion Knowledge in a Sample of New York Educators

Autism spectrum disorder (hereafter, autism[1]) is a neurodevelopmental condition characterized by differences in social communication and restricted or repetitive behaviors and interests (American Psychiatric Association, 2013). Approximately 1 in 36 children are estimated to have an autism diagnosis as of 2023, representing a 91.9% increase from 2012 prevalence estimates (Centers for Disease Control and Prevention, 2023). Given this increase, educators are serving more autistic students in general education, or inclusive, settings. According to the U.S. Department of Education (2023), over 40% of autistic students spend at least 80% of the school day in general education settings, with an additional 18% participating in the general education environment for at least 40% of the day.

For purposes of this study, we use Anderson et al.'s (2022) definition of "inclusion" - a set of practices and beliefs that focus on increasing student involvement within the regular education classroom (p. 3). We recognize that in practice inclusion is often conflated with educational placement; namely, placement of students with disabilities in the general education classroom. However, to effectively meet the needs of autistic students in inclusive settings, educators (e.g., general educators, special educators, specialists such as related service providers or reading teachers, administrators) require a set of practices and beliefs that include the following: (a) understanding the unique characteristics and needs of the autistic students and (b) knowledgeably choosing supports and interventions that will meet those needs (Bolourian et al., 2022; Paisley et al., 2023). In addition, administrators must be knowledgeable of inclusive

[1] The terminology used in this paper reflects guidance for reducing pathologizing language (Bottema-Beutel et al., 2021) and a preference for identity-first language (i.e. autistic) over person-first language (i.e. person with autism) currently reflected in English speaking samples of autistic adults (Bury et al., 2023; Keating et al., 2023; Kenny et al., 2016; Taboas et al., 2023).

practices and EBPs for autistic students in order to support EBP use among teachers, promote effective practices, and sustain an inclusive culture for autistic students throughout the school (Roberts & Webster, 2022).

Autistic students have unique academic, social, and behavioral needs compared to peers with other disabilities (Blacher et al., 2014). For example, autistic students may have cognitive or communication needs (e.g., the use of alternative and augmentative communication) that require specialized teacher training to support classroom engagement and access (Fleury et al., 2014). Socially, autistic students experience increased isolation and are less likely to develop and maintain reciprocal, high-quality relationships compared to non-autistic peers (Locke et al., 2017). These needs can be exacerbated in inclusive classrooms without appropriate structure and support to foster academic, social, and behavioral development (Locke et al., 2017; Segall & Campbell, 2012). Additionally, within inclusive environments, autistic students (and students with disabilities more generally) should be taught the general education curriculum alongside peers without disabilities through evidence-based practices (EBPs) and other research-based supports to ensure meaningful access and measurable progress (Brock et al., 2020; Paisley et al., 2023). Finally, inclusion of autistic students must be a school-wide approach, with effective leadership that provides a vision and supports an inclusive school culture, support for knowledge and skills of teachers and other staff, and organizational structures that enable autistic students to be successful within an inclusive setting (Anderson et al., 2022; Roberts & Webster, 2022).

Effective educators employ EBPs such as adapting the educational environment or implementing specific instructional approaches. For example, autistic students benefit from highly structured environments, with visual and/or auditory cues, especially for transitions (Crosland & Dunlap, 2012). Autistic students with individualized education programs (IEPs)

require specially designed instruction, often in communication (e.g., functional communication training) and social skills (e.g., social skills training) as well as in core academic areas (e.g., direct instruction; Crosland & Dunlap, 2012; Hume et al., 2021; Paisley et al., 2023). According to Steinbrenner et al. (2020), EBPs for autistic students have been established most prevalently in communication, social skills, and behavior (92%), followed by academic skills (15%). Other areas of EBPs include play (13%), school readiness (11%), and adaptive/self-help skills (11%).

Recent research suggests there is a research-to-practice gap (McGhie-Richmond & Haider, 2020), including a mismatch between educator priorities for student outcomes, the availability of EBPs related to those outcomes (Brock et al., 2020), and a lack of intervention studies with educators as interventionists (Mason et al., 2022; Steinbrenner et al., 2020). For example, academic and cognitive skills are a priority for educators, yet EBPs for autistic students tend to focus on social, communication, and behavioral outcomes (Brock et al., 2020). A possible reason for the research emphasis on these outcomes could be the fact that autistic students are often segregated from general education classrooms due to social and behavioral concerns (Frake et al., 2023). Similarly, recent systematic reviews demonstrated that, in over half of included studies of EBPs for autistic students, the interventionists were researchers (Mason et al., 2022; Steinbrenner et al., 2020). This is problematic because it is unclear if the practices would still be effective or implemented with fidelity if implemented by educators in natural settings, such as inclusive classrooms (Roberts & Webster, 2022). As such, educators may not be adequately prepared with autism knowledge and the skills to use EBPs to meet the needs of autistic students in the general education environment (Hamrick et al., 2021).

