



Self-efficacy of early childhood special education teachers: Links to classroom quality and children's learning for children with language impairment



Ying Guo^{a,*}, Jaclyn M. Dynia^b, Christina Yeager Pelatti^c, Laura M. Justice^b

^a School of Education, University of Cincinnati, Cincinnati, OH 45221, USA

^b The Crane Center for Early Childhood Research and Policy, The Ohio State University, OH, USA

^c Department of Audiology, Speech-Language Pathology and Deaf Studies, Towson University, MD, USA

HIGHLIGHTS

- Early childhood special education (ECSE) teacher self-efficacy was positive.
- ECSE teacher self-efficacy was not directly related to child outcome.
- Low-level teacher self-efficacy in a high-quality classroom improves child outcome.

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ABSTRACT

This study described the self-efficacy of early childhood special education (ECSE) teachers ($n = 28$) and investigated relations among teacher self-efficacy, classroom quality, and language and literacy gains of children with language impairment (LI; $n = 108$), as well as the extent to which classroom quality moderated the relations between teacher self-efficacy and children's language and literacy gains. Overall, ECSE teachers received high ratings for their self-efficacy. Lower levels of ECSE teachers' self-efficacy were associated with greater gains in children's language and literacy when children with LI were in classroom with a higher instructional support.

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Literacy is a highly valued skill, as children who read accurately and fluently are likely to succeed in school (National Reading Panel, 2000). The preschool years are a significant period of pre-reading development, in which children establish foundational skills in the areas of language (e.g., vocabulary, grammar) and literacy (e.g., print knowledge, phonological awareness) (Storch & Whitehurst, 2002; Whitehurst & Lonigan, 1998). Because preschoolers' language and literacy skills are critically related to later academic success, it is important to identify children, such as those with language impairment (LI), who may exhibit delays in these areas. Within the United States (US), LI is one of the most common childhood disability, with approximately 46% of preschool children who receive special education services identified as having LI as their primary disability (U.S. Department of Education, 2010). In

many other countries, early childhood LI also represents a common disorder among children (Keating, Turrell, & Ozanne, 2001; Lin, 1984). For example, about 2% of Australian children between the ages of birth and 14 have LI (Keating et al., 2001), and 5% of children between the ages of five and 14 have LI in Taiwan (Lin, 1984).

In the US, conventional definitions characterize LI as a developmental disorder of delayed or disordered language ability in the absence of significant sensory, neurological, or intellectual impairments (Leonard, 2000). Researchers in other countries provide a similar definition of LI (Paradis, 2010; Visscher et al., 2010). For instance, researchers in the Netherlands (Visscher et al., 2010) define LI as a condition in which children demonstrate delay in speech and language without the occurrence of cognitive or physical disability, emotional disorder, hearing loss, and environmental deprivation. The consequences of LI are serious and affect children's life-long academic performance, particularly with reading. For example, in the US, approximately 50% of preschool children diagnosed with LI exhibit reading difficulties in second grade. Further, young children

* Corresponding author.

E-mail address: guoy3@UCMAIL.UC.EDU (Y. Guo).

with LI are six times more likely to be identified with reading disability in school than non-impaired children (Catts, Fey, Tomblin, & Zhang, 2002). Similar trends are seen elsewhere; for instance, 62% of Chinese children in Hong Kong with diagnosed LI at age five subsequently manifest reading disability at age seven (McBride-Chang et al., 2011). Consequently, it is important to identify salient factors that may influence early reading achievement (i.e., language and literacy) for this population across the globe.

Teachers play an important role in young children's language and literacy development via mechanisms related to teacher characteristics, classroom quality, and children's academic gains (e.g., Guarino, Hamilton, Lockwood, & Rathbun, 2006). Teachers' self-efficacy, defined as their self-perceptions of competence or capability (Bandura, 1995), is one characteristic that has been associated with higher-quality classroom instruction and increased academic performance among children in the classroom (Guo, Connor, Yang, Roehrig, & Morrison, 2012; Guo, Piasta, Justice, & Kaderavek, 2010). In particular, teachers' self-efficacy has a positive impact on children's language gains through an association with higher level of classroom quality (i.e., the quality of teacher–child interactions), such that classroom quality is a significant moderator of the relations between teacher self-efficacy and children's skills (Guo, Piasta et al., 2010; Guo et al., 2012). Importantly, however, little research has investigated the self-efficacy of early childhood special education (ECSE) teachers, particularly those who teach children with LI. Furthermore, we have little understanding of the relations among preschool ECSE teachers' self-efficacy, classroom quality, and the language and literacy skills of children with LI. Identifying ECSE teachers' self-efficacy, including their capabilities to affect child development, could be of value in better educating and equipping ECSE teachers for the complex task of guiding young children on the pathway to early reading proficiency.

1. Teacher self-efficacy

The concept of self-efficacy is grounded in social cognitive theory (Bandura, 1986, 1997) and is conceptualized as an individual's judgment of their capabilities to attain a desired level of performance (Bandura, 1997). In the field of education, self-efficacy refers to teachers' beliefs pertinent to their ability to bring about desired change in children's achievement (Bandura, 1995). Bandura (1995) proposed that belief in one's abilities is a powerful drive that influences one's motivation to act. Further, self-efficacy is related to the effort one allocates in the endeavor and persistence when faced with setbacks. Therefore, a teacher with low self-efficacy likely puts forth less effort in the preparation and delivery of classroom instruction and gives up more readily when children struggle (Dembo & Gibson, 1985). Given its importance, teachers' self-efficacy has proved to be a powerful construct in studies of teacher quality over time (Tschannen-Moran, Hoy, & Hoy, 1998). For example, there is an emerging construct named “disposition for teaching” that has been assessed in pre-service education in the US (Damon, 2007, p. 366). This construct captures teachers' beliefs (e.g., self-efficacy) that are essential to the quality of teaching. For example, teacher's beliefs may be directly associated with teachers' competence and motivation to teach (Damon, 2007).

