Article

Early Childhood General and Special Educators: An Examination of Similarities and Differences in Beliefs, Knowledge, and Practice

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Abstract

In this study, we provide a contemporary examination of the similarities and differences between early childhood general educators (ECEs) and early childhood special educators (ECSEs) within a theoretically driven model that accounted for the associations of beliefs and knowledge with practice. We used structural equation modeling to examine the associations among these multifaceted constructs, controlling for background characteristics, for 147 ECEs and 78 ECSEs. Univariate analyses revealed differences between ECEs and ECSEs on measures of beliefs, knowledge, practice, and background characteristics; yet, when examining these variables in a complex model, this pattern of difference did not hold. ECSE status was predictive of differences in knowledge and one component of practice; however, in most cases, the differences between ECEs and ECSEs were not statistically significant. Implications of the findings and the importance of examining the associations of beliefs, knowledge, and practice within a complex system are discussed.

Keywords

early childhood special educators, early childhood educators, beliefs, knowledge, practice

Considerable evidence links the use of recommended instructional practice (e.g., teacher–student interactions, classroom and behavior management, language modeling, and explicit instructional interactions) with increases in children's later language, literacy, math, and social development (e.g., National Early Literacy Panel, 2008; Yoshikawa et al., 2013). Recommended instructional practices are similarly effective for children with and at risk for disabilities with adjustments to delivery features such as pacing, group size, and explicitness (e.g., Harn, Linan-Thompson, & Roberts, 2008; Justice, Logan, Kaderavek, & Dynia, 2015). Despite strong empirical and policy support for use of these recommended practices, evidence suggests that the extent to which these practices are implemented in early childhood classrooms is less than ideal. For example, in multiple studies examining the quality of teacher–child interactions using the Classroom Assessment Scoring System (CLASS; Pianta, La Paro, & Hamre, 2008), classroom organization and emotional support levels are generally moderate or high, but instructional support levels are low (e.g., Mashburn et al., 2008; Weiland, Ulvestad, Sachs, & Yoshikawa, 2013). Moreover, several recent studies examining the quantity of instruction in early childhood contexts show low levels of recommended practices and strong floor effects, with minimal amounts of time spent on teacher-guided instruction in general (e.g., Fuligni, Howes, Huang, Hong, & Lara-Cinisomo, 2012; Pelatti, Piasta, Justice, & O'Connell, 2014). Although less research has specifically examined the practice delivered to young children with and at risk for disabilities, available studies show similar patterns (e.g., Guo, Dynia, Pelatti, & Justice, 2014; Guo, Sawyer, Justice, & Kaderavek, 2013; Pelatti, Dynia, Logan, Justice, & Kaderavek, 2016).

These findings are particularly problematic for children with and at risk for disabilities, for whom the use of recommended practice, with appropriate individualization and supports, is critical (e.g., Harn et al., 2008). The field of early childhood provides children with disabilities access to these services across a wide range of programs to meet the diverse needs of children and families (e.g., home-based care, Head Start, public and private preschools, early childhood special education programs; Division of Early Childhood [DEC] & National Association for the Education of Young Children

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[NAEYC], 2009). These programs involve both early childhood general and special education contexts, which may vary on a number of critical factors (e.g., proportion of children with disabilities, severity of disabilities, class size, and length of day); however, it is important to note that early childhood special education is defined as the provision of specialized instruction for children ages 3 to 5 (Individuals With Disabilities Education Improvement Act, 2004), rather than a specific context or place. As such, the intent of the law is that all children with disabilities can receive their free and appropriate public education in both general and special education contexts, which means that the educators who work with children with disabilities can be either general education early childhood educators (ECEs) or early childhood special educators (ECSEs).

ECEs and ECSEs may have distinct educational, philosophical, and pedagogical approaches that can lead to differences in practice. The possibility of systematic differences between ECEs and ECSEs holds important implications, as they may provide insight into the types of factors that are malleable and can be targeted in teacher education and professional development (PD) opportunities to improve outcomes for all children, but particularly those with disabilities. As such, there is a critical need to understand the factors that may influence the practice of ECEs and ECSEs, and the similarities and differences between them.

Similarities and Differences Between ECEs and ECSEs

Historically, the fields of general and special education have varied distinctly in the required training and professional standards provided to educators. For instance, general educators tend to have more thorough knowledge about their specific content area but less training on differentiating instruction in the diverse classroom (e.g., Selesho, 2012). For the field of early childhood, differences between ECEs and ECSEs may be even more pronounced. For example, substantial differences exist in the certification requirements among ECEs and ECSEs. In terms of minimum education qualifications, ECEs often have widely varying requirements across states and contexts that may or may not include a college degree or teaching credentials (e.g., Rhodes & Huston, 2012), whereas ECSEs are typically required to possess a bachelor's degree in early childhood or a related field and complete ECSE endorsement coursework (e.g., Geiger, Crutchfield, & Mainzer, 2003). Differences in preservice training may also be more pronounced, with separate coursework and experiences focused on ECE- or ECSE-specific content, knowledge, and practice. For example, field-based practicum placements are more likely for educators who complete a bachelor's degree or higher, and the opportunities educators receive to work with children with disabilities may vary substantially across programs (e.g., Chang, Early, & Winton, 2005). Collectively, these varying requirements and experiences may lead to differences in the beliefs, knowledge, and practice of ECEs and ECSEs.

Despite this potential for differences, recent efforts have attempted to promote cohesion and alignment in the practice of ECEs and ECSEs (Chandler et al., 2012; DEC & NAEYC, 2009; Sexton, Snyder, Lobman, & Daly, 2002). For example, there are increasing numbers of blended educator preparation programs that offer joint ECE and ECSE licenses (Chandler et al., 2012). There is also strong evidence of increasing collaboration between the NAEYC and DEC, the two professional flagship organizations of the ECE and ECSE fields, whose policies guide standards of practice and educator preparation. For instance, a recent alignment of the DEC and NAEYC personnel standards indicated strong overall agreement between the two fields, albeit with some notable differences (e.g., NAEYC standards emphasize general support for inclusion, whereas DEC standards emphasize specialized knowledge and skills to support children with disabilities; Chandler et al., 2012). Consequently, some aspects of ECEs' and ECSEs' beliefs, knowledge, and practice may align well, whereas others may still be dissimilar.