There are several reasons for the lack of knowledge related to inclusion of autistic students and using EBPs among educators. Reasons include lack of adequate preservice and in-service teacher and administrator training, lack of resources within inclusive settings, lack of knowledge of the characteristics of autism and effective interventions, and a belief that students with disabilities should exclusively be taught in special education settings or earn their way to the general education classroom (Alexander et al., 2015; Frake et al., 2023; Lauderdale-Littin & Brennan, 2018; Love et al., 2019; Morrier et al., 2011). For example, Paisley et al. (2023) examined autism-related EBP knowledge and use among 303 general educators and special educators and found just 25% of teachers identified at least one autism-specific EBP and reported using the EBP in their own class. An additional 20% either identified an EBP or described using one or more in their class (but did not identify it as an EBP). In a study by Hamrick et al. (2021), over 50% of the special educator sample had no training on 19 of 36 EBPs and indicated being prepared to use just two EBPs - prompting and reinforcement. More positively, Bolourian and colleagues (2022) found general educators with no autism-related professional development could accurately identify core characteristics of autism and some EBPs for supporting students with autism, suggesting a foundational level of knowledge.

There may also be differences in autism-related knowledge and use of EBPs by educator characteristics (e.g., educator type or training background), and school variables, such as geographic setting and funding resources, and student variables, such as age or disability severity. Specifically, a review by Gómez-Marí and colleagues (2021) included 25 studies conducted between 2015 and 2020 representing 13 countries including the U.S. Among the results, the authors suggested that, globally, autism knowledge among teachers is largely insufficient and may impact efficacy with students. However, among studies with US samples,

Gómez-Marí et al. found higher levels of teacher autism knowledge and higher levels of knowledge among special educators compared to general educators. Similarly, Segall and Campbell (2012) reported higher levels of autism knowledge among school psychologists and special educators compared to general educators and administrators. Finally, Brock and colleagues (2020) found that different EBPs were identified by educators based on the age and level of need of their students; that is, teachers of younger students were more likely to nominate a specific EBP, Picture Exchange Communication System (PECS; Bondy & Frost, 1994), while teachers of students with more intensive needs were more likely to identify other EBPs such as discrete trial training and visual supports.

The paucity of knowledge and skills related to autism, inclusion, and EBPs is compounded by educators' attitudes and beliefs, particularly the belief that one has the skills and resources to enact inclusive practices effectively, or teacher self-efficacy. Teachers often lack the attitudes or self-efficacy necessary to effectively meet the needs of autistic students in the general education classroom. Teachers with more positive attitudes toward inclusion and a stronger belief that they have the skills and resources necessary to successfully implement inclusive practices are more likely to be open to training in and implementation of EBPs and more likely to cultivate environments in which inclusive attitudes are modeled (Garman-McClaine, 2024; Gómez-Marí et al., 2022). A review of teacher self-efficacy and inclusion demonstrated that teachers with higher self-efficacy towards inclusive practices felt more responsibility for the outcomes of their students with special education needs and exhibited greater commitment to implementing necessary supports in their classrooms (Zee & Koomen, 2016). Furthermore, in a study of primary school teachers in New Zealand, teachers with high self-efficacy were found to have similar conceptual knowledge about

inclusion than teachers with low self-efficacy; however, the teachers with higher self-efficacy reported more frequent implementation of specific inclusive education practices in their classrooms (Woodcock et al., 2022).

Differences in self-efficacy and attitudes toward inclusive education have been found by educator characteristics including age, gender, educator type, and instructional level (i.e., primary vs. secondary). Teachers in jurisdictions with a longer history of inclusive education and more clarity in stated policies tend to report higher self-efficacy for implementing inclusive practices, as do teachers with more experience working directly with students who have disabilities (Wray et al., 2022). Special education teachers tend to report more positive attitudes toward inclusion than general educators and even administrators (Garman-McLaine, 2024; Segall & Campbell, 2012). Additionally, primary school teachers tend to report higher self-efficacy for implementing inclusive practices than secondary teachers (e.g., Specht et al., 2016; San Martin et al., 2021). Gender has also been identified across several studies as a predictor of teacher attitudes and self-efficacy, with some studies finding that female educators tend to feel more positively toward inclusion in general than male educators (e.g., Specht et al. 2016, San Martin et al. 2021). However, findings on this trend are highly variable (Wray et al., 2022) and appear dependent on the specific classroom skills being examined (e.g., male teachers reported higher self-efficacy for behavior management; Chao et al., 2016; Specht et al., 2016).

The purpose of this exploratory study is to examine patterns of autism knowledge, knowledge of evidence-based practices, and self-efficacy toward working with autistic students in inclusive settings in a large sample of educators in one U.S. state. We focus on a single state because, although special education is guided by the Individuals with Disabilities Education Act (2004), state interpretation and implementation of the law varies (U.S. Department of Education,

2023) and educator preparation and certification requirements vary by state (Tobin, 2012). Our study expands current research by exploring whether differences exist in self-efficacy and knowledge of autism, EBP, and inclusion among educators at the state level. We included instructional staff (general educators, special educators, specialists) and administrators, all of whom play a role in creating an inclusive environment and delivering EBPs with fidelity (Anderson et al., 2022; Brock et al., 2020; Paisley et al., 2023; Roberts & Webster, 2022).