While there is a growing body of literature on teachers' self-efficacy beliefs, very little is known about early childhood educators' self-efficacy beliefs. A recent exception is research by Justice, Mashburn, Hamre, and Pianta (2008), which examined 135 preschool teachers in classrooms serving preschool children exhibiting social and/or economic risks in the US, using an abbreviated 7-item version of the Teacher Self-Efficacy Scale (TSES; Bandura, 1997). This study found that preschool teachers reported having generally high self-efficacy ($M = 4.39$ on a 5-point Likert scale). Further, Guo,

Justice, Sawyer, and Tompkins (2011) used a 20-item version of TSES (Bandura, 1997) to assess preschool teacher self-efficacy and found that 48 preschool teachers in the US who taught children at-risk for academic difficulty reported having similarly high levels of self-efficacy ($M = 3.60$ on a 5-point Likert scale). Finally, in another investigation of 94 general education preschool teachers' sense of efficacy within the US, Todd Brown (2005) utilized the Teachers' Sense of Efficacy Scale (Tschannen-Moran & Hoy, 2001) and found that these teachers demonstrated high and positive efficacy about their capabilities to teach children ($M = 7.44$ on a 9-point Likert-type scale). Taken together, such findings indicate that general education preschool teachers seem to be optimistic about their abilities to teach young children in the classrooms (e.g., to motivate and engage children, control disruptive behaviors, use effective instructional strategies). Compared with general education preschool teachers, however, research specific to ECSE teachers' self-efficacy has been much more limited.

1.1. Teacher self-efficacy and child reading achievement

A number of studies suggests that teachers' perceived self-efficacy is associated with enhanced reading achievement among typically-developing children across grade levels (e.g., Armor et al., 1976; Ashton & Webb, 1986; Goddard, Hoy, & Hoy, 2000; Guo, Piasta et al., 2010; Guo et al., 2012). For instance, Goddard et al. (2000) analyzed the levels of self-efficacy of 452 teachers in 50 elementary schools within the US. Teachers' self-efficacy was strongly related to second–fourth-grade students' reading skills, explaining 70% of the between-school variances in student outcomes. Similarly, another study examined the self-efficacy of 2000 teachers in Italian junior high schools and found that teachers' perceived self-efficacy was a significant predictor of students' academic achievement across various content areas (e.g., reading, math, science) when controlling for the previous academic performance (Caprara, Barbaranelli, Steca, & Malone, 2006). In two recent studies within the US, Guo, Justice, Kaderavek, and McGinty (2012), Guo, Piasta et al. (2010), Guo et al. (2012) found that teachers' self-efficacy significantly predicted preschool children's print knowledge and fifth-grade students' reading outcomes. Finally, a study of 775 teachers from 53 elementary schools located in the Netherlands and showed that teachers' perception of self-efficacy significantly predicted students' language skills (Moolenaar, Slegers, & Daly, 2012). Therefore, teachers' self-efficacy may be an important aspect of the classroom, as it has been shown to be related to children's literacy and academic skills in both the US and internationally.

Notably, no studies in the extant literature, to the best of our knowledge, have examined the relations between teacher's self-efficacy and the achievement of young children with LI. Indeed, there are significant differences between children with LI and their typically-developing peers on the measures of pre-reading skills, such as vocabulary, alphabet knowledge and print-concept knowledge during the preschool years (Justice, Bowles, & Skibbe, 2006; Tomblin et al., 1997). These early gaps may directly contribute to the high rates of reading difficulty among children with LI in the primary grades (Catts, Bridges, Little, & Tomblin, 2008). Thus, as teacher's self-efficacy may be positively related to gains in children's language and literacy skills, identifying the possible associations between ECSE teachers' self-efficacy and the outcomes of children with LI is an important line of research.

1.2. Classroom quality and child reading achievement

In addition to teachers' self-efficacy, classroom quality is associated with children's language and literacy skills (e.g., Connor, Son, Hindman, & Morrison, 2005; Mashburn et al., 2008; Pianta, La Paro,

Payne, Cox, & Bradley, 2002). Frequently, quality is conceptualized as teacher–child interactions and can include two broad constructs: emotional support and instructional support (Mashburn et al., 2008; Pianta, La Paro, & Hamre, 2008). Emotional support encompasses the extent to which teachers are responsive and sensitive to children's needs (Pianta et al., 2008), whereas instructional support is operationally defined as when teachers used effective strategies to promote children's cognitive skills, provided feedback that expands children's learning, and incorporated language stimulation and facilitation techniques (e.g., frequent conversation, open-ended questions, repetition and extension) to bolster language skills (Pianta et al., 2008).

Research has shown that the domains of emotional support and instructional support are related to children's language and literacy skills within research conducted in the US. For instance, teachers' emotional support predicts children's gains in emotional development (e.g., self-reliance, engagement, competence) and reading skills (e.g., Mashburn et al., 2008; Pianta et al., 2002), and contributes to closing the reading gap for children who are at-risk for academic difficulty (Hamre & Pianta, 2005). Instructional support is associated with children's academic growth, particularly in the area of reading skills (e.g., Connor et al., 2005; Guo, Piasta et al., 2010; Mashburn et al., 2008; NICHD Early Child Care Research Network, 2000). Concerning children in ECSE classrooms, a study by Dynia, Yeager Pelatti, Logan, Justice, and Kaderavek (2013) found that the emotional support of classrooms was related to children with developmental delay's gains in social skills and the instructional support of classrooms was related to children's gains in language skills.

1.3. Moderating role of classroom quality

Previous research highlights that teachers' self-efficacy and classroom quality are both directly related to children's language and literacy skills. Ashton and Webb (1986) explained that teachers with a higher level of self-efficacy tended to enact effective instructional strategies, were responsive and sensitive to students' needs, and provided a classroom environment that facilitated learning. Building on this idea, we and other researchers have proposed that the relations between teacher self-efficacy and child achievement may be moderated by classroom quality, as highly efficacious teachers may interact with children in ways that promote their achievement (e.g., Ashton & Webb, 1986; Goddard & Goddard, 2001; Guo, Piasta et al., 2010; Guo et al., 2012). Empirical evidence supports this view, which suggests a significant relation between teacher self-efficacy and classroom quality in US and Finland (i.e., dynamics of teacher–child interactions; Guo et al., 2012; Justice et al., 2008; Pakarinen et al., 2010). Moreover, classroom quality was associated with positive child outcomes in a number of studies (e.g., Connor et al., 2005; Dynia et al., in press; Guo, Piasta et al., 2010; Guo et al., 2012; Mashburn et al., 2008). Thus, the mechanism with which teachers' self-efficacy relates to achievement is through enhanced classroom quality.

