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Does Teachers' Self-Efficacy Vary for Different Children? A Study of Early Childhood Special Educators

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Abstract

Teacher self-efficacy (TSE) is a frequently studied construct due to its positive relations with student outcomes. However, TSE of teachers in inclusive early childhood special education (ECSE) classrooms has seldom been studied. To fill this gap, we examined the extent to which (a) teachers exhibited differing levels of TSE for students; (b) children's characteristics, particularly disability status and learning behaviors, were associated with TSE; and (c) relations between children's characteristics and TSE remained consistent across an academic year. Thirty-seven teachers of inclusive ECSE classrooms completed surveys to ascertain their student-specific TSE and children's learning behaviors for 114 children. Results indicated that teachers had different levels of TSE for students in their classrooms. Children's characteristics, particularly their attention/persistence, were related to TSE, with more relations shown between TSE and children's characteristics at the start of the school year than at the end. Implications for teacher professional development are discussed.

Keywords

teacher self-efficacy, early childhood, preschool, special education, learning behaviors

Bandura's (1997) reciprocal determinism theory proposes that teachers' actions both exert an influence on and are influenced by personal factors, such as teachers' beliefs and the environment. In this model, teacher self-efficacy (TSE) is a primary personal factor believed to affect teachers' actions in the classroom (Bandura, 1997; Hoy et al., 2009). TSE refers to beliefs regarding a teacher's capability of acting in a way that produces desired outcomes for students. Importantly, students whose teachers have higher levels of TSE show greater academic achievement and feelings of competence, engagement, and motivation than students whose teachers have lower TSE (Klassen et al., 2011; Zee & Koomen, 2016). In addition, higher TSE has a positive effect on teachers, including increased job satisfaction and lower rates of career exhaustion (Brouwers & Tomic, 2000; Klassen & Chiu, 2010; Zee & Koomen, 2016).

Given important teacher and student outcomes, as related to higher levels of TSE, researchers have been interested in determining the circumstances under which teachers feel more or less self-efficacious. Researchers have moved away from examining TSE as a global trait to a focus on TSE at narrower levels of specificity (Klassen et al., 2011; Zee & Koomen, 2016). The majority of this research has focused on specificity in regard to pedagogical domains and content areas. As perhaps the most well-known example, Tschannen-Moran and Hoy (2001) validated the existence of three domains of TSE, namely, instructional strategies, classroom management, and student engagement. Researchers have also examined TSE in regard to specific content areas, such as science, technology, and literacy (e.g., Riggs & Enochs, 1990; Ross et al., 2001; Tschannen-Moran & Johnson, 2011).

An additional and potentially important contributor to TSE are characteristics of students and how these characteristics intersect with teachers' perceived abilities. Recently, Zee and colleagues (2016) adapted the domain-specific TSE Measure (Tschannen-Moran & Hoy, 2001) to measure TSE at the student-specific level. They found that elementary school teachers reported feeling differentially efficacious with individual students in their classrooms. In subsequent studies, Zee and colleagues (2016, 2017) found that elementary school teachers felt less self-efficacious with students who displayed more challenging behaviors compared with students who exhibited more positive

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social-emotional behaviors, indicating that student characteristics are associated with TSE.

Investigating the relation between TSE and individual children's characteristics is of particular interest in the context of inclusive early childhood special education (ECSE) classrooms. In inclusive ECSE classrooms, children with disabilities are educated alongside peers without disabilities. Although inclusive environments are academically and socially beneficial to children (Lawrence et al., 2016), providing differentiated learning opportunities to such a heterogeneous group of children presents challenges or alternatively opportunities for growth, for teachers. In particular, teachers may feel more or less efficacious with children as a function of a child's disability status or learning behaviors; understanding these relations can then provide insight into areas of professional development that may be beneficial for teachers.

Self-Efficacy of Early Childhood Education (ECE) Teachers

The vast majority of archival research on teachers' TSE has focused on teachers of school-age children (for a review, see Zee & Koomen, 2016), although a limited number of studies have examined ECE teachers' TSE (Chung et al., 2005; Guo et al., 2010, 2011, 2014; Justice et al., 2008; Rhoad-Drogalis et al., 2018; Todd Brown, 2005). Overall, ECE teachers generally have moderately high-to-high TSE, which may not be surprising, given that teachers who teach younger school-age children report higher TSE than teachers of older students (Klassen & Chiu, 2010; Wolters & Daugherty, 2007). However, a limitation of this research is the use of global measures of TSE that are not able to examine potential differences in TSE toward individual children in their classrooms.