The following aims guided the present investigation: (1) to examine levels of autism knowledge and self-efficacy among educators, including differences by educator characteristics (i.e., gender and educator type); and (2) to examine relations between educator autism knowledge, self-efficacy to teach autistic students, and knowledge of EBPs for supporting autistic students in inclusive environments. We believe the knowledge gained from this study will inform both research and professional development for preservice and inservice educators.

Method

Participants

Participants were recruited from across the state of New York using a publicly available email list of New York educators. We could not ascertain instructional position from the contact list. As such, we sent the survey to 250,300 educators in New York. Over 15,000 bounced back or were reported as duplicates.

A total of 1,023 of recruited participants started to complete the online survey. Surveys were reviewed for completion and only participants who progressed through every section of the survey were included in this study (these included participants who had some missing responses but completed the majority of each section; see later section on missing data). A total of 385 participants was the final sample included for this study.

Over half of the sample were currently employed as general educators (n = 219, 56.9%), while 119 (30.9%) were employed as special educators. The rest of the participants included 15 (3.9%) school administrators, three paraprofessionals or instructional aides (0.8%), and 27 school specialists (including 11 [2.9%] school counselors, four [1.0] speech language pathologists, and academic intervention teachers, adaptive PE teachers, school social workers [<1.0%]). Two participants (0.5%) did not report their current position.

Ninety-four percent (94.9%) of participants endorsed having taught or supported students with special education needs at some point during their career in education. Participants' years of teaching experience ranged from 1 year to 42 years (M = 16.79, SD = 9.23), and participant age ranged from 23 to 70 (M = 44.18, SD = 11.48). Elementary and secondary education were evenly represented with over 30% of respondents reporting at each elementary- and high-school levels and 20.4% of respondents working in middle school environments. Twenty six percent of the sample reported working in preschool classrooms. See Table 1 for participant demographics.

Respondents were distributed across geographic regions across New York and employed in schools with a range of needs-to-resource capacities (N/RC), an indicator of school resource availability (i.e., poverty percentage in district/combined wealth ratio). See Table 2 for descriptive statistics regarding geographic region and N/RC categories of participants' districts.

Measures

This study is part of a larger project examining educator views about inclusion and disability in education. Participants completed a survey through the Qualtrics online platform. The survey included 86 questions and was divided into three sections: Demographics and Teacher Characteristics, the *International Survey on Inclusion* (ISI; Krezmien et al., 2017), and the *Autism Stigma and Knowledge Questionnaire* (ASK-Q; Harrison et al., 2017).

Demographics and Teacher Characteristics

The first section of the survey asked educators to answer several questions to characterize individual and career descriptors. Educators reported their age, current position, years of teaching experience, grades served, and school type. They also answered questions about their experience in special education, including whether they had ever worked with or supported students with special needs and the percentage of their current students with special needs.

International Survey on Inclusion - Autism Self-Efficacy

The second section of the survey was the ISI which was developed to measure educators' attitudes, perceptions, and knowledge about serving students with disabilities in inclusive settings (Krezmien et al., 2017). This project is one of a series using versions of this survey, which have been conducted in other countries around the world including Germany, Chile, and Massachusetts, United States (Bosch, 2021; Larmon, 2021; Przibilla et al., 2016).

The first part of the ISI included 45 Likert-style questions (rated on a 4-point scale from "Strongly Agree" to "Strongly Disagree") in which respondents rated statements about their knowledge and ability to implement evidence-based support for students with various disabilities described in brief vignettes. In the second section, participants responded to questions that directly assessed their perceived ability to serve students with four specific disabilities - Specific Learning Disability, Emotional and Behavioral Disability, Intellectual Disability, and Autism Spectrum Disorder. Only responses to the four items regarding autistic students were analyzed for this study. Reliability of these four items was calculated using Cronbach's Alpha, with a 0.87 coefficient, demonstrating strong internal consistency. Therefore, teacher responses across these four items were averaged to create a variable named "Autism Self-Efficacy" representing educator's overall self-efficacy for meeting the needs of autistic students in their service.

Finally, respondents were presented with vignettes describing students with disabilities in inclusive settings and asked to nominate strategies they would use to support each student in an open-ended format. The vignette analyzed in this study described an autistic student exhibiting behaviors of concern in a mathematics class and asked participants to nominate the strategies they would use to support the student's successful participation in the classroom. The vignette prompt can be found in the Supplementary Material.

Autism Stigma and Knowledge Questionnaire

The final section was the ASK-Q, a 49-item measure developed by Harrison and colleagues (2017) to assess basic knowledge about autism. The measure has established psychometric support across multiple domains of autism knowledge and utility for cross-cultural and cross-professional comparisons (Harrison et al., 2017). The instrument was developed by collecting questions spanning several instruments designed to measure autism knowledge, then using a diagnostic classification model (DCM) analysis to inform item validity and dimensionality for a consolidated questionnaire. The questionnaire consists of 49 true or false statements. The first item, "I have heard of autism" is used only for sample characterization and is not included in scoring; therefore, 48 items are scored based on factual accuracy.