Two recent studies within the US explored such hypothesized relations among teacher self-efficacy, classroom quality, and child outcomes (Guo, Piasta et al., 2010; Guo et al., 2012). For example, Guo, Justice, et al. (2012), Guo, Piasta et al. (2010) showed that teachers' self-efficacy was positively related to preschool children's vocabulary skills only in the classrooms characterized by emotionally supportive relationships between teachers and young children. Likewise, Guo et al. (2012) reported that the relation between teachers' self-efficacy and fifth-grade students' reading skills was indirect, with teachers' self-efficacy influencing the quality of teacher–child interaction which, in turn, promoted fifth students' reading outcomes. These findings indicate that teachers with a higher level of self-efficacy may be more likely to have increased

levels of warm, responsive, and positive interactions with children than teachers with a lower level of self-efficacy.

1.4. Aims of the present study

Informed by these previous studies, we anticipate that the language and literacy skills of children with LI may be associated with teacher self-efficacy and classroom quality. In the US, the Individuals with Disabilities Education Act (IDEA) mandates that preschool-aged children with disabilities are served in classrooms that are least restrictive; thus, many young children with LI are served in inclusive ECSE settings (U.S. Department of Education, 2007). Understanding the relations between teacher self-efficacy and the academic achievement of children with LI is important to inclusion efforts. In this study, we addressed three research aims: (a) to characterize ECSE teachers' self-efficacy, (b) to investigate whether there are relations among preschool teachers' self-efficacy, classroom quality, and language and literacy gains of children with LI, and (c) to examine whether and to what extent relations between preschool teachers' self-efficacy and language and literacy gains of children LI are moderated by classroom quality.

2. Methods

2.1. Participants

The present study included 28 ECSE teachers and 108 children who participated in a larger study called Sit Together and Read – 2 (STAR – 2; Justice, Logan, Kaderavek, & Dynia, 2013). All preschool classrooms enrolled in the larger study were located in the Mid-west region of the US. The main purpose of the STAR – 2 study was to evaluate the impact of a book-reading intervention on the language and literacy skills of preschool children in ECSE classrooms. The STAR-2 study employed an experimental design, involving three conditions (i.e., two treatment conditions and one comparison), and all participating teachers were randomly assigned to one of these three conditions. The present study focused on the classrooms and children in the comparison group of teachers, thus making it neutral to any impacts of treatments studied in STAR – 2. These comparison teachers, as part of their involvement in STAR – 2, did not receive any treatment, but received one book per week to read with their students.

Participating teachers and children were affiliated with either a school district ($n = 21$), a state funded preschool program ($n = 6$), or a church-based program ($n = 1$), and they were located in suburban ($n = 16$), urban ($n = 11$), and rural ($n = 1$) areas. These classrooms were all ECSE classrooms such that they served children with a developmental disability and, for some, children who were at-risk for a developmental disability. Twenty-seven of these programs were inclusive programs with typically-developing peers, whereas one program was a self-contained ECSE classroom and only served children with developmental disabilities. The majority of classrooms was half day ($n = 27$). The average class size was 11 children ($SD = 4$ children; range = 5–21 children).

2.1.1. Lead teachers

All of the participating teachers were lead teachers and female. With regard to race and ethnicity, the majority of teachers was White/Non-Hispanic (93%; $n = 26$), whereas 3.5% were Native American ($n = 1$), and 3.5% were Asian ($n = 1$). Most teachers had earned a Master's degree (79%, $n = 22$); the remaining teachers all had obtained a Bachelor's degree (21%, $n = 6$). The teachers' experience as a lead teacher (in any grade level) ranged from 0 to 34 years, with an average of 10.4 years ($SD = 9.8$ years, Median = 6, Mode = 0). As the questionnaire that pertained to teachers'

credentials was completed in the fall, teachers with 0 years as a lead teacher were in their first year of being a lead teacher and thus had not completed one full year.

2.1.2. Children

A subset of children in the 28 classrooms was purposively selected to participate in ongoing developmental assessments. Those children who were selected all had LI; their standard score on the Core Language Composite of the *Clinical Evaluation of Language Fundamentals Preschool* (CELF: P-2; Wiig, Secord, & Semel, 2004) was at least one standard deviation below the age-based mean. Of the 108 children included in the present study, the majority was male (67%, $n = 62$); gender information was missing for 16 children (15%). Although males were overrepresented in this sample, these percentages reflect the gender ratios for children diagnosed or at-risk for a developmental disability (Oswald, Best, Coutinho, & Nagle, 2003). At the beginning of the academic year, the children's average age was 4 years, 4 months (SD = 7 month; range = 2 years, 9 months–5 years, 8 months old). Most children were White/Non-Hispanic (73%; $n = 79$), whereas 10% were African-American ($n = 11$), 2% were Latino ($n = 2$), and 5% of children were identified as having another race/ethnic background ($n = 5$); information was missing for 10% of children ($n = 11$). Ninety-four percent of the children ($n = 101$) enrolled in the present study had an Individualized Education Plan (IEP), whereas 6% did not ($n = 6$; 1% unreported). Furthermore, 27% had a known diagnosis ($n = 29$); autism was the most prevalent diagnosis ($n = 8$), and the least prevalent was apraxia ($n = 1$) and William's syndrome ($n = 1$).