Examining whether TSE is associated with children's disability status is important, given that higher TSE is related to positive beliefs about inclusion and teaching children with disabilities (e.g., Brownell & Pajares, 1999; Soodak et al., 1998). In a study of second-grade general education teachers, Brownell and Pajares (1999) found that TSE predicted teachers' perceived success in teaching special education students who were mainstreamed in their classrooms. In turn, more positive beliefs about teaching children with disabilities are related to implementation of evidence-based practices with children with disabilities, such as embedding learning opportunities into daily activities/routines and positive behavior supports (e.g., Allinder, 1994; Mitchell & Hegde, 2007).

Whereas no studies have examined whether individual teachers' TSE is different for children with and without disabilities, existing studies suggest that TSE may be negatively associated with teaching young children with disabilities. Chung and colleagues (2005) found that a subsample of teachers who taught one or more children with disabilities/delays (30% of total sample) had lower TSE than the full sample of ECE teachers. Additional evidence is garnered from studies that used the Teacher Self-Efficacy Scale (TSES; Bandura, 1997) to examine TSE for ECE and ECSE teachers (Guo et al., 2011, 2014; Justice et al., 2008); these studies indicate that the TSE of ECSE teachers is similar or lower than the TSE of ECE teachers.

Yet, simply comparing TSE scores across different samples of early childhood teachers does not account for the myriad of other teacher or classroom factors that may influence TSE. In addition, all of these studies have examined TSE at the classroom-level such that teachers rated their self-efficacy considering all of the children in their classroom. Given the differentiated needs of children in inclusive ECSE classrooms, it is important to understand whether TSE relates to children's disability status.

Teacher Self-Efficacy and Children's Learning Behaviors

Children's learning behaviors, which are also often termed approaches to learning, is another important child-level variable that may relate to TSE. In this study, we focused on several critical student learning behaviors, namely, competence-motivation (child's willingness to engage in learning tasks), attention and persistence (paying attention and sustaining engagement in learning tasks), and learning strategies (how a child engages in learning tasks; McDermott et al., 2002). These specific preschool learning behaviors concurrently and longitudinally predict children's improvements in language, literacy, and math skills (Duncan et al., 2007).

Learning behaviors are important to examine in the context of inclusive ECSE classrooms, given that researchers routinely find that children with disabilities demonstrate fewer learning behaviors than children without disabilities (e.g., Rhoad-Drogalis et al., 2018; Schaefer et al., 2004). However, the relation of these learning behaviors to TSE has not been explicitly studied. Instead, researchers have studied the inverse relation, finding that TSE positively influences school-age students' learning behaviors, including motivation, engagement, and positive attitudes about learning (Reyes et al., 2012; Rhoad-Drogalis et al., 2018; Ross et al., 2001). It is likely that the relation between TSE and students' learning behaviors is bidirectional, whereby students' learning behavior may also influence TSE.

In addition, numerous studies provide indirect evidence to support the premise that students' learning behaviors predict TSE. For instance, teachers perceive themselves as being less efficacious with students with challenging

behaviors compared with students with more prosocial behavior (Spilt et al., 2011; Zee et al., 2016, 2017). Children who exhibit stronger prosocial behaviors also display more positive learning behaviors due to their abilities to demonstrate self-control, pay attention, and persist in completing tasks (McDermott et al., 2002; Schaefer et al., 2004). Furthermore, TSE is positively related to close student–teacher relationships (Chung et al., 2005; Mashburn et al., 2006) that are influenced by children's learning behaviors (Rhoad-Drogalis et al., 2018).

Stability of Teacher Self-Efficacy

Considering Bandura's (1997) reciprocal determinism theory, TSE is malleable to change. Specifically, Bandura posited that TSE is influenced by mastery experiences, vicarious experiences, social persuasion, and physiological states. Teachers' experiences with children over the academic year likely influence their TSE. It may be that TSE increases over the school year for teachers who have positive interactions with children (i.e., mastery experiences), witness others' success (i.e., vicarious experiences), receive encouraging feedback from others, like parents or administrators (i.e., social persuasion), and feel more comfortable (i.e., physiological states); conversely, TSE may decrease as a result of nonoptimal experiences. Thus, a key question of the current study was to determine whether relations between student characteristics and TSE remain consistent from fall to spring of the academic year. No studies have yet examined this question.

Although the preponderance of studies has only measured TSE at one time point, they nonetheless provide evidence that TSE is not fixed. TSE is associated with teachers' experience (Guo et al., 2010; Klassen & Chiu, 2010; Malinen et al., 2013; Tschannen-Moran & Hoy, 2007), suggesting that TSE varies over time. Few studies have examined TSE longitudinally (Brouwers & Tomic, 2000; Hoy & Burke-Spero, 2005; Salanova et al., 2011; Zee et al., 2017). Hoy and Burke-Spero (2005) found that TSE rose from the start of preservice teacher preparation to the end of student teaching but fell when comparing the end of student teaching with the end of the first year of teaching.