Items in the ASK-Q span four content domains: Diagnosis/Symptoms (D/S; 18 items), Etiology (ET; 16 items), Treatment (TR; 14 items), and Stigma (ST; 7 items), resulting in a corresponding subscale score for each domain. Items in the ST subscale are items also included in one of the first three subscales that are posited to capture both factual knowledge and negative attitudes. Example items for each domain are shown in Table 3. For the first three subscales, a score is calculated from the number of items answered correctly in that domain. Higher scores on each of these subscales indicate better autism-related knowledge in that domain. Items in the ST

subscale are reverse scored (i.e., incorrect responses are scored "1" and summed) where a higher score indicates more frequent endorsement of negative and inaccurate beliefs about autism. Each of the ASK-Q subscales has a corresponding threshold score, informed by the developers' DCM analysis of the validation sample, which classifies respondents as having "Adequate" vs "Inadequate" levels of knowledge in that domain (ranges for "Adequate" knowledge on each subscale are as follows: D/S 11-18, ET 11-16, TR 10-14, and ST 0-3).

Reliability for the full 49-item scale in this sample was acceptable (α = .667). Reliability for individual subscales was lower (D/S α = .589, ET α = .409, TR α = .350). Therefore, only total ASK-Q score was used for inferential analyses.

Procedure

After receiving approval from the university's human subjects review committee, an email describing the study was distributed to the email list of educators across the state. Individuals who followed the survey link within the email were presented with a summary of the study procedures and an informed consent. The survey took participants approximately 30-40 minutes to complete. Following consent to participate, participants completed the demographics section, followed by the ISI, and then the ASK-Q. Participants who reached the end of the survey were asked if they would like to provide their contact information to be entered into a raffle for a $50 gift card. Gift cards were sent to five participants randomly selected from the set of completed surveys.

Data Analysis

To analyze data in relation to Aim 1, we first conducted descriptive analyses of ASK-Q scores and Autism Self-Efficacy scores across the full sample. We then conducted t-tests to examine differences in autism knowledge and self-efficacy by gender, and one-way ANOVAs to

test for group differences by educator type. Pearson's correlations were conducted to examine relations between specific participant demographics (i.e., gender, age, educator type, years of teaching experience) and ASK-Q scores, and Autism Self-Efficacy scores. As informed by group comparisons, gender and educator type were then coded as dichotomous (female vs. not female and special education teacher vs. not special education teacher, respectively) to be included in correlation and regression analyses.

To analyze data in relation to Aim 2, we conducted a multiple regression analysis to examine all correlated variables as concurrent predictors of the number of EBPs nominated. Assumptions for normality and multicollinearity (all VIF values under 10) were met.

We used content analysis to qualitatively analyze responses to the open-ended vignette on the use of EBPs for students with autism. Educators' open-ended responses were analyzed in a multi-step, recursive process (Erlingsson & Brysiewicz, 2017). First, the first two authors reviewed participant open-ended responses and identified each distinct meaning unit – "a word, sentence, or section of text that conveys a single central meaning" (Erlingsson & Brysiewicz, 2017, Supplementary Material) – contained within the response. Both authors coded the first 10% of responses to evaluate inter-coder reliability for this step (calculated as the number of unit agreements/unit agreements + disagreements for each response, then averaged across participants); reliability at this step was 86.6%. Disagreements were resolved through mutual discussion and consensus before completing remaining extraction of meaning units. A final 10% of responses were checked upon completion of coding; reliability for the final set was 93.5%.

Next, each meaning unit extracted from the original response was assigned a code using a deductive approach, based on a list derived from nationally recognized sources of EBPs. EBPs were identified from the National Standards Project: Phase 2 (National Autism Center, 2015),

Hume et al. (2021), and the National Center for Intensive Intervention (2021). We included all possible EBPs to account for the fact that respondents may nominate an academic intervention that would also address the behavioral and social needs of the student in the vignette. The full list of EBPs can be found in the Supplementary Materials.

Each code was evaluated to determine if it represented an established EBP for autistic students. Codes were scored "0" if they did not represent an identifiable EBP, "1" if they did represent a single identifiable EBP, and "2" if two or more distinct EBP strategies were represented in a single meaning unit (e.g., a response of "provide the student with a visual schedule" was coded for both visual supports and use of schedules). The second author coded all entries for EBPs identified, and the first author reviewed codes and confirmed whether a response represented a valid EBP. Fewer than 10 disagreements were found; the authors discussed each disagreement and came to agreement. A total score of nominated EBPs was calculated for each participant (M = 2.71, *range* = 0-13 EBPs). We did not analyze the EBPs beyond identifying whether an EBP was nominated, as that was beyond the scope of this study and is addressed in Author et al. (2025).

Results

Missing Data/ Checking of Assumptions

Missing data across the ASK-Q and the Inclusion autism items was less than .05%. Therefore, ASK-Q total scores were calculated by the sum of all correctly answered items (i.e., skipped items were considered incorrect). ASK-Q total scores were not calculated for participants who were missing item responses for more than 20% of ASK-Q items (n = 4, 1.0%).

Twenty-nine participants (7.5%) who completed all closed-ended items did not answer any open-ended vignette items in the survey, and therefore did not have responses to be coded

for EBPs. Pearson's correlations were conducted to determine if other variables were systematically related to these missing data, perhaps indicating a problem with response effort and subsequent validity of those participants' data. Skipping all open-ended questions was weakly significantly correlated with ASK-Q scores (r = -.109, p = *.033*), and was not correlated with participants' Autism Self-Efficacy score (r = .007, p = *.892*). These participants were retained in analyses that did not include the EBP variable. Participants who responded to all other open-ended vignette items but did not respond to the vignette about the autistic student (n = 6, 1.6%) were included in all analyses and were scored "0" for EBPs nominated.