Details about children's home life were also available. Total household income was highly variable; 8% ($n = 9$) resided in homes with an annual income of \$5000 or less, 33% ($n = 36$) resided in homes with an annual income of \$5001–\$45,000, 27% ($n = 29$) resided in homes with an annual income of \$45,001–\$85,000, and 17% resided in homes with an annual income of over \$85,001; information was missing for 16 children (14%). The highest level of education completed by the mother or female caregiver included the following: Some high school but no diploma (8%; $n = 9$), high school diploma or GED (41%; $n = 44$), two-year degree (5%; $n = 5$), Bachelor's degree (16%; $n = 17$), Master's degree (15%; $n = 16$), and doctoral degree (5%; $n = 5$); 2% of respondents chose Other ($n = 2$), and information was missing for 9% of children ($n = 10$). Ninety percent of the children spoke English as their primary language in their homes (1% spoke Spanish, 9% unreported).

2.2. Study procedures

ECSE teachers were required to complete two tasks as part of the larger study's procedures. First, teachers read regularly to their students using books provided for the purposes of the larger study; teachers read aloud using their typical reading style four times per week. Second, teachers completed questionnaires regarding their background, beliefs, and experiences and were periodically observed in their classroom. Data collection occurred at various time points throughout the year. For example, teachers completed questionnaires in the fall of year, and field assessors completed classroom observations in both the fall and spring of the academic year. Methods pertinent to children in the study involved them completing a battery of assessments in the fall and spring of the year; all assessments were conducted by the trained field staff with experience working with children with disabilities.

2.3. Teacher measures

2.3.1. Self-efficacy

Teachers' self-efficacy was measured via a 19-item questionnaire adapted from *Teacher Self-Efficacy Scale* (TSES; Bandura, 1997),

which has been used in several previous studies (Guo et al., 2012; Rimm-Kaufman & Sawyer, 2004). Based on the previous studies (e.g., Rimm-Kaufman & Sawyer, 2004), this scale has five sub-scales including efficacy to influence decision-making, efficacy to influence school resources, instructional self-efficacy, disciplinary self-efficacy, and efficacy to create a positive school environment. It is important to note that this questionnaire has not been used previously with ECSE teacher population. Moreover, these sub-scales cannot be validated in the present sample via confirmatory factor analysis, given the limited sample size. Thus, we used the total scale mean score (i.e., teachers' responses to all items were averaged) in the further analyses rather than sub-scale scores. A 5-point Likert scale was modified from Bandura's 9-point scale anchored with notations "no feeling of influence" (score = 1) to "very strong feeling of influence" (score = 5). Internal consistency coefficient (Cronbach's alpha) ranged from .77 to .87 across sub-scales. Descriptive data are presented in Table 1.

2.3.2. Classroom quality

The *Classroom Assessment Scoring System* (CLASS) is a systematic observational tool used to rate the quality of preschool classrooms (Pianta, La Paro, & Hamre, 2005; Pianta et al., 2002). The measure is divided into three domains; for the purposes of the present study, only the domains of emotional support and instructional support were used (the third domain, classroom organization, was not pertinent to our interests). Emotional support includes the dimensions of positive climate, negative climate, teacher sensitivity, and regard for student perspectives; instructional support includes the dimensions of concept development, quality of feedback, and language modeling. Videotaped classroom observations conducted in the fall were coded using CLASS, which provides a score on a rating scale from 1 to 7, with one being low and seven being high. These ratings are averaged across three, 15-min intervals to create an average score for each domain. In order to determine inter-rater agreement for the present study, 20% of the videos were double-coded. Percentage agreement within-one for emotional support and instructional support composite was 83% and 72%, respectively, which indicate a moderate level of inter-rater reliability (Pianta et al., 2002). See Table 2 for descriptive results for the CLASS.

2.4. Child measures

In the current study, the following measures, selected from the larger battery, represented children's language and literacy skills.

2.4.1. Language skills

Children's receptive and expressive language ability were assessed using the Core Language Composite of the *Clinical Evaluation of Language Fundamentals Preschool* (CELF: P-2; Wiig et al., 2004). Scaled scores from three subtests, Word Structure, Sentence Structure, and Expressive Vocabulary, were summed to create the Core Language Composite, which was used in analyses. The Word Structure subtest measures the child's ability to use correct morphology; Sentence Structure gauges the child's understanding of grammatical sentences, and Expressive Vocabulary assesses the child's ability to label nouns and actions. Table 3 presents children's mean, standard deviations, range of standard and raw scores on the CELF measure; raw scores were used for analysis.

2.4.2. Literacy skills

The Print Knowledge subtest of the *Test of Preschool Emergent Literacy* (TOPEL; Lonigan, Wagner, Torgesen, & Rashotte, 2007) was used as a measure of literacy skills. This subtest consists of 36 items, which measures children's early knowledge about written language conventions and form as well as alphabet knowledge. The

Table 1
Descriptive statistics for the measure of teacher self-efficacy.

	M	SD	Range	Teacher Response (%)	
				Low Rating (1 or 2) (%)	High Rating (4 or 5) (%)
1. Influence decisions	2.9	1.1	1–5	40.7	33.3
2. Express views on school matters	3.5	1.0	2–5	18.5	51.8
3. Get the instructional materials	3.5	.9	2–5	11.1	44.4
4. Influence the class size	1.7	.8	1–4	92.6	7.4
5. Get through the most difficult children	4.5	.6	3–5	0	96.1
6. Promote learning (lack of home support)	3.9	.7	2–5	3.7	77.8
7. Keep children on tasks on difficult activities	4.0	.6	3–5	0	85.2
8. Increase children's recall of what they have learned	4.0	.8	2–5	3.7	77.8
9. Motivate children who show low interest	4.3	.6	3–5	0	92.6
10. Get students to work together with one another	4.5	.5	4–5	0	100
11. Overcome the influence of adverse community	3.3	1.0	1–5	18.5	48.1
12. Get children to learn activities at home	2.9	.6	2–4	23.1	15.4
13. Get children to follow classroom rules	4.4	.6	3–5	0	92.5
14. Control disruptive behavior	4.3	.6	3–5	0	92.6
15. Prevent to problem behavior	3.6	.8	2–5	11.1	63
16. Make the school a safe place	4.2	.8	3–5	0	81.4
17. Make children enjoy coming to school	4.7	.5	4–5	0	100
18. Get children to trust teachers	4.7	.5	4–5	0	100
19. Help other teachers with teaching skills	3.4	.8	1–4	11.1	51.9
Teacher Self-efficacy scores (the average scores of 19 items)	3.8	.3	3.2–4.3		

Note. Teacher self-efficacy scores from Teacher Self-efficacy Scale (TSE; Bandura, 1997). Each item ranges 1 (strongly disagree) to 5 (strongly agree).

child is asked to point to aspects of print, identify letters, associated sounds, and written words, name specific letters, and say the sounds associated with specific letters. Internal consistency for the Print Knowledge subtest ranged from .93 to .96. Table 3 presents the mean scale scores, standard deviations and ranges on the measure of print knowledge. The raw scores were used for analysis.