Connections Among Beliefs, Knowledge, and Practice

In this study, we focused on ECEs' and ECSEs' beliefs, knowledge, and practice because of strong theoretical links among these constructs and, as will be reviewed, evidence and expectations of possible differences in these constructs between ECEs and ECSEs. Beliefs are hypothesized to inform educators' perceptions about classroom processes, acting as filters through which educators interpret information about students and content, thus influencing practice (e.g., Leko, Kulkarni, Lin, & Smith, 2014). Similarly, professional knowledge informs educators' instructional decision making and practice (e.g., Moats, 2009; Neuman & Cunningham, 2009). Despite widespread agreement that beliefs and knowledge influence practice, the extant literature regarding the degree and direction of associations between these constructs is largely equivocal. One possible explanation may be the multifaceted nature of these constructs. For example, throughout the literature, the term "beliefs" has been used to describe multiple constructs, including beliefs related to educators' instructional orientation (e.g., McMullen et al., 2006), self-efficacy (e.g., Guo et al., 2014), and discipline-specific instruction (e.g., Hindman & Wasik, 2008). Similarly, the term "knowledge" has been used to describe educators' applied knowledge in practice (KIP; Neuman & Cunningham, 2009), disciplinary content knowledge (DCK; for example, Cunningham, Zibulsky, & Callahan, 2009), and early childhood development and pedagogical knowledge (e.g., Cheesman, McGuire, Shankweiler, & Coyne, 2009). Recent research recommendations highlight the need to take

a multifaceted approach to measuring these multidimensional constructs to address concerns that multiple types of beliefs or knowledge may interact to impact practice (e.g., Schachter, Spear, Piasta, Justice, & Logan, 2016; Spear-Swerling & Cheesman, 2012).

In addition to the need for more complex measurement approaches, many researchers highlight the need to examine malleable background characteristics that influence educators' beliefs and knowledge (e.g., Trivette, Dunst, Hamby, & Meter, 2012). Whereas differences in background characteristics alone have not been found to be strong predictors of practice (e.g., Mashburn et al., 2008), such characteristics may influence educators' beliefs and knowledge and thereby influence practice. For instance, Lang, Mouzourou, Jeon, Buettner, and Hur (2017) found that both education level (i.e., bachelor's degree or higher) and type of training (e.g., child development coursework) were associated with educators' instructional orientation (i.e., child-centered beliefs) and that these beliefs had an indirect association with educators' reported practice. Educators' different types of beliefs and knowledge may, therefore, serve as a mechanism through which we can influence practice and child outcomes through preservice and inservice training.

ECE and ECSE Beliefs

Research generally indicates that educators' beliefs develop early; are based on educational, professional, and personal experiences; and are difficult to change (e.g., Leko et al., 2014; Pianta et al., 2014). As such, there are strong theoretical- and policy-based reasons to expect differences in the beliefs of ECEs and ECSEs, yet there are few examinations of these differences in the extant literature. Those studies that do examine differences in beliefs highlight a range of similarities and differences between ECEs and ECSEs. For example, although Sexton and colleagues (2002) found that ECEs and ECSEs generally held similar beliefs about recommended practices, these groups viewed the importance of classroom management and behavioral strategies differently. Less is known about how differences in the beliefs of ECEs and ECSEs relate to practice. In a meta-analysis examining the associations among a range of beliefs and practices in early childhood contexts, Trivette and colleagues (2012) found clear evidence that educators' beliefs were related to practice, although the size of the associations varied based on the types of belief and practice measures used. The authors specifically noted that studies examining the beliefs and practices of ECSEs or comparing ECSEs with ECEs were highly limited. In a K-12 context, Ruppar, Dymond, and Gaffney (2011) compared beliefs and reported use of specific literacy practices between educators who worked with students in inclusive settings and those who worked with students with more significant disabilities in self-contained settings. Educators in inclusive settings reported stronger beliefs that all children could benefit from literacy instruction than those in self-contained environments and were significantly more likely to indicate intention to teach specific literacy skills.

ECE and ECSE Knowledge

The different educational and pedagogical backgrounds of ECEs and ECSEs may also lead to differences in knowledge. Although the majority of this research has been done in K-12 contexts, the evidence here is also mixed, indicating that differences in knowledge between general and special educators largely depend on the type of knowledge that is measured. For instance, Spear-Swerling and Cheesman (2012) found that special educators had higher knowledge of assessment and response-to-intervention (RTI) practices than general educators, although both types of educators performed comparably on two other measures of content knowledge. Cheesman and colleagues (2009) found that elementary-level general and special educators and ECEs all had comparably low knowledge of phonemic awareness and phonemic awareness instructional approaches. When examining the associations of knowledge with practice, the extant literature is again mixed. Some researchers find positive associations between levels of knowledge and high-quality practice (e.g., Hindman & Wasik, 2011), whereas others have found mixed or negative associations (Hamre et al., 2012; Neuman & Cunningham, 2009; Schachter et al., 2016). Little is known, however, about the knowledge of ECEs and ECSEs as related to practice. In a study from the K-12 field, Spear-Swerling and Zibulsky (2014) found significant differences in general and special educators' reports of planned literacy instruction (e.g., special educators planned to focus more on letter knowledge and print concepts); however, none of these reports of practice were predicted by educators' knowledge. Further research is needed to examine the associations of knowledge with practice for ECEs and ECSEs.

ECE and ECSE Practice

Very few studies have compared the practice of ECEs and ECSEs; however, there is a small body of work that has examined differences between inclusive and noninclusive settings that indicate there may be both similarities and differences, depending on the context of delivery and the type of practice. Several studies have found that inclusive classrooms generally provide instruction of higher global quality (e.g., Hestenes, Cassidy, Shim, & Hegde, 2008; Jeon et al., 2010). In one study that did directly compare the practice of ECEs and ECSEs, Pelatti and colleagues (2016) found that ECSEs provided lower levels of instructional support than their ECE counterparts, but other components of practice were comparable. Notably, none of these studies have examined practice as part of a complex system, and these equivocal findings highlight the need for additional research.

Limitations of the Extant Literature and the Present Study

Collectively, extant research indicates that there may be important differences in the beliefs, knowledge, and practice of ECEs and ECSEs; however, the available literature base for making such claims is small and limited in a number of important ways. Many of the available studies are over a decade old and involve small, nongeneralizable samples (e.g., Dunne, 2002; Sexton et al., 2002). Moreover, many studies are based on educators in K-12 contexts (e.g., Spear-Swerling & Cheesman, 2012; Spear-Swerling & Zibulsky, 2014) and the extent to which beliefs, knowledge, and practice are similar or different specifically within early childhood contexts remains unknown. Given the increasing number of children with or at risk for disabilities served in early childhood settings (e.g., DEC & NAEYC, 2009) and current efforts to align ECE and ECSE practice (Chandler et al., 2012), it is important to provide a contemporary examination of the beliefs, knowledge, and practice of ECEs and ECSEs to inform the development and implementation of preservice and inservice teacher preparation programs. Thus, the first aim of the present study was to characterize and compare ECEs and ECSEs, using multiple observed measures of beliefs, knowledge, and practice, to expand the existing literature.