Descriptive Analyses – Autism Knowledge and Self-Efficacy

Means and standard deviations of total scores for each ASK-Q subscale were calculated to examine levels of autism knowledge in each domain across participants. In general, participant knowledge across each subscale was very good, with most participants exceeding the scores identified as indicating "Adequate" in Harrison et al.'s (2017) validation sample (Diagnosis/Symptoms - 98.2%, Etiology - 98.4%, and Treatment - 95.3%). Only 3.4% of educators endorsed autism-related stigma per ASK-Q classification cutoffs. Descriptive statistics of the sample's ASK-Q Total scores are displayed in Table 4.

With respect to self-efficacy, educator responses to autism-related items from the ISI were mostly positive, with 87% responding "Agree" or "Strongly Agree" to the item "I know and understand the characteristics associated with [autistic] students." Educators also responded mostly positively to items assessing instructional self-efficacy, including "I know and understand the instructional strategies necessary to teach [an autistic student] in a general education classroom" (79.0% Agree/Strongly Agree), "I prepare [autistic] students to become adults who obtain and keep a job" (79.2% Agree/Strongly Agree), and "I prepare [autistic] students to

become adults who live independently (75.1% Agree/Strongly Agree). For the combined Autism Self-Efficacy variable, the sample mean was 2.96 (*SD* = 0.68) *range* 1.00 - 4.00). Aggregate statistics for individual items are displayed in Table 4.

Autism Knowledge and Autism Self-Efficacy by Educator Characteristics

For Aim 1, we explored potential relations between educator characteristics and their autism knowledge and self-efficacy. Independent group *t*-tests were conducted to test for differences in autism knowledge and self-efficacy by gender. Only male and female groups were compared as the total number of participants who reported "Other" or did not report a gender was too small for analyses ($n = 8$). There was a significant difference in autism knowledge, with female educators ($M = 41.74$, $SD = 3.64$) scoring higher than male educators ($M = 40.71$, $SD = 3.06$), $t(371) = -2.31$, $p = .022$. The effect size was small, Cohen's $d = .292$. Female educators also reported slightly higher self-efficacy for working with autistic students ($M = 3.00$, $SD = 0.68$) than males ($M = 2.81$, $SD = 0.68$), $t(366) = -2.076$, $p = .039$, with a small effect size, Cohen's $d = 0.266$.

A one-way ANOVA was conducted to test for differences in ASK-Q scores by educator type among general educators, special educators, administrators, and specialists. Paraprofessionals/aides were excluded from this analysis due to very small sample size ($n = 3$). No significant differences were found in autism knowledge by educator type, $F(3,373) = 2.09$, $p = .101$. Next, we used a one-way ANOVA to test for differences in Autism Self-Efficacy score by educator type. There was a significant group effect, $F(3, 368) = 8.46$, $p < .001$, for self-efficacy. Bonferroni post-hoc comparisons revealed a significant difference in Autism Self-Efficacy scores between special educators ($M = 3.21$, $SD = 0.65$) and general educators ($M = 2.82$, $SD = 0.66$) such that special educators reported greater self-efficacy for working with

autistic students. Post-hoc comparisons of Autism Self-Efficacy scores between specialists (M = 2.97, SD = 0.73) and administrators (M = 2.87, SD = 0.60) with any other group were not significant.

Finally, Pearson's correlations were conducted to test for associations between educator age and years of experience with ASK-Q scores and Autism Self-Efficacy. Educator age was not significantly correlated with ASK-Q Total scores (r = -0.37, p = .484), nor was years of teaching experience (r = -.059, p = .254), suggesting that participants' autism knowledge did not systematically differ alongside either educators' chronological age or their years of professional experience. Neither variable was significantly related to Autism Self-Efficacy scores (r = -.095, p = .072 for age; r = -.050, p = .313 for years of experience; Table 4).

Relations Between ASK-Q Scores, Self-Efficacy, and EBP Knowledge

To examine Aim 2, Pearson's correlations were explored for potential associations between educator characteristics – educator age, years of experience, gender (female/male), and educator type (special educator/non-special educator) – with autism knowledge on the ASK-Q, ratings of autism self-efficacy, and number of valid EBPs educators identified in open-ended vignette responses. All correlations are displayed in Table 4. EBP nomination was not significantly associated with age or years of experience, but was positively associated with gender, educator type, ASK-Q, and Autism Self-Efficacy (see Table 4).

A multiple regression model was then tested to evaluate gender, educator type, autism knowledge, and self-efficacy concurrently as predictors of teacher ability to nominate valid EBPs. Age and years of experience were not included in the regression model because they were not significantly related to ASK-Q scores, Autism Self-Efficacy, or EBPs nominated. Results indicated the model explained 10.2% of variance (F(4,366) = 610.35, p < .001) in the number of

EBPs nominated. Gender, ASK-Q Total Score and Autism Self-Efficacy emerged as significant predictors, with female gender, higher self-efficacy, and higher ASK-Q scores predicting more nominated EBPs. Regression coefficients and significance values are displayed in Table 5.