2.5. Analytic strategy

To examine the relations among teacher self-efficacy, classroom quality, and children's language and literacy gains, hierarchical linear modeling was used (HLM; Raudenbush, Bryk & Congdon, 2002). The two-level hierarchical linear models nested children within classrooms and predicted children's residualized gains (i.e., Time-2 scores with Time-1 scores as covariates) on language and literacy skills; teacher self-efficacy and classroom quality (emotional and instructional support) were used as classroom-level measures. Children's age, mother's education level, and annual family income were included as covariates in the level 1 model. When examining the residualized gains, raw scores for the language and literacy measures were used for analysis as recommended in HLM analysis; this is because raw scores provide an indicator as to gain over time (Bonate, 2000; Hartman, Stage & Webster-Stratton, 2003).

HLM models were built systematically starting with the unconditional model without any predictors to compute the intraclass correlation coefficient (ICC), or the proportion of variance in individual child outcomes falling between class-level variables. We

then included the following child variables into Level 1 of the model: Children's Time-1 scores to examine residualized gains from fall to spring and children's age, mother's education level, and family income as covariate variables. Next, we added teacher/classroom variables to Level 2 of the model to model changes in children's outcomes (Time-1–Time-2) as a function of teacher self-efficacy and classroom quality (emotional and instructional support). Finally, we included the interactions between teacher self-efficacy and emotional or instructional support.

3. Results

3.1. ECSE teachers' self-efficacy

Table 1 presents the means, standard deviations, and ranges for each question on the teacher self-efficacy questionnaire and for teacher self-efficacy scores (the average scores of 19 questions), as well as the percentage of teachers providing low ratings (i.e., a score of 1 or 2) and high ratings (i.e., a score of 4 or 5) for individual question. Descriptive data showed that the mean of teacher self-efficacy scores was 3.8 (SD = .3, see Table 1), suggesting that ECSE teachers' overall perceptions of self-efficacy was positive.

Examination of the item-level data revealed that the majority of teachers (63% or greater) provided high ratings to questions concerning their perceptions about teaching effectively (i.e., instructional self-efficacy; Questions 5–10), managing children's

Table 2
Descriptive statistics for classroom quality measure.

	M	SD	Range
Emotional Support (Average of PC, NC, TSRSP)	5.17	.63	4.1–6.3
Positive Climate (PC)	5.29	.78	4.0–6.7
Negative Climate (NC: reversed score)	1.42	.48	1.0–2.3
Teacher Sensitivity (TS)	4.66	1.00	2.7–6.0
Regard for Student Perspectives (RSP)	4.13	1.08	1.7–6.0
Instructional Support (Average of CD, QF, LM)	2.32	.67	1.0–4.0
Concept Development (CD)	2.27	.73	1.0–4.3
Quality of Feedback (QF)	2.35	.72	1.0–4.7
Language Modeling (LM)	2.34	.78	1.0–4.0

Table 3
Descriptive statistics for children's language and literacy outcomes.

Measure	Time-1			Time-2		
	M	SD	Range	M	SD	Range
RW: Language composite score	26.64	17.11	0–72	37.92	18.97	0–79
SS: Language composite score	75.16	18.97	10–116	78.89	20.42	10–123
RW: Sentence structure	8.20	4.95	0–21	10.94	5.71	0–21
RW: Word structure	6.35	5.35	0–20	9.90	6.20	0–24
RW: Expressive vocabulary	12.09	8.58	0–37	16.97	9.14	0–36
RW: Print knowledge	10.15	9.40	0–35	14.99	11.27	0–36
SS: Print knowledge	91.05	13.95	61–128	91.74	16.14	62–133

Note. RW = raw score; SS = standard score.

behaviors (i.e., disciplinary self-efficacy: Questions 13–15) and creating a positive school environment (e.g., Questions 16–18). For the question related to their influence on the classroom size, a large percentage of teachers (92.6%) provided low ratings (i.e., Question 4: influence the class size), and 40.7% also provided low ratings to another question (i.e., Question 1: influence the decision). However, nearly half of teachers provided high ratings to the question related to expressing their views. About 50% of teachers provided high ratings to the questions concerning their influence on school resources (i.e., Questions 3 and 19). A small percentage of teachers (15.4%) provided high ratings to the question about enlisting parental involvement (i.e., Question 12); however 48% provided high ratings to the question about enlisting community involvement (i.e., Question 11).

3.2. Self-efficacy, classroom quality, and language and literacy gains of children with LI

We first tested the unconditional model for each of the two language and literacy outcomes using HLM as described before. ICCs were .28 for Time-2 language scores and .21 for Time-2 literacy scores, which showed that 28% of the variance in Time-2 language scores was accounted by within-classroom effects, and 21% of the variance in Time-2 literacy scores was explained by within-classroom effects. On average, the children in this study demonstrated substantial gains in language and literacy skill over the academic year (see Table 2).

The first research question examined the relations among teacher self-efficacy, classroom quality and children's language and literacy gains over the academic year. HLM results showed that teacher self-efficacy ($\gamma = .19, p = .97$) did not significantly predict the residualized change in the language scores of children with LI, after controlling for children's Time-1 language scores and child and family characteristics. Likewise, teacher self-efficacy ($\gamma = -4.67, p = .26$) was not a significant predictor of the residualized change in the literacy scores of children with LI once children's Time-1 literacy scores and child and family characteristics were controlled.