In addition, the extant literature fails to take into account the multifaceted and complex nature of beliefs, knowledge, and practice. Available studies have typically operationalized beliefs, knowledge, and practice using discrete single measures that represent one particular aspect of the intended construct, despite recent research recommendations for more comprehensive measurement (e.g., Spear-Swerling & Cheesman, 2012). Moreover, accumulating research suggests not only complex interrelations among beliefs, knowledge, and practice but also associations between these constructs and other educator background characteristics (e.g., Schachter et al., 2016). Accounting for the latter is particularly important when comparing ECEs and ECSEs, given the potential differences in training and education. To our knowledge, although previous studies have sometimes controlled for background characteristics (e.g., Hestenes et al., 2008; Jeon et al., 2010), all such work has been conducted within a univariate framework. Thus, the second and primary aim of the present study was to investigate the complex associations among beliefs, knowledge, and practice, conceptualized as multifaceted constructs, across ECEs and ECSEs using structural equation modeling. These models were informed by a theory of change positing that educators' beliefs and knowledge are informed by their training, education, and experiences and accounted for both the direct and interrelated influence of beliefs and knowledge on practice (e.g., Breffni, 2011; Hamre et al., 2012), while also controlling for background characteristics.

Method

The current study used data from the first two cohorts of a larger evaluation of a state-provided early childhood PD opportunity in one Midwestern state (see Piasta et al., 2017, for full description of the PD and larger evaluation project). Participating educators (a) worked in early childhood classrooms from across the state as lead, co-lead, or assistant educators, (b) directly taught at least one child who was 4 years of age,[1] and (c) were willing to participate in all study and data collection activities. The data used in the current study were collected only at the fall timepoint before PD activities were completed.

Participants

In total, 225 educators contributed data to the current study. Educators were identified as either ECE (n = 147) or ECSE (n = 78) based on educators' responses to multiple items on a background questionnaire. Given no clear regulations or other delineations defining ECSE within the state (Operating Standards for Ohio Educational Agencies Serving Children With Disabilities, 2014), educators were identified as ECSEs if they (a) responded positively to at least two out of three questions about ECSE status (i.e., educator self-identified as special education educator, labeled class as an ECSE, or identified as a preschool special education classroom), (b) reported that there were six or more children with individualized education plans (IEPs) in their classroom *and* responded positively to at least one question about ECSE status, or (c) reported that there were eight or more children with IEPs in their classroom, which requires an ECSE teacher under state law. All other educators were classified as ECEs.

Across participants, the majority of educators identified as female (n = 216; 96%) and Caucasian (n = 180; 80%), 42 educators (19%) identified as African American, two (1%) educators identified as Asian, and one educator (0.5%) identified as Native American/Indian. Most educators identified as non-Hispanic/Latino (n = 203, 90%). Educators' ages ranged from 23 to 69 years old, with an average of 41.16 years (SD = 10.46). Educators' early childhood teaching experience ranged from 0 to 36 years, with an average of 11 years (SD = 7.34). Sixty percent (n = 131) of educators had at least a bachelor's degree, and 78% (n = 173) had an education-related major as their highest degree. See Table 1 and the "Results" section for additional educator demographic and background characteristics.

Measures

Data for the current study were collected in the fall of 2011 and 2012. Background characteristics, beliefs, and knowledge data were collected via educator survey. Practice data were coded by research staff from videotaped classroom observations.

Table 1. Descriptive Statistics and Comparisons Across ECEs and ECSEs on Observed Characteristics and Beliefs, Knowledge, and Practice Variables.

Characteristic, Beliefs, Knowledege, and Practice	ECE (n = 147)		ECSE (n = 78)	
Continuous variables	n	M (SD)	n	M (SD)
Beliefs				
Instructional orientation				
DAP basic skills*	143	2.01 (0.58)	76	1.79 (0.58)
DAP child centered	144	2.93 (0.46)	76	2.96 (0.42)
Modernity*	145	1.39 (0.57)	78	1.22 (0.52)
Self-efficacy				
Instructional self-efficacy	144	2.75 (0.50)	77	2.81 (0.46)
Language and literacy self-efficacy	144	3.29 (0.58)	77	3.31 (0.52)
Knowledge				
KIP*	145	44.47 (6.17)	77	48.37 (5.82)
DCK*	139	11.94 (3.12)	76	14.00 (2.33)
ECK*	139	12.72 (3.25)	77	15.01 (2.63)
Practice				
Classroom organization*	147	4.83 (0.68)	78	5.06 (0.60)
Emotional support*	145	5.10 (0.73)	78	5.33 (0.49)
Instructional support	147	2.29 (0.73)	78	2.44 (0.71)
Background characteristics				
Years of experience (pre-K)	147	10.32 (7.49)	78	12.27 (6.93)
Categorical variables	n	n (%)	n	n (%)
Minority*	145		78	
White/Caucasian		102 (70)		77 (99)
Other race/ethnicity		43 (30)		1 (1)
Level of education*	133		72	
Less than a BA		70 (52)		4 (6)
BA		27 (20)		6 (8)
More than a BA		36 (27)		62 (86)
Degree in education*	143	105 (73)	77	68 (88)
NAEYC*	144	51 (35)	76	8 (11)
Publicly funded*	145	115 (79)	78	76 (97)

Note. Note that the sample size reported next to each variable in Table 1 represents the number of cases with complete data on each corresponding variable, as basic descriptive variables were not imputed for initial analysis. Between-group differences examined with t tests for continuous variables and chi-square tests for categorical variables. ECE = early childhood general educator; ECSE = early childhood special educator; DAP = developmentally appropriate practice; KIP = knowledge in practice; DCK = disciplinary content knowledge; ECK = early childhood knowledge; NAEYC = National Association for the Education of Young Children.
*$p < .05$.

Background characteristics. We examined educator race and dichotomized this variable into minority (i.e., any educators identified as non-White) versus nonminority (i.e., any educators who identified as White) given that the vast majority of educators were in the latter category. We examined education, which we coded as three separate dichotomous variables indicating that educators had (a) less than a bachelor's degree, (b) a bachelor's degree, or (c) more than a bachelor's degree (e.g., a bachelor's degree plus additional coursework and graduate degree). We also coded whether or not educators' major for their highest degree was in an education-related field and the number of years of experience educators had working with preschool children. In addition, we created two dichotomous variables that characterized the types of programs in which educators worked: whether the program received public funding and whether it was accredited by NAEYC.