Discussion

The purpose of this exploratory study was to examine patterns of educator knowledge about autism and inclusive practices to teach autistic students in a large sample of educators in New York. Furthermore, we explored demographic characteristics that predicted differences in autism knowledge, and associations between autism knowledge, self-reported ability to serve autistic students competently, and knowledge of autism-specific EBPs. This study marks one of the first state-wide analyses of educators' autism knowledge, self-efficacy, and EBPs. The findings reflect a strong foundational knowledge among general educators and special educators, a positive change from prior research (Gomez-Mari et al., 2021; Seagull & Campbell, 2012).

The sample of New York educators demonstrated high levels of knowledge as measured by the ASK-Q, suggesting that this sample is well versed in basic factual information about autism. Educators also reported relatively high levels of self-efficacy with teaching autistic students, with the majority of the sample reporting positive feelings about their ability to achieve success with autistic students. Finally, educators were able to nominate an average 2.71 EBPs for teaching autistic students in inclusive settings. Eighty one percent of our sample nominated at least one EBP, a higher number than those in Paisley et al.'s (2023) sample, although different coding approaches could partially explain this discrepancy. Given the increased presence of autistic students in general education settings, these results are a positive indicator of this sample's preparedness to effectively meet the needs of this population of students.

The overall strong foundational knowledge of autism and EBPs among New York educators is encouraging and similar to findings related to US teacher samples by Bolourian et al. (2022) and Gómez-Marí et al. (2021). New York special education teacher preparation programs are required to include coursework on "understanding the needs of [autistic students]" (New York Codes, Rules, and Regulations 52.21) and all teachers in the state must have at least one special education course. Seemingly, these requirements alone do not account for the knowledge among this sample and don't account for the lack of difference in knowledge among general educators and special educators. We did not include items on teacher certification area(s) or professional development experiences related to autism, which could shed light on additional sources of teacher knowledge of these topics.

Unlike findings from prior studies (Gomez-Mari et al., 2021; Segall & Campbell, 2012), there were no significant differences in autism knowledge or EBP knowledge by educator type. However, special educators did report higher self-efficacy for working with autistic students compared to general educators, similar to results by Wray et al. (2022). Administrators and specialists did not significantly differ from either special or general educators in autism knowledge, self-efficacy, or EBP knowledge. Likewise, neither educator age nor years of teaching experience were related to autism knowledge, reported EBPs, or self-efficacy; in other words, no significant trends were observed that might indicate chronological changes in autism-related training within our sample.

We found that females reported slightly higher autism knowledge and self-efficacy for teaching autistic students than males, a trend that has been only intermittently demonstrated in previous literature (Gómez-Marí et al., 2021, Wray et al., 2022). In other studies, female teachers have been noted to feel more positively about inclusion (Boyle et al., 2013; Salovita, 2019) and

demonstrate greater self-efficacy and knowledge of autism (Wittwer et al., 2024) than male teachers. However, gender did not significantly correlate with ASK-Q scores or EBPs reported, and gender nor educator type emerged as significant predictor of EBP knowledge when simultaneously accounting for autism knowledge and self-efficacy. It is possible that other variables that have been shown to relate to gender, such as grade level (male teachers are more represented in higher grades; National Center for Education Statistics, 2023) might help account for observed associations between gender and self-efficacy.

The results of our study indicate a ceiling effect with the ASK-Q. While the ASK-Q may be a useful tool for assessing most basic/foundational understanding of autism, it may not be sensitive enough to capture differences in understanding within populations who do have basic exposure and training in autism characteristics. Respondents may have enough knowledge of autism and autism characteristics to understand how to respond favorably to the questions in the measure but could still have knowledge gaps or negative attitudes not captured that may impact their teaching efficacy. While the ASK-Q may be useful as an initial assessment of early career educators' foundation knowledge and comfort teaching autistic students, an assessment of more advanced knowledge would be helpful before progressing to more specific skills training.

While ASK-Q scores, self-efficacy ratings, and nominated EBPs were positively related, the correlations were weak. Positive associations between these variables could be explained by individual differences in autism knowledge, but could also reflect individual participants' level of effort, focus, or testing ability. Given that the overall model only predicted 10.2% of variance, a large portion of the variability in EBP knowledge was left unexplained by these variables and therefore may be more strongly related to factors unexamined in this study.

Interestingly, while the ASK-Q did not prove to be a sensitive tool for differentiating knowledge levels among practicing teachers (and may perform similarly in other relatively educated populations), it did predict nomination of EBPs among this sample. That is, participants with higher ASK-Q scores nominated a greater number of EBPs. Performance-based tasks, such as vignettes requiring open-ended responses, therefore may be an alternative approach for assessing teacher knowledge and may be more sensitive to differing knowledge levels among relatively educated samples. Teacher self-efficacy was also positively related to EBPs nominated, suggesting that teacher feelings of confidence in their abilities could be a valid indicator of applied knowledge and ability to implement strategies.