In addition, some research indicates that factors that influence TSE may change over time (Brouwers & Tomic, 2000; Tschannen-Moran & Hoy, 2007). For example, Tschannen-Moran and Hoy (2007) found that factors influential to TSE, such as mastery experiences and availability of teaching resources and support, varied in importance at different time points in teachers' careers. Taking these findings together, TSE likely changes over time and may have varied influences at different time points. As such, we conjecture that relations between children's characteristics and TSE from the beginning of the school year to the end of the school year may vary as well.

Current Study

To advance research regarding TSE in the context of early childhood classrooms, we examined whether teachers in inclusive ECSE classrooms reported differential levels of self-efficacy with individual students (i.e., student-specific TSE) based on children's disability status and learning behaviors. We examined the degree to which TSE of teachers of inclusive ECSE classrooms varies for individual children within their classrooms and whether this variability may be associated with children's disability status and learning behaviors. Three research questions guided this study:

Research Question 1 (RQ1): To what extent is there variability in teachers' feelings of self-efficacy among the children in their classrooms?
Research Question 2 (RQ2): What is the relation between student-specific TSE and child characteristics, namely, whether child has a disability (i.e., disability status) and student's learning behaviors?
Research Question 3 (RQ3): Do the relations between child characteristics and student-specific TSE remain consistent from fall to spring of the academic year?

We anticipated that teachers' feelings of self-efficacy for individual children within their classrooms would vary and that teachers would feel (a) less efficacious with children with disabilities and (b) more efficacious with individual children who exhibit more positive learning behaviors. We also hypothesized that the relations between children's characteristics and student-specific TSE would vary from fall to spring; the nature of how those relations would vary was not conjectured, given that no research has examined this topic.

Method

The current study was part of a larger study designed to test the effectiveness of a supplemental curriculum in ECSE classrooms on children's language and literacy skills. The current study measures were not central to the research aims of the larger study. Inclusion and exclusion criteria for children pertained to their ability to participate in the language and literacy standardized assessments; children were able to speak in phrases of two or more words, were proficient in English, and had no severe sensory or cognitive difficulties or diagnoses that would prevent their ability to be assessed. The participants in this study represented lead teachers of a subset of ECSE classrooms from the larger study; the larger study sample included both inclusive and self-contained ECSE classrooms. As a key aim of the current study was to examine teachers' differential TSE based on child disability status, we only included classrooms that enrolled children

with and without disabilities (i.e., inclusive classrooms) in this sample.

Participants

Thirty-seven lead teachers of inclusive ECSE classrooms participated in the current study. Per classroom, the percent of children with disabilities ranged from 11% to 64%. Across two states, teachers taught in urban (n = 20, 57%), suburban (n = 9, 27%), and rural (n = 7, 11%) areas and within full-day (n = 19, 51%) or half-day (n = 18, 49%) programs. Thirteen (35%) classrooms were affiliated with Head Start programs. The majority of teachers were female (n = 24, 67%) and White (n = 32, 89%). All teachers indicated that they held a higher education degree (n = 35; two were missing) and majored in education (n = 36; one was missing). The majority of teachers held a state-level certification (n = 27, 73%; two were missing). Furthermore, over half of teachers reported a state teaching credential in early childhood (n = 23, 62%) and/or special education (n = 22, 60%). Teachers were moderately to very experienced in early childhood teaching, with over half (n = 21, 57%) teaching 11 or more years; all teachers (n = 36; one was missing) had taught a minimum of 3 years in early childhood classrooms.

Slightly more than 100 children (n = 114) participated, representing students with disabilities (n = 53, 46.5%) and students without disabilities (n = 61, 53.5%). Disability status was operationalized based on whether the child had an Individualized Education Program (IEP). Receptive and expressive language was identified as a primary need for 41% of the children with disabilities (n =22). More specific information on the child's disability, as reported by parents, was only available for 22 (42%) of the 53 children with disabilities; data on the specific type of disability were missing for 31 (58%) children with disabilities. The most common disability was developmental delay (n = 13). Less commonly reported disabilities were autism spectrum disorder (n = 4), specific learning disability (n = 2), visual impairment (n = 1), orthopedic impairment (n = 1), cognitive disability (n = 1), traumatic brain injury (n = 1), and other health impairment (n = 1). [Note: two children had multiple diagnoses.]

Children's mean age was 4.39 years. Gender was equally represented (53% male, 47% female). Fifty-three percent (n = 60) of the children were White, 20% (n = 23) were African American, 12% (n = 14) Latinx, 5% (n = 6) other, 2% (n = 2) Asian, and 8% (n = 9) unknown. One student was a dual language learner but was proficient in English based on parent and teacher report. Children were primarily from low-income households. The median annual income was US$30,000, and 25% ($n$ = 29) of the mothers had completed an associate's degree or higher.