Beliefs measures. We used multiple measures to examine two types of educator beliefs: instructional orientation and self-efficacy. Each is described below.

Educators' instructional orientation. We used three measures to capture this construct. The first two measures were drawn from the *Appropriate Practices in Preschool Survey* (adapted from Stipek & Byler, 1997), which has two subscales (Basic Skills Orientation [Appropriate Practices: Basic, APB; 15 items]; Child-Centered Orientation [Appropriate Practices:

Child, APC; 11 items]), that examine educators' agreement with teacher-directed or child-led practices (e.g., "The enthusiasm and interest children have in a task is more important than how well they can do it"). Overall internal consistency, as reported in the literature, was .91 and .75 for the APB and APC scales, respectively (Stipek & Byler, 1997), and .81 and .65 in the current sample. We also used an abbreviated 10-item version of the Modernity Scale (adapted by Justice, Mashburn, Hamre, & Pianta, 2008, from Shaefer & Edgerton, 1985), which characterizes educators' instructional orientations on a continuum of more adult or child centered (e.g., "Children learn best by doing things themselves rather than by listening to others."). Previous research using an 11-item modernity scale had reported an internal consistency of .73 (Arthur, McCormick, & Bovaird, 2012), with values of .72 for the current 10-item scale. Response options for all three measures ranged from 0 to 4 (0 = *strongly disagree*, 4 = *strongly agree*), although the APC scale was reverse coded to be consistent with the direction of teacher-directed instruction (i.e., higher scores indicate higher teacher-directed instruction).

Educators' self-efficacy. We used two subscales of a measure of self-efficacy (Justice et al., 2008, adapted from Bandura, 1997) to examine educators' general instructional self-efficacy (eight items), and language- and literacy-specific self-efficacy (five items; for example, "How much can you do to promote children's phonological awareness?"). Response options ranged from 0 to 4 (0 = *no feelings of efficacy in this area*, 4 = *very strong feelings of efficacy in this area*). Previous research reported internal consistency of .85 for instructional self-efficacy and .92 for language- and literacy-specific self-efficacy (Arthur et al., 2012), with values of .84 to .94 in the current study.

Knowledge measures. We used three measures to examine different types of educator knowledge: KIP, basic DCK, and general early childhood development and pedagogical knowledge. As these measures all have similar names, we refer to these via acronyms that describe the types of knowledge targeted, as further described below.

KIP. The *Teacher Knowledge Assessment of Early Language and Literacy Development* (Neuman & Cunningham, 2009) is described as a measure of knowledge that would be used in practice; as such we refer to it as "Knowledge in Practice" (KIP). KIP consisted of 70 multiple-choice and true-false items that targeted educators' knowledge about language and literacy as major focal areas in early childhood and child development (e.g., "True/False: Children learn to sort and identify letters by their sound features."). Previous research reported internal consistency of .96 (Neuman & Cunningham, 2009); internal consistency in the current sample was .73.

DCK. The *Teacher Knowledge Assessment* (Cunningham et al., 2009) was designed to assess "disciplinary content knowledge" related to language and literacy, and we thus refer to it as "Disciplinary Content Knowledge" (DCK). DCK consisted of 19 multiple-choice and short-answer items. These items targeted educators' basic content knowledge of phonology, morphology, and orthography (e.g., "Does the word *scratch* contain a consonant blend?"). Overall internal consistency in the current sample was .75.

Early childhood knowledge (ECK). The ECK measure was made up of a subset of items from an online sample of the *Early Childhood Subject Matter Test From Massachusetts Tests for Educator License* (MTEL®) that targeted educators' general knowledge of early childhood education beyond language and literacy content. This measure consisted of 20 multiple-choice items targeting educators' general knowledge of child development (e.g., "The psychological process during early childhood in which children try to take on the qualities of important people in their environment is called (a) social co-construction, (b) self-regulation, (c) identification, or (d) induction."). Internal consistency in the current sample was .83.

Educator practice. We used the pre-K version of the CLASS (Pianta et al., 2008) to measure practice. CLASS is a widely used standardized direct observation measure that assesses the quality of instructional interactions across three domains, as described in Table 3 of Pianta et al. (2008): Emotional Support (i.e., Classroom Climate, Teacher Sensitivity, and Regard for Student Perspective), Classroom Organization (i.e., Behavior Management, Productivity, and Instructional Learning Formats), and Instructional Support (i.e., Concept Development, Quality of Feedback, and Language Modeling). Each domain consists of three to four dimensions rated on a scale of 1 to 7, indicating low (scores of 1-2), moderate (scores of 3-5), or high (scores of 6-7) quality of practice. Several studies involving the CLASS report moderate to strong internal consistency for each domain (e.g., .76-.95; Pianta et al., 2008). Internal consistency was .82, .71, and .85 for Emotional Support, Classroom Organization, and Instructional Support domains, respectively, in the current sample.

CLASS was coded from videotaped classroom observations. Trained field assessors videotaped each classroom for the entirety of instructional time on a day selected by the educator as representative of typical classroom practice. CLASS coders completed an initial training delivered by certified CLASS trainers, reached standard CLASS benchmarks to begin coding, and completed CLASS retraining annually. Each video was segmented into 20-min cycles. Three cycles were randomly selected and coded using CLASS; domain scores were averaged across cycles. Twenty percent of coding cycles were randomly selected and double coded for reliability purposes. Interrater agreement, measured as the percent of agreement within one point per

Table 2. Correlations.

Item	1	2	3	4	5	6	7	8	9	10	11	12	13
1. ECSE	1												
2. Minority	**−.34**	**1**											
3. Education level	**.40**	**−.36**	1										
4. Education major	**.17**	**−.20**	.06	1									
5. Pre-K experience	.13	.02	−.09	.07	1								
6. PFP	**.26**	−.02	.09	**.21**	.12	1							
7. NAEYC accreditation	**−.14**	**.18**	**−.16**	.07	**−.23**	.07	1						
8. Instructional beliefs	**−.14**	**.23**	−.06	−.02	−.10	**.18**	.06	1					
9. Self-efficacy beliefs	.04	.11	.09	−.05	−.04	−.07	−.05	**−.20**	1				
10. Educators' knowledge	**.23**	**−.33**	**.28**	.05	.10	−.02	−.09	**−.37**	.12	1			
11. ES	**.17**	−.02	−.02	.00	.04	.08	.04	**−.17**	.10	**.14**	1		
12. CO	**.16**	−.04	.09	.04	−.03	.06	.03	−.05	.04	.13	**.80**	1	
13. IS	.08	−.11	.02	.01	−.12	−.08	.09	**−.14**	.09	**.19**	**.51**	**.52**	1

Note. Bolded correlations were significant at $\alpha = .05$. Correlations are based on the imputed data. ECSE = early childhood special educator; PFP = publicly funded program; NAEYC = National Association for the Education of Young Children; ES = emotional support; CO = classroom organization; IS = instructional support.