Limitations

There are several limitations to our study. Notably, the ASK-Q resulted in a ceiling effect for this sample, indicating the items did not discriminate well between differences in knowledge within this sample. Furthermore, we administered the ISI and the ASK-Q together, as a single instrument rather than two stand-alone measures. It is possible that responses to the ASK-Q measure were influenced by the ISI. We did not counter-balance presentation of the measures, so it is possible that questions on the ISI influenced participants' responses on the ASK-Q.

In addition, we report on a relatively small sample size, especially for administrators, arts teachers, and specialists such as related service providers. Due to small group sizes for administrators, arts teachers, and specialists, our ability to make inferences about educator type is limited. This sample is not necessarily representative of the distribution of educators in this state, or the range of educators involved in autistic students' success. For future studies, researchers should consider intentional recruitment of diverse educator roles to better investigate differences

in knowledge and self-efficacy, knowing that school-wide factors affect student outcomes (Suhrheinrich et al., 2021).

Another limitation was that coding of EBPs used a generous approach due to the nature of the qualitative data. Given the brevity of educators' open-ended nominations, EBPs were coded if they were consistent with an established practice. However, we could not assess responses for accurate understanding of the nominated strategies or educators' ability to implement EBPs with fidelity in the classroom.

Future Research

This study demonstrated a degree of foundational knowledge about autism, self-efficacy for teaching autistic students, and EBP identification among a sample of teachers in one state. Replicating this study in other states would provide a broader picture of the current status of knowledge and self-efficacy across the nation, which could inform preservice education and professional development of current educators. Future research would benefit from an examination of differences in preservice training of general and special educators in New York and other states and whether this difference is related to identification and reported use of EBPs in inclusive settings. We also found differences in knowledge by gender. While gender may relate to educator knowledge and attitudes, more nuanced investigation is necessary to better inform why gender differences might occur and how this may inform training needs. We found participants could accurately nominate multiple EBPs based on a single scenario involving an autistic student. We did not report on which EBPs were nominated or the frequency of nominated EBPs, which is an important consideration. Similarly, it is still unknown whether teachers (general educators and special educators) of autistic students implement EBPs with fidelity. Studies that include observations of general education and special education classrooms

serving autistic students, along with teacher interviews, would provide an understanding of the quality, including efficacy and consistency of using EBPs with autistic students in inclusive settings.

Finally, our study used one brief vignette to elicit educator nomination of EBPs for autistic students. We did not assess educator knowledge of EBPs in response to differing student needs (e.g., academic or pre-academic skills) and school-related scenarios. While a similar task may be an effective and low-resource method for assessing teacher knowledge and preparation in applied settings, future qualitative case studies or phenomenological studies would allow for a more comprehensive exploration of factors related to knowledge and self-efficacy for teaching autistic students in inclusive environments. In addition, qualitative research on the experiences of autistic students in educational settings would provide critical knowledge of the student perspective. Similarly, research on administrator understanding of EBPs and inclusive practices and how they perceive their role in supporting teachers and support staff in implementing those practices is a logical next step. Investigating administrator and teacher training program curricula would provide a baseline understanding of the adequacy and depth of content related to autism characteristics, inclusive practices, and EBPs. Taken together, these studies might help to inform preservice and continuing education of educators as well as the necessary supports and resources required from school system administrators and other school support personnel.

Implications for Practice

Participants in our study demonstrated foundational knowledge and positive self-efficacy for teaching autistic students in inclusive settings and knowledge of EBPs. This suggests educators in New York have requisite knowledge to serve autistic students in inclusive settings, especially if supported by administrators who are also knowledgeable on autism and EBPs.

However, the efficacy of implementation of EBPs for autistic students is still unknown. Professional development opportunities could focus on successful implementation of inclusive practices in classroom settings with autistic students. First, providing preservice teacher candidates targeted instruction and fieldwork opportunities with autistic students would expand foundational skills. Including courses and fieldwork within education leadership programs that focus on understanding characteristics of disabilities, building and sustaining inclusive cultures, and implementation of EBPs with fidelity would ensure administrator preparedness and improved student outcomes. Offering in-service general and special educators and support staff ongoing training opportunities on characteristics of autism, features of inclusive settings, and delivery of EBPs in inclusive settings could reduce the stigma associated with autism. Increased school staffing, especially of special educators and specialists trained specifically in autism and coupled with training and policies that support an inclusive culture, would support general educators to deliver effective and inclusive academic, social, and behavioral instruction to students with disabilities, including autistic students. Effective supervision by knowledgeable administrators of novice teachers of autistic students and teachers in inclusive settings would ensure EBPs are being delivered with fidelity (Roberts & Webster, 2022).

Conclusion

The purpose of this study was to investigate educator knowledge and attitudes about autism and inclusion in a statewide US sample. Results suggest that New York educators broadly have good foundational knowledge about autism, have relatively positive feelings about their ability to educate autistic students, and are able to report at least some evidence-based strategies for supporting autistic students in inclusive settings. Teacher autism knowledge and self-efficacy were both significantly and positively related to EBP nominations on an open-ended vignette

task, suggesting the potential utility of these low-cost tools in assessing educators training needs. Future research should focus on the relations between similar assessment measures and educator implementation fidelity for evidence-based strategies.