Measures

Teachers completed two self-report measures that assessed their TSE for specific students as well as children's learning behaviors. The Student-Specific Teacher Self-Efficacy Scale (SSTSES; Zee & Koomen, 2015) includes 25 items that assess TSE on a 7-point Likert-type scale (1 = *not at all able* to 7 = *completely able*). The SSTSES is adapted from Tschannen-Moran and Hoy's (2001) Teachers' Sense of Self-Efficacy Scale. Teachers rate their TSE when considering *individual children* in the following four domains: instructional strategies (six items; for example, "How well can you adjust your lessons to the proper level for [student]?"), behavior management (five items; for example, "How well can you get [student] to follow classroom rules?"), emotional support (seven items; for example, "How well can you provide a safe and secure environment for [student]?"), and student engagement (six items; for example, "How well can you get [student] to believe he or she can do well in schoolwork?"). Mean ratings for each domain were calculated. For our current sample, internal consistency at the fall time point was .93 for instructional strategies, .97 for behavior management, .95 for emotional support, and .97 for student engagement), which were consistent with Zee and Koomen's (2015) reported internal consistency statistics (α = .89 for instructional strategies, α = .94 for behavior management, α = .85 for emotional support, and α = .90 for student engagement).

The Preschool Learning Behaviors Scale (PLBS; McDermott et al., 2002, 2012) was used as a measure of children's learning behaviors. Teachers rate 29 children's behaviors on a 3-point Likert-type scale (0 = *doesn't apply* to 2 = *most often applies*); items correspond to three domains of learning behavior: competence-motivation, attention/persistence, and learning strategies. Competence-motivation items assess children's dependence on adults, a positive approach to learning tasks, and a willingness to tackle new classroom activities (12 items; for example, "Says task is too hard without making much effort to attempt it"). Attention/persistence items assess children's cooperation with a group, paying attention to the teacher, and persistence on activities (12 items; for example, "Pays attention to what you say"). Learning strategy items assess children's learning strategies, such as performing tasks in unacceptable ways and seeking help (eight items; "Follows peculiar and inflexible procedures in tackling activities"). After reversing applicable items, summed ratings for each domain were calculated following McDermott et al. (2002). McDermott et al. (2002) had high internal consistency (α = .85 for competence-motivation, .83 for attention/persistence, and .75 for learning strategies). Internal consistency for our current sample at the fall time point was .76 for competence-motivation, .88 for attention/persistence, and .58 for learning strategies.

Procedures

As part of the larger study, up to 10 children per ECSE classroom were selected to participate; specifically, up to six children with disabilities and up to four typically developing peers who met the inclusion/exclusion criteria were eligible to participate (more information on enrollment procedures can be found in Piasta et al., 2019). Because teachers were completing numerous measures for the larger study, it was not deemed feasible for teachers to complete the SSTSES and PLBS on every child participating in the larger study. Thus, teachers were requested to complete the SSTSES and PLBS on a random subsample of up to four students, including students with and without disabilities, who were participating in the larger study at both time points; teachers completed the measures on the same children at both fall and spring time points. In 16 classrooms, data were collected on four children (two with disabilities and two without). In 21 classrooms, data were collected on one to three children; of these, five and three classrooms provided data only on children with and without a disability, respectively. At the beginning of the year, teachers also completed a demographic questionnaire that provided data on teacher and classroom variables.

Analytic Plan

We used SPSS (Version 24; IBM Corporation, 2016), R (Version 3.2.4; R Core Team, 2019), and MPlus (Version 8; Muthén & Muthén, 1998–2017) for all analyses. There were no missing data at the teacher level, with a range of 2% to 9% missing at the child level in fall and 22% to 25% in spring. However, Little's missing completely at random (MCAR) test supported the assumption of data MCAR (p = .478). Accordingly, we used full-information maximum likelihood (FIML) to fit the latent-variable models (Enders & Bandalos, 2001) and Huber–White robust standard errors to account for clustering of students within classrooms and the small sample size. Our models were powered at .81 to examine effects of interest (Preacher & Coffman, 2006).

We began by examining descriptive statistics and correlations between our primary measures (i.e., four SSTSE and three PLBS subscales) from fall to spring. For each of these seven variables, we also examined and report effect sizes for mean differences in scores between students with and without disabilities. The first research question focused on the degree of variability in TSE ratings for individual students in teachers' classrooms. We used two approaches to answer this question. First, we calculated the intraclass correlation coefficient (ICC) for the four student-specific TSE subscales in fall and spring. Then, we calculated the classroom-based (i.e., within-teacher) standard deviation in student-specific TSE ratings for each teacher with multiple children in the sample.