CLASS guidelines, was 82% for the overall score; by domain, agreement was 85% for Emotional Support, 78% for Classroom Organization, and 75% for Instructional Support.

Results

Research Aim 1: Observed Differences Between ECEs and ECSEs

To address this research aim, we first used basic descriptive statistics to characterize the beliefs, knowledge, and practice of ECEs and ECSEs. We then compared ECEs and ECSEs on each observed measure, using *t* test and chi-square tests of independence as appropriate, to determine the extent to which patterns previously reported in the extant literature held in our data. We also examined background characteristics in these analyses as a means of identifying those characteristics to include as control variables in analyses for the second research aim.

Results for these analyses are reported in Table 1, with correlations among all observed variables reported in Table 2.[2] ECEs and ECSEs differed on two measures of beliefs. As compared with ECSEs, ECEs tended to agree with more teacher-directed instructional orientations on the Developmentally Appropriate Practice (DAP) Basic Skills scale, $t(217) = 2.64$, $p = .009$, and also had more adult-centered instructional beliefs on the Modernity scale, $t(221) = 2.22$, $p = .027$. ECSEs exhibited significantly higher knowledge than ECEs on all three knowledge measures: KIP, $t(220) = -4.96$, $p < .001$; DCK, $t(213) = -5.15$, $p < .0001$; and ECK, $t(214) = -5.48$, $p < .001$. ECSEs also scored significantly higher on two measures of practice: Classroom Organization, $t(223) = -2.36$, $p = .019$, and Emotional Support, $t(221) = -2.50$, $p = .013$.

ECEs and ECSEs differed on almost all background characteristics. Compared with ECSEs, ECEs were more likely to come from a racial or ethnic minority, $\chi^2(1, N = 223) = 25.78$, $p < .001$. ECSEs tended to have higher levels of education, $\chi^2(1, N = 205) = 66.90$, $p < .001$, and were more likely to have a degree in education, $\chi^2(1, N = 220) = 6.60$, $p = .010$. On a program level, ECSEs were more likely to work in a publicly funded program, $\chi^2(1, N = 225) = 14.65$, $p < .001$, whereas ECEs were more likely to work in an NAEYC accredited program, $\chi^2(1, N = 220) = 17.89$, $p < .001$. The one background characteristic on which ECEs and ECSEs did not differ (i.e., experience) was subsequently dropped from additional analyses.

Research Aim 2: Associations of Beliefs and Knowledge With Practice for ECEs and ECSEs

To address the second research aim, we conducted a series of structural equation models (SEMs). The use of latent variables within SEM allowed us to create models that included multiple observed measures and thereby accounted for the complex, multifaceted nature of our constructs of interest. We examined two distinct belief constructs: (a) Instructional Orientation, which was defined using the APB, the reverse-scored APC, and Modernity scales, and (b) Self-Efficacy, which was defined using the instructional and language and literacy self-efficacy scales. We examined one construct for educators' knowledge, which was defined using the KIP, DCK, and ECK measures. This construct was considered to be a general indicator of educators' knowledge of recommended practice, with a focus on language and literacy instruction given the prevalence of these areas in early childhood education. Correlations among beliefs and knowledge constructs were included in our models. Finally, we used the traditional approach of defining CLASS using its three

domains. As such, we examined three latent practice constructs: (a) Emotional Support, (b) Classroom Organization, and (c) Instructional Support. Our models also controlled for background characteristics on which ECEs and ECSEs significantly differed. Preliminary models included associations between all background characteristics and beliefs, knowledge, and practice constructs. For the sake of parsimony, only significant paths between background characteristics and the constructs of interest were retained in the final models in which a dummy-coded variable for ECSE (1 = ECSE, 0 = ECE) was added as a predictor of beliefs, knowledge, and practice to address our second research aim.

We used Mplus Version 6.12 for all analyses. Prior to estimating SEMs, we used multiple imputation for missing data (missingness ranged from 0% to 16% across variables as reported in Table 1; $M_{\text{missingness}} = 3.30\%$, $SD_{\text{missingness}} = 3.53$). Ten imputed datasets were analyzed, with parameter estimates averaged and standard errors pooled following Rubin's (1987) rule. As preliminary analyses showed that several variables exhibited skewed distributions, all analyses were conducted using a robust maximum estimator. SEM fit was examined using the following indices: comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). CFI is considered adequate when it exceeds .95 (Hu & Bentler, 1999), RMSEA when it is below .08 (and good fit when below .05; Browne & Cudeck, 1993), and SRMR when it is below .05 (Hu & Bentler, 1999). Results are presented in Figure 1 and discussed across each practice outcome.

Results of the emotional support model are reported in Model 1a of Figure 1. Model fit was good according to fit indices. After controlling for background characteristics and accounting for the complex associations among beliefs, knowledge, and practice, being an ECSE educator was not associated with beliefs or knowledge (though a trend toward significance was noted for knowledge and educators' instructional orientation beliefs); however, ECSEs provided higher amounts of emotional support than ECEs. Also notable was that educators' beliefs and knowledge were not associated with practice operationalized as emotional support.

Results of classroom organization model are reported in Model 1b of Figure 1. Model fit was adequate according to fit indices. ECSE was not associated with beliefs, knowledge, or classroom organization (though a trend toward significance was noted for knowledge, educators' instructional orientation beliefs, and classroom organization). Moreover, similar to the results for emotional support, educators' beliefs and knowledge were not associated with classroom organization.

Results of the instructional support model are reported in Model 1c of Figure 1. Model fit was adequate. ECSE was not associated with educators' beliefs or instructional support (though a trend toward significance was noted for educators' instructional orientation beliefs), but ECSEs had significantly higher knowledge than ECEs. Again, educators' beliefs and knowledge were not associated with their practice operationalized as instructional support.