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Table 1
Educator Demographics

	M (SD)	***range***
Age (*n* = 367)	44.2 (11.48)	23 - 70
Years of Teaching Experience	16.8 (9.2)	1 - 42
	n	**%**
Gender		
Female	298	77.4
Male	79	20.5
Other	2	0.5
Prefer not to answer/No Response	6	1.6
Current Position		
General Education Teacher	219	56.9
Arts Teacher	7	1.8
Special Education Teacher	119	30.9
School Administrator	15	3.9
Paraprofessional or Instructional Assistant	3	0.8
Specialist	27	7.0
School Counselor	11	2.9
Speech Language Pathologist	4	1.0
Other Specialist	11	2.9
No Response	2	0.5
% of current students with special education needs		
0-10%	101	26.3
11-40%	152	39.5
41-60%	30	7.8
61-90%	13	3.4
91-100%	88	22.9
No Response	1	0.0
Grades Currently Served		
Preschool or Pre-Kindergarten	21	5.5
Kindergarten – 5th Grade	148	38.4
6th Grade – 8th Grade	125	32.5
9th Grade – 12th Grade	151	39.2
Type of School		
Preschool	5	1.3
Elementary School	126	32.9
Intermediate School	16	4.2
Middle School	78	20.4
High School	121	31.6
Vocational/Technical High School	7	1.8
Public Alternative School	9	2.3
Day School for Students with Special Educational Needs	12	3.1
No Response	2	0.0

Note. *N* = 385 unless otherwise noted.

Table 2

Educator Region and District Needs to Resource Capacity (N/RC)

	n	%
New York State Geographic Region		
Central	51	13.2
Eastern	37	9.6
Hudson Valley	23	6.0
New York City/Long Island	168	43.6
North Country	16	14.2
Western	61	15.8
Unknown	29	7.5
Needs to Resource Capacity (N/RC)		
High N/RC: Large City Districts	10	2.6
High N/RC: Urban-Suburban Districts	29	7.5
High N/RC: Rural Districts	24	6.2
High N/RC: New York City	123	31.9
Average N/RC	104	27.0
Low N/RC	25	6.5
Charter	15	3.9
BOCES	26	6.8
Unknown	29	7.5

Note: Educator responses indicating their school or district of employment were coded for corresponding geographic region and needs-to-resource capacities (N/RC), an indicator of school resource availability (i.e., poverty percentage in district/combined wealth ratio; a high N/RC has a high poverty rate compared to its wealth per pupil) using publicly available New York State Education Department (NYSED) classification information (2012). Charter schools and schools designated under the NY Board of Cooperative Educational Services (BOCES) are funded differently than public schools and their enrollments may not match the demographics of the community in which they are situated, thus these were categorized into separate groups (Knight & Toenjes, 2020).

Table 3
ASK-Q Domains and Example Items

ASK-Q Domain	Example Items
Diagnosis/Symptoms	29. Some children with autism show intense interest in parts of objects.
	46. There is currently no medical test to diagnose autism.
Etiology	16. Autism is more frequently diagnosed in males than in females.
	53. The cause of autism is not yet known for sure.
Treatment	39. Early intervention can lead to significant gains in children with autism's social and communication skills.
	49. With the proper treatment, most children diagnosed with autism eventually outgrow the disorder.
Stigma	51. Autism is caused by God or a supreme being.
	55. Autism is due to cold, rejecting parents.

Table 4
Variable Means and Correlations

Variable	*M*	*SD*	1	2	3	4	5	6
1. Age	44.18	11.45	—					
2. Gender (Female/Male)	-	-	-.095	—				
3. Special Educator (Yes/No)	-	-	-.018	-.114*	—			
4. Years of Experience			.792***	-.040	-.022	—		
5. ASK-Q Total Score	41.52	3.55	-.037	-.115*	.050		—	
6. Autism Self-Efficacy	2.96	0.68	-.095	.101	.247***	-.052	.146**	—
6a. Instructional Strategies	2.92	0.84	-0.17	.079	.208**	.002	.165**	—
6b. Characteristics of Autism	3.19	0.76	-0.97	.054	.228***	-.045	.150**	—
6c. Prepare for Job	2.92	0.80	-.108*	.072	.207***	-.064	.046	—
6d. Prepare to Live Independently	2.82	0.81	-.098	.102*	.199***	-.088	.139**	—
7. EBPs Nominated	2.71	2.10	-.052	.140*	.100*	-.032	.219**	.234***

Note. *$p < .05$, **$p < .01$, ***$p < .001$

Table 5

Multiple Regression Predicting Number of Nominated EBPs from Teacher Characteristics, Autism Knowledge, and Self-Efficacy

Predictor	*b*	*beta*	Sig.	Fit
(Intercept)	-3.815			
Gender (Female)	.504	.216	.046	
Teacher Type (Special Education)	.060	-.234	.797	
ASK-Q Total	.104	.030	<.001	
Autism Self-Efficacy	.612	.159	<.001	
				R^2 = .102, p <.001

Note. A significant *b*-weight indicates the beta-weight and semi-partial correlation are also significant. *b* represents unstandardized regression weights. *beta* indicates the standardized regression weights.