To answer our second and third research questions, we fit separate predictive models for each of the four subscales of TSE (instructional strategies, behavior management, emotional support, and student engagement) from the three subscales capturing preschool children's learning behavior (competence-motivation, attention/persistence, and learning strategies), with child disability status and the percentage of students with IEPs in that classroom as additional predictors. We included percentage of students with IEPs as a control variable as classrooms varied from 11% to 64% on this variable and extant literature suggests that TSE is negatively influenced by teaching children with disabilities (e.g., Chung et al., 2005). In earlier predictive models, we also included dichotomized predictors for teacher level of education (beyond bachelor's degree vs. other), type of teaching certification (ECE vs. other), and teacher years of experience (11 or more years vs. fewer) as control variables because prior research has indicated that these variables may influence TSE (e.g., Tschannen-Moran & Hoy, 2007); however, none of the teacher variables were significant predictors in models for fall or spring and thus were not included in further analyses.

Prior to fitting the predictive models, we fit confirmatory factor analysis (CFA) models for fall and spring to both measures based on their theoretical factor structure (McDermott et al., 2002; Zee & Koomen, 2015). We assessed measurement invariance across the two time points for both measures. Measurement invariance tests whether the same latent construct is being measured from one time point to another, whereas structural invariance examines how latent factors are related over time (Millsap, 2011). If measurement invariance holds, tests for structural invariance can determine whether relations between latent variables are equal over time (Little, 2013; Sass & Schmitt, 2013); if measurement invariance does not hold, neither will structural invariance, making patterns of differences over time problematic to interpret.

Results

Preliminary Descriptive Findings

Mean ratings for each student-specific TSE and learning behavior domain are displayed in Table 1 as well as results of cluster-robust t tests assessing whether overall teacher ratings significantly differ between children with and without disabilities. Teachers reported higher levels of TSE in the domain of emotional support for children with and without disabilities across the school year, followed by behavior management, instructional support, and student engagement. There were statistically significant differences between children with and without disabilities in the mean TSE ratings across all four domains in fall; in spring, the differences were significant only for student engagement

Table 1. Intraclass Correlation Coefficients (ICC) and Results of Two-Sample *t* Tests[a] Examining Differences in Teacher Self-Efficacy and Preschool Learning Behaviors for Students With and Without Disabilities.

	Fall			Spring		
Domains & behaviors	SWD[b] *M* (*SD*)	SWoD[c] *M* (*SD*)	*T* (effect size)	SWD[b] *M* (*SD*)	SWoD[c] *M* (*SD*)	*T* (effect size)
Teacher self-efficacy domain						
SE	4.82 (1.48)	5.91 (1.01)	4.51*** (0.85)	5.36 (1.21)	6.22 (1.06)	3.48*** (0.75)
BM	5.27 (1.54)	5.94 (1.26)	2.51* (0.48)	5.75 (1.52)	6.30 (1.11)	1.92 (0.41)
ES	5.89 (1.11)	6.29 (0.81)	2.16* (0.41)	6.14 (0.97)	6.47 (0.54)	1.67 (0.36)
IS	4.83 (1.31)	5.73 (1.08)	3.91*** (0.74)	5.50 (1.24)	6.05 (1.07)	2.25* (0.48)
Children's learning behaviors						
AP	15.92 (4.73)	19.87 (4.23)	4.47*** (0.88)	16.44 (4.23)	20.17 (4.13)	4.10*** (0.89)
CM	16.67 (3.86)	19.60 (2.88)	4.33*** (0.85)	16.49 (3.16)	19.20 (3.76)	3.61*** (0.79)
LS	11.71 (2.62)	13.09 (1.94)	3.02** (0.59)	12.00 (2.75)	13.54 (2.57)	2.66** (0.58)

Note. All variables are based on scale recommendations of Zee and Koomen (2015) and McDermott et al. (2002) as described in results.
SWD = students with disabilities; SWoD = students without disabilities; SE = student engagement; BM = behavior management; ES = emotional support; IS = instructional support; AP = attention/persistence; CM = competence-motivation; LS = learning strategies.
[a]With cluster-robust standard errors. [b]Students with disabilities. [c]Students without disabilities.
*$p \leq .05$. **$p \leq .01$. ***$p \leq .001$.

and instructional support. In general, average student-specific TSE ratings were higher for students without disabilities. Both in fall and spring, the mean ratings for each of the preschool learning behavior domains differed significantly between children with and without disabilities; teacher ratings of learning behaviors were higher for children without disabilities.