Discussion

The present study fills an important gap in the literature by providing a contemporary characterization of ECEs and ECSEs, while also comparing these educators using a model that accounts for the complex associations among beliefs, knowledge, and practice. An additional contribution of this study was its use of a multifaceted measurement approach in studying ECEs' and ECSEs' beliefs, knowledge, and practice. Although many studies have examined relations of various components of beliefs and knowledge with practice, very few have examined multiple types of beliefs, knowledge, and practice simultaneously (Schachter et al., 2016) or utilized an SEM approach to model the complex associations among these constructs. In doing so, this study expands current understandings of the differences between ECEs and ECSEs and contributes to our more general understanding of relations among educators' beliefs, knowledge, and practice. Key findings and future research directions are discussed below.

Similarities and Differences Between ECEs and ECSEs

Although we observed significant univariate differences in the beliefs, knowledge, and practice of ECEs and ECSEs, when examined as part of a complex system of practice, these differences were less evident. These findings are discussed by construct, with a comparison of univariate and SEM findings.

Beliefs. ECSE status was not a significant predictor of beliefs in our SEM models, despite the fact that we found ECEs reported more teacher-directed beliefs than ECSEs in our univariate analyses. Our findings at the univariate level were somewhat unexpected, given the theoretical orientation of the broader special education field toward more adult-oriented, direct instruction approaches, which align with a teacher-directed instructional orientation. It may also be indicative, however, of recent efforts to align ECE and ECSE standards, which emphasize a balance between child-centered and adult-oriented instruction. It is also possible that this finding is representative of the fact that ECSEs may have had more early childhood-specific coursework or training, which tend to emphasize child-centered orientations.

Whereas the limited research that has compared the beliefs of ECEs and ECSEs indicates that there are differences in beliefs that are theoretically linked to differences in practice (e.g., beliefs about behavior support and ability to support children with disabilities; Dunne, 2002; Sexton et al., 2002), our findings did not support this claim. It seems likely that these findings are representative of the fact that

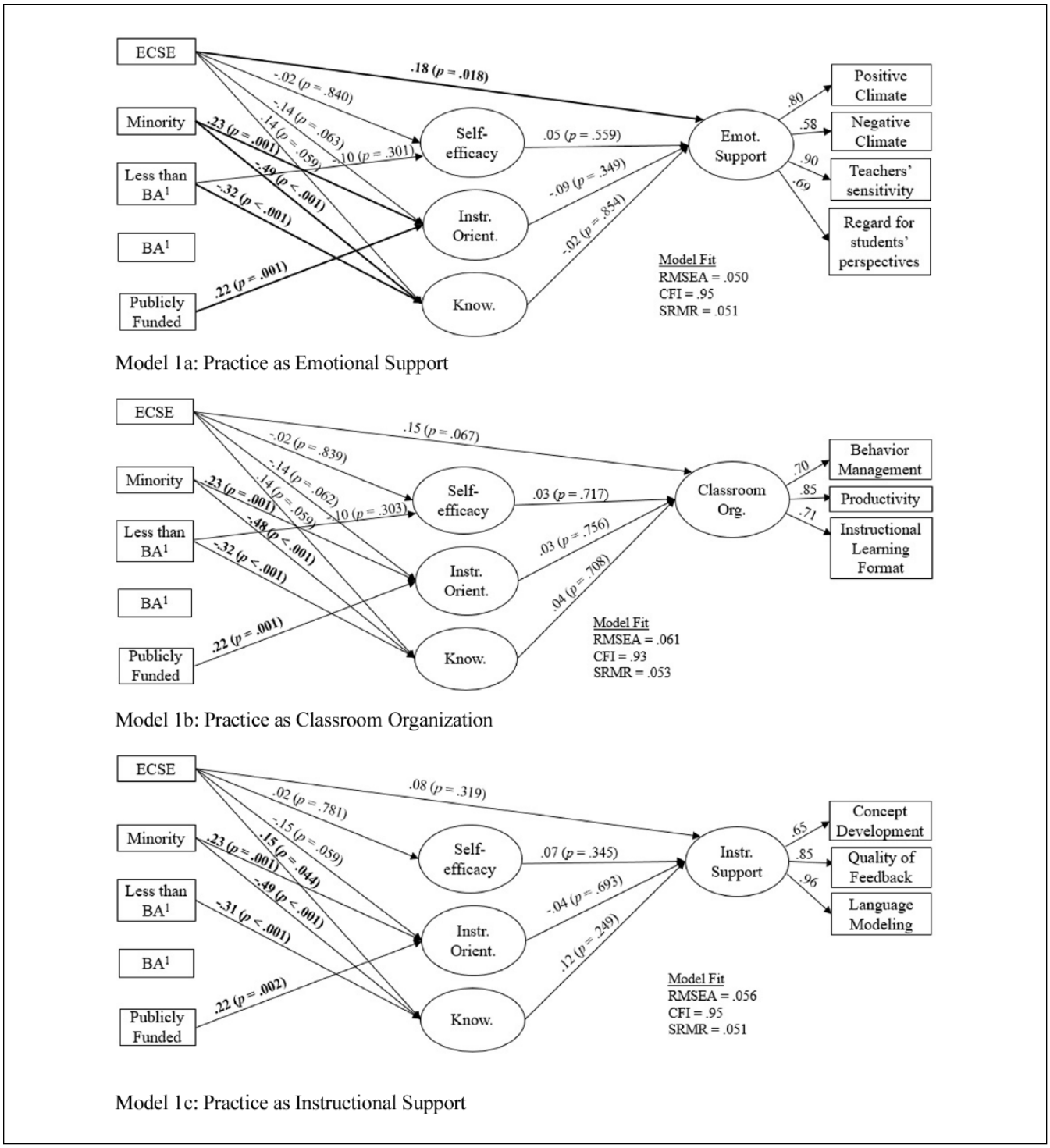

Figure 1. Structural equation models across practice types.

Note. Reported coefficients are standardized, and *p* values are in parentheses; significant paths are in bold. The indicators of the self-efficacy construct were instructional self-efficacy (loading Models 1a and 1b = .68, Model 1c = .65), and language- and literacy-specific self-efficacy (loading Models 1a and 1b = .93, Model 1c = .97). The indicators of the instructional orientation beliefs construct were the APB scale (all loadings = .83), the APC scale (all loadings = .70), and the modernity scale (all loadings = .76). The knowledge construct was defined with the KIP (all loadings = .80), DCK (all loadings = .65), and ECK (loadings Models 1a and 1b = .76, Model 1c = .75). The three latent predictors were allowed to correlate in the model.

[1]The reference group is educators with more than a BA. Correlation between self-efficacy and instructional orientation was $r = -.21$, $p = ns$; correlation between self-efficacy and knowledge was $r = .34$, $p < .001$; and correlation between instructional orientation and knowledge was $r = -.61$, $p < .001$.