With regard to the relations of classroom quality, namely instructional and emotional support with child outcomes, HLM results showed that neither instructional support ($\gamma = 1.62, p = .46$) nor emotional support ($\gamma = 1.73, p = .41$) significantly predicted the residualized change in children's language scores after controlling for children's Time-1 language scores and child and family characteristics. Similarly, there were no main effects for instructional support ($\gamma = .18, p = .93$) or emotional support ($\gamma = 1.96, p = .32$), on the residualized change in children's literacy scores after controlling for children's Time-1 print knowledge scores and child and family characteristics.

The second research question considered the extent to which the relations between teacher self-efficacy and the language and

literacy gains of children with LI may be moderated by classroom quality. For language gains, teacher self-efficacy did not significantly interact with emotional support in predicting residualized gain in children's language scores ($\gamma = -8.17, p = .217$, see Table 5); however, there was a significant interaction between teacher self-efficacy and instructional support in relation to gains in children's language ($\gamma = -16.41, p = .021$, see Table 4). Unexpectedly, the interaction between teacher self-efficacy and instructional support was negative. As depicted in Fig. 1, children with LI in higher instructional quality preschool classroom showed the greater language gains from teachers with lower levels of self-efficacy.

For the literacy gains of children with LI, the interaction between teacher self-efficacy and emotional support in predicting residualized change in children's literacy scores was not significant ($\gamma = -7.71, p = .141$, see Table 5), whereas teacher self-efficacy and instructional support significantly interacted in predicting children's residualized literacy gains ($\gamma = -12.66, p = .051$, see Table 4). Fig. 2 depicts this relation. The interaction between teacher self-efficacy and instructional support was also negative. Children showed greater literacy growth when they were enrolled in higher instructional quality preschool classrooms and teachers showed lower-level self-efficacy.

4. Discussion

The purposes of the present study were threefold: (a) to describe the self-efficacy of ECSE teachers, (b) to investigate how ECSE teachers' self-efficacy relates to children's gains in language and literacy, and (c) to determine whether the associations between teachers' self-efficacy and children's gains in language and literacy may be moderated by classroom quality. Three major findings, which are discussed in turn, include the following: (a) ECSE teachers' self-efficacy, in general, was high, (b) ECSE teachers' self-efficacy was not related to children's gains in language and literacy, and (c) associations between teachers' self-efficacy and the language and literacy gains of children with LI were significantly, negatively moderated by classroom quality.

Regarding the first major finding, ECSE teachers provided generally high ratings concerning their overall perceptions of self-efficacy, averaging nearly 4 points (3.82) on a 5-point scale. This finding extends the current research, which highlights that general education preschool teachers demonstrate a positive efficacy toward their capabilities to teach young children (Guo, Justice et al., 2011; Guo, Kaderavek, Piasta, Justice, & McGinty, 2011; Justice et al., 2008). These two research studies, in particular, incorporated the same teacher self-efficacy scale that was used in the present study; thus, direct comparisons can be made. The average teacher self-efficacy rating ranged from about 3.60 (Guo, Justice et al., 2011; Guo, Kaderavek, Piasta et al., 2011) to 4.39 (Justice et al., 2008) in prior work; the present result (3.82) falls within

Table 4
HLM results for relation of teachers' self-efficacy and instructional support to children's language and literacy gains.

Variable	Language Skills				Literacy Skills			
	Coefficient	SE	df	p	Coefficient	SE	df	p
Time-2 Score	39.39	1.09	17	<.001	15.65	.99	17	<.001
<i>Child-level Variables</i>								
Time-1 Score	.99	.06	39	<.001	.84	.11	39	<.001
Age	-.13	.15	39	.389	-.03	.14	39	.849
Mother Education	-1.00	.16	39	.790	-.18	2.15	39	.932
Family Income	-.04	2.16	39	.645	.25	.15	39	.102
<i>Classroom-level Variables</i>								
Teacher Self-efficacy	-2.79	4.53	17	.546	-6.86	4.11	17	.113
Instructional Support (IS)	4.27	2.34	17	.085	3.24	2.08	17	.139
Self-efficacy \times IS	-16.41	6.45	17	.021	-12.66	6.02	17	.051

Table 5

HLM results for relation of teachers' self-efficacy and emotional support to children's language and literacy gains.

Variable	Language Skills				Literacy Skills			
	Coefficient	SE	df	p	Coefficient	SE	df	p
Time-2 Score	39.75	1.14	17	<.001	16.25	.90	17	<.001
<i>Child-level Variables</i>								
Time-1 Score	1.01	.06	39	<.001	.81	.11	39	<.001
Age	-.18	.15	39	.244	-.07	.14	39	.611
Mother Education	-1.48	2.23	39	.510	.33	2.15	39	.880
Family Income	-.02	.16	39	.913	.29	.15	39	.067
<i>Classroom-level Variables</i>								
Teacher Self-efficacy	1.75	4.66	17	.711	-8.47	3.79	17	.039
Emotional Support (ES)	-1.56	2.21	17	.490	3.95	1.69	17	.032
Self-efficacy \times ES	-8.17	6.38	17	.217	-7.71	4.99	17	.141

this range. Collectively, ECSE teachers' self-efficacy appears to be comparable to that of general education preschool teachers.

To further investigate this finding, we analyzed item-level questions of ECSE teachers' self-efficacy, and we found that ECSE teachers in the present study indicated high ratings related to their abilities to teach (e.g., keep children on task), effectively discipline (e.g., control and prevent problem behaviors), and create a positive school environment (make children enjoy coming to school). On the other hand, these teachers provided low to moderate ratings for their abilities to influence class size and administrative decisions. These results are consistent with previous studies, which showed that general education preschool teachers' perceptions of their influence in schools are low or moderate (Guo, Kaderavek, Piasta et al., 2011; McGinty, Justice, & Rimm-Kaufman, 2008). One potential explanation for this finding may be that ECSE teachers feel that there are many policy-related decisions, such as class size, that are made at the administration or government level that they do not have control over. In addition, ECSE teachers reported low ratings for their abilities to enlist parental involvement, and moderate ratings for their abilities to involve the community. Parental involvement in education is considered an important component of early childhood education as well as ECSE programs (Dail & Payne, 2010; Mistry, Benner, Biesanz, Clark, & Howes, 2010; Zigler & Muenchow, 1992). In particular, research studies indicate that parent participations lead to a host of positive outcomes for children with disabilities, including higher reading achievement and fewer years in special education (Miedel & Reynolds, 2000). Investigation aimed at building partnerships with parents is an

important avenue for future research, particularly because ECSE educators do not feel like they are able to enlist change in parents.