Table 2 provides the correlation values between the domains of student-specific TSE and learning behaviors, which were moderate to high in fall and spring, although the pattern of associations between student-specific TSE and learning behavior domains were not the same across the two time points. Table 2 also provides the subscale correlations and "test–retest" reliabilities for student-specific TSE and learning behavior domains between fall and spring. Test–retest reliability values suggest moderate consistency in these measures over the course of an academic year and ranged from $r = .61$ to $r = .75$, with the exception of the children's learning behavior subscale for learning strategies ($r = .56$) and teachers' behavior management self-efficacy ($r = .58$).

RQ1: Variability of Student-Specific Teacher Self-Efficacy Within Classrooms

The first research question focused on the degree of variability in TSE ratings for individual students in their classrooms. We partitioned total variability into between- and within-teacher variation through the ICC for the four domains on SSTSES for fall and spring. ICCs represent proportion of total variability that is due to between-teacher differences, with 1—ICC representing within-teacher differences. In fall, within-teacher variability ranged from 80.72% to 94.91% for the student engagement, behavior management, and instructional support subscales and was lowest at 48.34% for emotional support self-efficacy. In spring, the within-teacher variability was large for all subscales and ranged from 63.41% (instructional support) to 73.70% (behavior management). These values suggest that while differences in ratings between teachers are evident, individual teachers are reporting varying degrees of TSE for students in their classrooms.

As an additional approach to examining variability in TSE ratings for individual teachers, we calculated the standard deviations *within teachers* for the student-specific TSE ratings for each teacher with multiple participating children in their classroom; three teachers were not included because they had only one child in the sample. Teacher-specific boxplots comparing the distribution of TSE scores across teachers indicated sufficient variability to conclude that teachers were not rating the students in their classrooms in a consistent fashion. The average classroom-based standard deviations were greater in fall than in spring (fall average *SD*s = 1.02, 1.17, .52, and .96 vs. spring average *SD*s = .80, .85, .41, and .79 for Student Engagement, Behavior Management, Emotional Support, and Instructional Support, respectively). Based on this dispersion data, there is evidence that teachers' feelings of self-efficacy vary based on the children they are rating within their classrooms.

RQ2: Relation Between Teacher Self-Efficacy and Child Characteristics

We addressed our second research question by examining the relation between teacher ratings for student-specific

Table 2. Overall Correlations Between PLBS and SSTSES Subscales for Fall and Spring.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. AP Fall	1													
2. CM Fall	.77	1												
3. LS Fall	.63	.60	1											
4. AP Spring	.75	.69	.58	1										
5. CM Spring	.57	.63	.46	.78	1									
6. LS Spring	.49	.51	.56	.68	.64	1								
7. SE Fall	.74	.54	.36	.56	.47	.38	1							
8. ES Fall	.54	.45	.36	.40	.39	.32	.69	1						
9. BM Fall	.74	.46	.45	.56	.34	.40	.77	.67	1					
10. IS Fall	.62	.43	.27	.44	.39	.28	.82	.70	.64	1				
11. SE Spring	.57	.51	.41	.72	.70	.56	.67	.53	.56	.56	1			
12. ES Spring	.41	.40	.45	.58	.51	.58	.51	.58	.46	.45	.83	1		
13. BM Spring	.49	.41	.43	.63	.40	.54	.52	.47	.66	.40	.76	.76	1	
14. IS Spring	.44	.37	.40	.56	.55	.50	.60	.50	.47	.61	.88	.78	.67	1

Note. AP, CM, and LS are PLBS subscales; SE, BM, ES, and IS are SSTSES subscales. All variables are based on scale recommendations of Zee and Koomen (2015) and McDermott et al. (2002) as described in results. Shaded regions on diagonal are test–retest correlations; shaded regions in box are correlations between PLBS and SSTSES subscales in fall and spring, respectively. All correlations are significant at $\alpha = .01$ level. PLBS = Preschool Learning Behaviors Scale; SSTSES = Student-Specific Teacher Self-Efficacy Scale; AP = attention/persistence; CM = competence-motivation; LS = learning strategies; SE = student engagement; BM = behavior management; ES = emotional support; IS = instructional support.

TSE and children's learning behaviors. Prior to fitting these predictive models, we used CFA to examine the structure of our fall data relative to scale recommendations of Zee and Koomen (2015) for the SSTSES scales and McDermott et al. (2002) for the PLBS.