Note. ECSE = early childhood special educator; RMSEA = root mean square error of approximation; CFI = comparative fit index; SRMR = standardized root mean square residual.

we directly examined those differences in a system that not only accounts for the associations of beliefs and practice but also knowledge. These findings highlight the importance of examining beliefs within a complex system, particularly given the equivocal state of the theoretical and empirical literature regarding the associations of beliefs and practice generally (e.g., Breffni, 2011; Hamre et al., 2012).

Knowledge. Our results indicate that, generally, ECSEs have higher knowledge than their ECE counterparts. This is substantiated by the significant differences on the observed measures in our univariate analyses, trends in two of our SEM models, and a significant path in the instructional support model. This is especially interesting given that the current study used three distinct knowledge measures, whereas mixed findings in the extant literature seem to indicate that differences between ECEs and ECSEs may largely depend on the type of knowledge that is measured. Alternatively, this may reflect the higher educational and credentialing requirements for ECSEs, and the role this training may play across different types of educators' knowledge. These findings warrant consideration for teacher educators and professional organizations (e.g., NAEYC) that develop teacher preparation standards. Although NAEYC's (2009) professional preparation standards emphasize "understanding content knowledge" (p. 16), our findings, coupled with the variability of education and certification requirements for ECEs, suggest that there may be a need for the ECE field to focus more on knowledge acquisition within preservice and inservice training opportunities.

It is interesting, however, that these differences in knowledge did not relate to practice. This aligns with previous research that indicates knowledge and practice are weakly related (e.g., Neuman & Cunningham, 2009). This lack of association in our study could also be related to how practice (i.e., CLASS) was operationalized. Although widely used and empirically validated in both research and early childhood evaluation contexts, it is possible that this measure did not capture important areas of difference between ECEs and ECSEs. From an analysis perspective, there is new evidence suggesting that it is challenging to find associations between knowledge and practice, particularly when there are range restrictions on the practice measures of interest, such as what we observed with the instructional support scale. Similar range restrictions on this particular domain of the CLASS have been reported in the literature (e.g., Burchinal, Vandergrift, Pianta, & Mashburn, 2010; Weiland et al., 2013). Given these patterns, more nuanced measures and analysis approaches (see Schachter et al., 2016) may be necessary to detect associations between complex multifaceted constructs such as knowledge and practice, particularly when these constructs are observed at less than optimal levels.

Practice. In terms of practice, when examined independently, ECSEs provided significantly higher quality emotional support and classroom organization than their ECE counterparts, which aligns with earlier work that found practice in inclusive classrooms was typically of higher quality (e.g., Hestenes et al., 2008; Jeon et al., 2010). There were no univariate differences between ECEs and ECSEs on the practice measure targeting instructional support although, as noted above, such low levels of instructional support are typical in the literature (e.g., Weiland et al., 2013).

When we examined these practice outcomes in our SEM models, however, ECSE status was only predictive of differences in emotional support, indicating that ECSEs provided significantly higher quality emotional support. There is a strong history in the field of ECSE of focusing on the social and emotional development of children with and at risk for disabilities (e.g., DEC, 2014), as this may represent an area in which many children with or at risk for disabilities require increased differentiation and support. ECSEs may also be more adept at engaging in the types of teacher–student interactions captured by this domain of the CLASS, in part due to the unique alignment of general and special education approaches that typical ECSE training programs have adopted. Given that we did not detect differences across all three practice models, despite the univariate differences on both the emotional support and classroom organization observed measures, it may be that emotional support is an area in which ECSEs are better able to integrate these complementary approaches into their practice. This may hold important implications for preservice and inservice training programs, as ECE programs may need a stronger focus on strategies to address the social–emotional needs of all children (DEC, NAEYC, & National Head Start Association, 2013).

Key findings. Overall, despite the fact that we observed significant univariate differences between ECEs and ECSEs, our findings indicate that ECEs and ECSEs were largely similar in beliefs and practice after accounting for background characteristics, the multifaceted nature of our constructs, and the complex system of associations among beliefs, knowledge, and practice. As such, these results highlight important areas of general alignment between two seemingly varying groups of educators who provide services for young children with disabilities. Recent research indicates strong general alignment between the professional standards across the ECE and ECSE fields (Chandler et al., 2012), and our results provide evidence that this alignment has been infused into the beliefs, knowledge, and practice of ECEs and ECSEs, when looking across the system as a whole. This growing convergence across the ECE and ECSE fields may be indicative of training, policy, and research efforts to promote critical factors that support the implementation of recommended practice (e.g., positive beliefs about inclusion, knowledge of specific content, or differentiation strategies). Despite these similarities, our results also highlight differences in the knowledge and some components of

the practice of ECEs and ECSEs. As noted above, these differences may align with the education and training that ECSEs typically receive and indicate areas where teacher educators and PD providers may need to provide targeted support to ECEs.

These mixed patterns of similarities and differences are somewhat unexpected given the theoretical, educational, and policy differences between the ECE and ECSE fields; however, these findings do align with recent research on the associations between knowledge, beliefs, and practice (e.g., Schachter et al., 2016; Spear-Swerling & Zibulsky, 2014), and expand the literature by comparing ECEs and ECSEs. Although we were not able to find evidence to support the existence of significant differences across all constructs, this may be due to the fact that we examined these constructs within a complex framework that accounts for the associations between beliefs, knowledge, and practice.

Measurement Considerations

It is also important to consider our mixed patterns of similarities and differences between ECEs and ECSEs from a measurement perspective, particularly given the complexity of our framework and the constructs involved. For instance, there may be differences in the classroom organization and instructional support practice of ECSEs that do not align with the way these constructs were conceptualized here. ECSEs may utilize more behavioral approaches to classroom management or more explicit instructional approaches that were not captured in a measure designed to assess global quality in a general education context. The instructional support scale, in particular, is designed to examine instructional interactions involving open-ended questions and higher order thinking skills, but evidence-based and recommended ECSE practices may target very different skills and approaches. This misalignment between practice and measure theory (e.g., Mowbray, Holter, Teague, & Bybee, 2003) may impact the way educators' practice is rated. Future research should examine differences and patterns in the practice of ECEs and ECSEs using the CLASS further, given its limited research base with children with and at risk for disabilities (cf. Guo et al., 2013; Pelatti et al., 2016), while also accounting for the role of practice within a complex system.