Concerning the second major finding, results indicated that there were no significant relations between ECSE teachers' self-efficacy and children's language and literacy skills. This finding is surprising given that previous research studies showed that teachers' self-efficacy was related to children's language and literacy skills (Goddard et al., 2000). However, the absence of the main effects of teachers' self-efficacy on child outcomes supports the view that the relations between teachers' self-efficacy and child achievement are indirect, with teachers' efficacy influencing child learning through classroom quality (Ashton & Webb, 1986; Goddard & Goddard, 2001; Guo, Justice et al., 2012; Guo et al., 2012). Thus, this finding must be interpreted in light of our third major finding.

The third major finding indicated that there was a significant interaction between ECSE teachers' self-efficacy and one domain of classroom quality, namely instructional support, in predicting language and literacy gains of children with LI. Although this finding is consistent with our predictions; the direction of this interaction was negative, which was incongruent with our hypothesis as well as the findings reported in previous studies (e.g., Guo, Justice et al., 2012; Guo, Piasta et al., 2010). Specifically, analyses revealed that lower self-efficacy, in combination with higher instructional support, was associated with greater gains in language and literacy gains for children with LI. Conversely, children with LI made fewer gains in language and literacy skills when ECSE teachers had high self-efficacy, even within the content of classroom characterized by high levels of instructional support. The

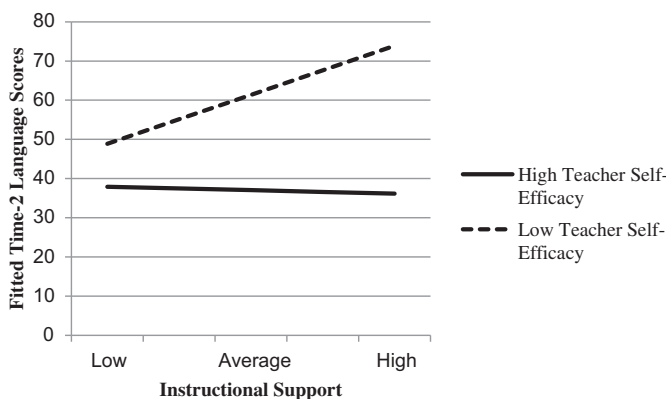


Fig. 1. Interaction between teacher self-efficacy \times instructional support on fitted Time-2 language scores. Note. Interaction between teacher self-efficacy \times instructional support on fitted time-2 language scores, adjusting for Time-1 language score, age, mother education and family income. Low teacher self-efficacy = -1SD, High teacher self-efficacy = +1SD, Instructional support falls at the 25th (low), 50th (average), and 75th (high) percentiles.

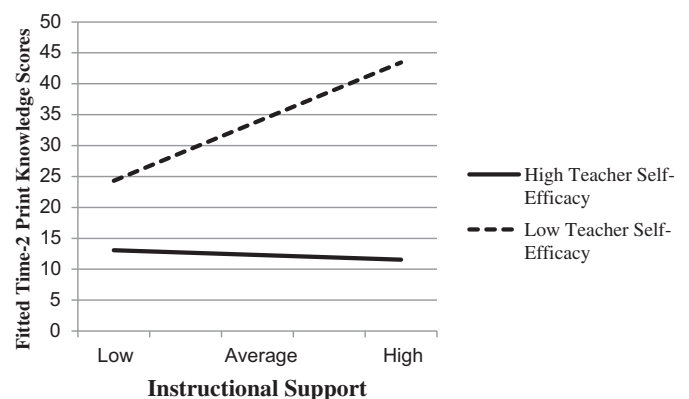


Fig. 2. Interaction between teacher self-efficacy \times instructional support on fitted Time-2 literacy (print knowledge) scores. Note. Interaction between teacher self-efficacy \times instructional support on fitted time-2 print knowledge scores, adjusting for Time-1 print knowledge score, age, mother education and family income. Low teacher self-efficacy = -1SD, High teacher self-efficacy = +1SD, Instructional support falls at the 25th (low), 50th (average), and 75th (high) percentiles.

most salient conclusion is related to the value of considering both teachers' self-efficacy and instructional support together when estimating the growth of children with LI in ECSE classrooms.

Notably, the interaction suggests that ECSE teachers' self-efficacy may be negatively associated with children's skills. Further, high levels of instructional support, such as providing feedback and incorporating language modeling techniques, can compensate for these impacts, at least in the area of language and literacy skills for children with LI. Therefore, not only may instructional support compensate for low teacher self-efficacy, but also instructional support may serve as a protective factor for children's language and literacy development, even though the ECSE teacher may have low self-efficacy. Specifically, ECSE teachers actions (i.e., providing high-quality instructional support), not their beliefs about their abilities, seems to matter more for children with LI with regard to language and literacy gains. This finding is interesting, given the considerable evidence that shows the positive relations between the instructional inputs provided by adults (e.g., caregivers, teachers) and the language and literacy learning of both typically-developing children (Connor et al., 2005; Mashburn et al., 2008) and children with LI (Schwartz, Carta, & Grant, 1996; Wilcox, Gray, Guimond, & Lafferty, 2011). Schwartz et al. (1996), for instance, found that preschool children with disabilities, including those with LI, demonstrated significant language gains in the classrooms with which their teachers' integrated evidence-based practices, including engaging children in conversational interactions, providing detailed feedback, and facilitating communication with peers.