Factor structure of SSTSES. Confirmatory factor models indicated similar structure to the four domains identified by Zee and Koomen (2015). Model fit was assessed against several criteria: robust Tucker–Lewis index (TLI) > .90 (Hu & Bentler, 1999; Sharma et al., 2005), robust root mean square error of approximation (RMSEA) < .08 (MacCallum et al., 1996), and standardized root mean square residual (SRMR) < .08 (Hu & Bentler, 1999). According to these guidelines, SRMR was adequate (SRMR = .064), but RMSEA was higher and TLI was lower than desired (RMSEA = .119, TLI = .865). Sharma et al. (2005) noted poor performance of cutoff indices for the TLI for small samples. Given that factor loadings were high and internal consistency of the four subscales was strong, we retained the recommended factor structure for the student-specific TSE with no modifications. We used multiple-groups CFA to examine measurement invariance over time for the SSTSES. We were able to confirm configural (dimensionality structure), metric (equality of factor loadings), and scalar (construct interpretation) invariance over time ($p > .05$ for all comparisons).

Factor structure of PLBS. A confirmatory model for the PLBS based on domains suggested by McDermott and colleagues (2002, 2012) failed to converge. Thus, we made modifications. The factor structure and scoring system according to McDermott's original PLBS included four items with cross-loadings. To address the convergence problem, items were loaded on the single factor for which it shared the strongest loading. This modification resulted in the loss of one item from competence-motivation and three items from learning strategies. CFA model fit indices based on these modified scales were lower than desired according to the guidelines noted above, with robust RMSEA = .101, SRMR = .111, and robust TLI = .633. Factor loadings were strong and significant for the attention/persistence and competence-motivation subscales but weaker for learning strategies. Correlations between the original McDermott approach and the modified scales were all > .90. Similar to SSTSES above, we used multiple-groups CFA to assess measurement invariance over time for the PLBS. We were able to confirm partial invariance ($p > .05$), allowing three items out of the 28-item total for the measure to exhibit noninvariance. This amounts to only 11% of the loadings, well below the 20% threshold suggested by Dimitrov (2010).

Relational models. Given the small sample size, our structural equation models (see Figure 1) failed to converge. The measurement invariance results supported the similar meaning for the measures from fall to spring. Thus, we fit predictive models for the four domains of SSTSES for both fall and spring. Predictors of SSTSES included child disability status and children's learning behaviors—our variables of interest—and percentage of children with IEPs enrolled in