These mixed findings may also be indicative of the ways in which beliefs, knowledge, and practice are interrelated. Our finding that neither beliefs nor knowledge were associated with practice aligns with other recent research (e.g., Breffni, 2011; Spear-Swerling & Zibulsky, 2014). This may be due to the type of alignment issues noted above or to difficulties in measuring these complex constructs (e.g., Schachter et al., 2016), or they may indicate that beliefs and knowledge have a more indirect influence on educator practice than has previously been suggested (e.g., Pianta et al., 2014). It may also suggest that coursework and PD experiences are disconnected, and teachers have limited opportunities to strengthen their learning by applying their knowledge in the field (Zeichner, 2010).

When considering our results from a measurement perspective, it is also important to note that educators in our sample scored in the low (i.e., instructional support and knowledge of ECEs) to middle (i.e., emotional support, classroom organization, and knowledge of ECSEs) range on the majority of our observed measures. This replicates patterns from other lines of research indicating that educators' knowledge and practice levels are less than optimal across the field of early childhood (e.g., Moats, 2009; Neuman & Cunningham, 2009). This too may be a measurement issue, indicating that measures are not sensitive enough or well aligned enough to capture important constructs (e.g., Burchinal et al., 2010; Weiland et al., 2013) or that more nuanced measurement approaches are required to detect associations in positively skewed data (e.g., Schachter et al., 2016). More practically speaking, these scores also imply a need in the field for teacher educators to focus more on key types of knowledge and practice in their preparation of both ECEs and ECSEs, such as a focus on preservice training in evidence-based strategies to intervene with young children with specific risk factors or disabilities (Snowling, 2013).

Limitations and Future Research Directions

Several limitations to the current research deserve attention. First, CLASS scores were based on a singular observation. Analyses of the larger evaluation study indicate relative stability across time (see Piasta et al., 2017), however, and global rating scales such as the CLASS have been found to capture relatively stable components of practice (e.g., Chomat-Mooney et al., 2008). Second, we made specific measurement decisions based on the data available. For instance, in creating our ECE/ECSE variable, there were discrepancies in the ways some educators answered questions (e.g., no report of ECSE status but a report of more than eight children with IEPs). We accounted for this through the use of a multipronged approach, whereby we also included classroom information (e.g., number of children with IEPs) when calculating ECSE status. This was done to account for both the discrepancies noted above and for the variability of service models for children with disabilities in early childhood settings. Future research should investigate whether differences in the type of service model and ECSE identification process reveal similar patterns.

Third, although our sample is larger than those comparing ECEs and ECSEs in the extant literature (e.g., Dunne, 2002), all educators came from one state. Moreover, although educator characteristics often aligned with available national data (e.g., education levels; Rhodes & Huston, 2012), it is unclear whether the sample can be considered representative of the U.S. ECE and ECSE workforce. Another limitation of this work may be a sample size that just meets minimum standards for SEM analysis and the unbalanced number of

ECE and ECSE teachers. This is particularly notable given the trends we observed across our three SEM models. Although the ECSE paths predicting instructional orientation and classroom organization did not meet traditional levels of significance, there were consistent trends that might have achieved significance with greater power. Yet, the magnitude of difference on both the trending (i.e., instructional orientation and classroom organization) and significant (i.e., knowledge and emotional support) paths was still notably small (i.e., standardized associations under 0.2). Future research is needed to determine whether the differences observed in this study are meaningful, particularly because we are not aware of any research that has determined what constitutes a practically significant difference in CLASS scores.

Finally, although we purposely used a wide range of theoretically important measures to create latent variables that capture the multifaceted constructs of beliefs, knowledge, and practice, there may still be additional aspects of these constructs that we did not capture. For instance, our belief measures targeted instructional orientation and self-efficacy; however, we did not specifically examine beliefs about behavior support that have been linked to differences between ECEs and ECSEs in the past (e.g., Chandler et al., 2012). Moreover, although the use of CLASS allowed us to examine the quality of teacher–child interactions across multiple domains, additional aspects of practice, such as the quality of specific language and literacy instruction or effective differentiation, are not accounted for by this measure. These additional aspects of practice may be critically important, particularly when working with children with disabilities, and may also align differently than the CLASS with measures of beliefs and knowledge, thereby highlighting different patterns in the associations of these broader constructs. Future research should examine both the predictive and convergent validity of the CLASS with early childhood special education contexts, as well as its use as one component of a more multifaceted measure that accounts for these other types of practice. Moreover, there is a clear need for measures that provide teacher educators with information on what elements of practice to target, and how, in a given context. For instance, our finding that differences in knowledge and beliefs were not necessarily associated with practice highlights the fact that traditional approaches to changing practice (e.g., changing beliefs and knowledge through coursework and PD) may need to be supplemented through approaches such as coaching or field-based learning opportunities (e.g., Neuman & Cunningham, 2009; Pianta et al., 2014). This work is predicated on the existence of valid and reliable measures of practice that teacher educators can use to develop and design specific, targeted supports.

Despite these limitations, the current study provided a much-needed contemporary examination of the similarities and differences between ECEs and ECSEs within a theoretically driven model that accounted for the associations among beliefs, knowledge, and practice as a complex system. The differences between our univariate and SEM analyses highlight the importance of using this type of multifaceted modeling to investigate the complex constructs that influence practice and align with additional research in this area reporting on mixed associations between educators' beliefs, knowledge, and practice. This study represents a first step toward a more nuanced view of these constructs and is one of the first studies to look at these constructs for ECEs and ECSEs in this way. Collectively, our results indicate that there are differences in the knowledge and some components of practice between ECEs and ECSEs, suggesting that the experiences of children may differ depending on who delivers their services. We encourage additional research to determine whether the patterns observed here can be used to help ensure that all educators are prepared to support the needs of children with and at risk for disabilities. Sustained collaboration among ECE and ECSE professional organizations, teacher preparation programs, and early childhood centers can facilitate meaningful advances in the content and delivery of the preservice and inservice trainings offered to educators. Such efforts can serve to strengthen the current knowledge, beliefs, and practice of educators in the field, and promote meaningful learning opportunities for all children with and at risk for disabilities.

Authors' Note

The opinions expressed are those of the authors and do not necessarily represent the views of the Institute of Education Sciences, U.S. Department of Education, Early Childhood Quality Network, or Ohio Department of Education. Inquiries regarding study data or materials should be directed to the second author.

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Notes

1. Note that given the age requirement, the majority of educators (97%) worked in classrooms with 3- to 5-year-olds. Across the two groups of teachers in our sample (i.e., early childhood general educator [ECE] and early childhood special educator [ECSE]), children's age was not significantly different, $t(218) = -0.72$, $p = .472$.
2. Although results from Aim 1 used only complete data to report differences across ECE and ECSE educators, the structural equation models described in more detail below relied on multiple imputation to account for missing data.

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