Our findings complement the extant research literature by showing that the potential contributions of ECSE teachers' self-efficacy at improving the language and literacy skills of children with LI is dependent on classroom conditions characterized by instructional responsiveness. In other words, low-level teacher self-efficacy within the context of high-quality classrooms that are instructionally supportive may contribute to the language and literacy gains of children with LI; however, high levels of ECSE teachers' self-efficacy within the context of high-quality classrooms may not improve language and literacy outcomes of children with LI. One potential explanation is that although low self-efficacy (i.e., doubt about teaching efficacy) is generally less desirable than high self-efficacy (i.e., strong confidence in one's efficacy), researchers have proposed that low levels of confidence in self-efficacy may have potential benefits for teachers and their teaching (Boulden, Hiester, & Walti, 1998, pp. 37–68; Callas, Mellinger, & King-Taylor, 1998, pp. 1–36; Tschannen-Moran & McMaster, 2009; Wheatley, 2002). For example, low efficacy may foster teacher reflection, support motivation to learn a new teaching strategy (Wheatley, 2002), improve the quality of classroom management (Boulden et al., 1998), and lead to the use of a constructivist approach to teach students with disabilities (Callas et al., 1998). Therefore, we speculate that ECSE teachers who had lower level of self-efficacy (i.e., feeling slightly on the positive side of neutral overall self-efficacy scores) may be more motivated to incorporate what is advocated in language and literacy instruction as they know there is room for their skills and knowledge to improve in this area. High-quality instructional support, in turn, improves the learning outcomes of children with LI. However, this assumption remains an empirical question, thus limiting their significance for educational practice.

Another potential explanation for this negative interaction among teacher self-efficacy, classroom quality, and children's achievement may be related to the self-efficacy measure used in this study. First, although we argue that the adapted version of teacher self-efficacy scale (TSES; Bandura, 1997) is valid and useful for measuring the intended aspects of teachers' beliefs about their

ability, it was not specifically developed to assess ECSE teachers' self-efficacy. For example, few TSES items capture self-efficacy beliefs related to teaching children with disabilities in inclusive settings. In fact, teachers in ECSE classrooms may have to employ different strategies, such as adapting the curriculum and embedding individualized learning opportunities into the usual classroom activities, to meet the needs of children with disabilities (Sandall & Schwartz, 2008). Perhaps teachers' self-efficacy for teaching children with disabilities is more multi-faceted than what the current measure describes. In addition, review of the item-level data revealed that three specific items are not pertinent, as they were negatively correlated with the other items. In other words, reliability increased when items (e.g., "how much can teacher influence decisions?", "how much can teacher influence the classroom size", and "how much can teacher make the school a safe place") were deleted. These items (i.e., how much can teacher influence decisions?" and "how much can teacher influence the classroom size) seem to capture constructs that are beyond the teachers' control.

Second, the present study exclusively focused on the efficacy beliefs on teaching and learning in general. However, self-efficacy in specific content areas (e.g., language, literacy and science), defined as confidence in teaching these areas is another type of teacher self-efficacy that is particularly important in determining the quality of teaching (Pajares, 1992). For example, Riggs and Enochs (1990) found that elementary teachers who had a high self-efficacy with respect to teaching science allocated more time and effort to teaching and developing science concept. Further, several studies also emphasized the importance of teacher self-efficacy for literacy instruction (Timperley & Phillips, 2003; Tschannen-Moran & Johnson, 2011). We surmise that if teachers' self-efficacy beliefs about language and literacy instruction, such as the scale used in the study of Tschannen-Moran and Johnson (2011), are examined, the relations among teacher self-efficacy, classroom quality, and the outcomes of children with LI may be different from those obtained from this work. Collectively, measuring self-efficacy in teaching language and literacy for ECSE teachers is an important avenue of future research.

5. Limitations

In light of these findings, four limitations must be acknowledged. First, the results of this study are correlational; thus, we cannot assume that any significant relation is causal in nature. Additional experimental and longitudinal research is needed to determine the causal relations among teacher self-efficacy, classroom quality, and child outcomes. Second, our sample included a relatively small number of 28 ECSE teachers, which makes it impossible to test the factor structure of teacher self-efficacy measure used in the present study. Perhaps with a larger sample size, our results may tell a different story related to the relations among teachers' self-efficacy, classroom quality, and children's language and literacy gains. Third, the CLASS is a well-established, reliable, and valid measure of classroom quality. However, much less is known about the validity of this measure in ECSE contexts. Perhaps ECSE teachers incorporate emotional and instructional techniques, for example, that meet the individual learning needs of their diverse students, which are not accurately captured by the CLASS. Fourth, as described before, the teacher self-efficacy measure employed in this study, the adapted 19-item version of Teacher Self-Efficacy Scale (TSES; Bandura, 1997), does not adequately represent the content of self-efficacy related to teaching children with LI in the inclusive settings, making it less germane to the focus of the present work. Future study should use a more valid measure capturing the multi-dimensions of teacher self-efficacy in the area of language and literacy teaching within the context of ECSE

classrooms. Finally, the present study exclusively focused on children with LI. Thus, it is not clear if these findings can be generalized to other population of children in ECSE classrooms. Research efforts designed to study the effects of teacher self-efficacy and classroom quality on child outcomes on a more general population of children with disability is an important area of future inquiry.

6. Conclusion

In conclusion, this study's primary findings add to the extant research literature related to the relations among ECSE teachers' self-efficacy, classroom quality, and children's language and literacy outcomes. In particular, our first finding supports that ECSE teachers have relatively high self-efficacy. Conversely, when studied at the item level, there are specific areas with which ECSE teachers were less self-efficacious, including their abilities to influence decision-making as well as parental and community involvement. Thus, it is important to cultivate stronger self-efficacy beliefs for these specific areas. Further, our results suggest that there is an indirect relation, not a direct association, such that for children with LI whose teachers had lower levels of self-efficacy, higher levels of classroom quality (i.e., instructional support) were associated with higher language and literacy gains. We argue that the teacher self-efficacy measure used in the study may serve as a key mechanism in explaining the negative interactions among teacher self-efficacy, classroom quality and children's outcomes. Clearly, the future study examining the self-efficacy of ECSE teachers may use a measure better suited to the area of language and literacy teaching. Our research findings area modest first step in examining ECSE teachers' self-efficacy; the research efforts in the field of ECSE teacher quality should continue to examine how teacher' efficacy beliefs impact their teaching quality and child development as well as how their efficacy beliefs are developed and fostered.

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