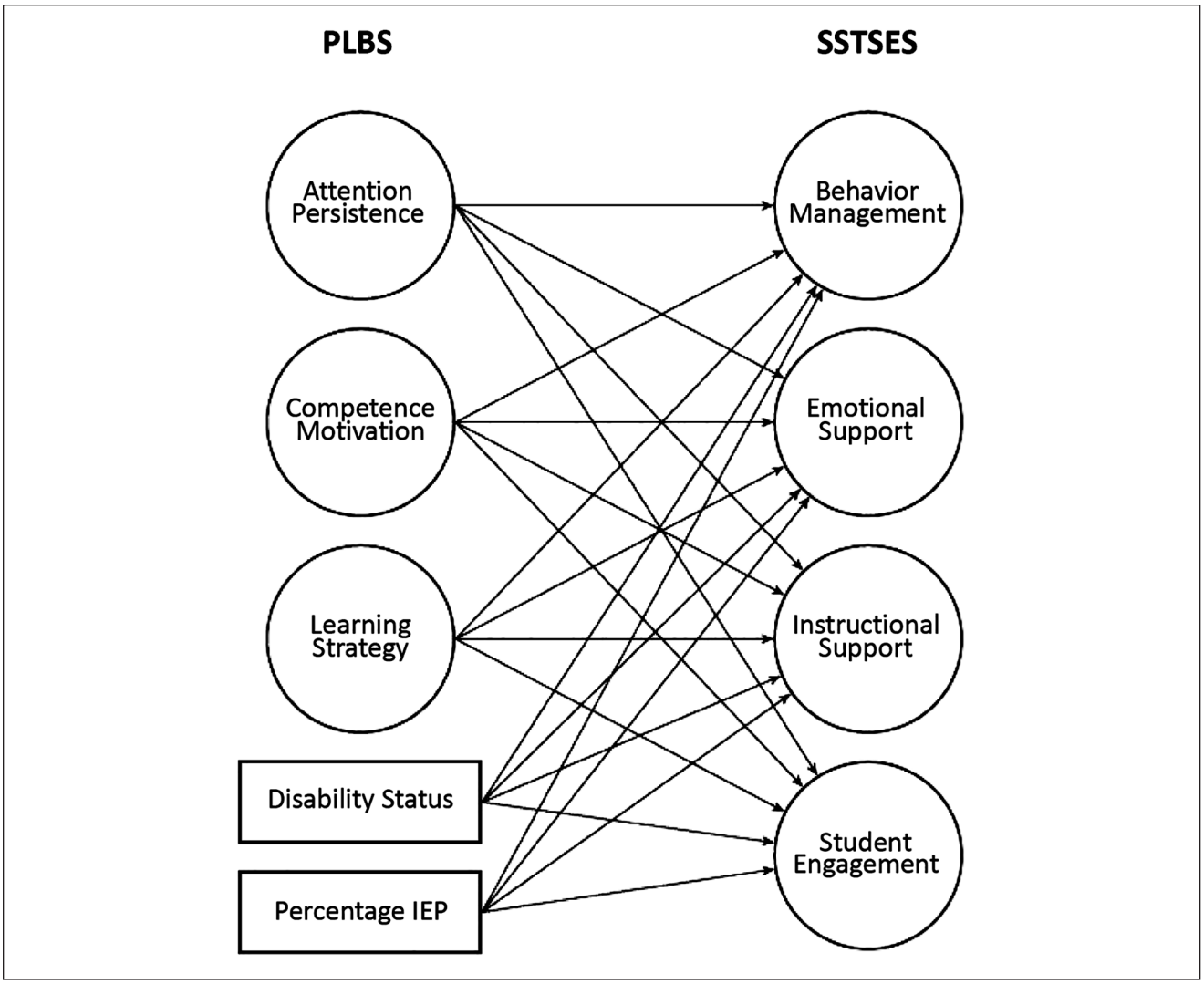

Figure 1. SEM model for child characteristics and domains of PLBS predicting domains of SSTSES.
Note. SEM = structural equation modeling; PLBS = Preschool Learning Behaviors Scale; SSTSES = Student-Specific Teacher Self-Efficacy Scale; IEP = Individualized Education Program.

the classroom (% IEP) to capture the range of inclusive classroom compositions.

Table 3 contains the unstandardized and standardized results for fall (top) and spring (bottom) for each of the four SSTSES domains. In fall, student-specific TSE in student engagement was significantly lower for children with disabilities than for children without disabilities. As classroom percentage of children with IEPs increased, TSE for emotional support increased. Teacher ratings on student competence-motivation were a significant but negative predictor of TSE for behavior management. After adjusting for other variables in the model, only attention/persistence showed a positive and significant relation to TSE for all domains: behavior management, emotional support, instructional support, and student engagement.

In spring, children's disability status had no relation with any TSE domain. Classroom percentage of children with IEPs was significantly and positively related to TSE for emotional support. Attention/persistence was positively related to TSE in behavior management and student engagement and negatively related to TSE in emotional support. Similar to fall, teacher ratings on student competence-motivation were negatively related to TSE in behavior management. Teacher ratings on learning strategies were positively related to TSE in emotional support.

RQ3: Stability of Relations From Fall to Spring

Our third research question focused on whether the relations between child characteristics and TSE remained

Table 3. SEM Regression Path Coefficients (Unstandardized and [Standardized]) Between Student Characteristics and Student-Specific TSE in Fall (Upper) and Spring (Lower).

	BM		ES		IS		SE	
	Estimate (*SE*)	β[a]	Estimate (*SE*)	β	Estimate (*SE*)	β	Estimate (*SE*)	β
Fall								
Disability status	0.107 (.181)	0.04	−0.098 (.169)	−0.05	−0.330 (.205)	0.14	**−0.373*** (.188)	−0.14
% IEP	0.452 (.406)	0.07	**0.999**** (.328)	0.24	0.506 (.382)	0.10	0.598 (.416)	0.11
AP	**0.284**** (.031)	0.97	**0.093**** (.025)	0.47	**0.171**** (.036)	0.68	**0.209**** (.035)	0.77
CM	**−0.115** (.047)*	−0.26	0.035 (.038)	0.12	−0.031 (.049)	−0.08	−0.027 (.049)	−0.07
LS	−.014 (.060)	−0.02	−0.028 (.054)	−0.05	−0.115 (.060)	−0.16	−0.086 (.056)	−0.11
Spring								
Disability status	−0.017 (.230)	−0.01	0.165 (.180)	0.09	0.052 (.248)	0.02	−0.213 (.223)	−.09
% IEP	0.869 (.505)	0.17	**0.844**** (.325)	0.23	0.753 (.463)	0.16	0.736 (.485)	0.15
AP	**0.218**** (.037)	0.78	**−0.083**** (.028)	0.41	0.079 (.043)	0.31	**0.124**** (.036)	0.47
CM	**−0.117*** (.052)	−0.29	0.015 (.038)	0.05	0.092 (.059)	0.25	0.083 (.049)	0.21
LS	0.097 (.064)	0.14	**0.173**** (.058)	0.33	0.088 (.069)	0.13	0.063 (.064)	0.09

Note. AP, CM, and LS are PLBS subscales, with CM and LS subscales modified from original factor structure as described in results. SE, BM, ES, and IS are SSTSES subscales. SEM = structural equation modeling; TSE = teacher self-efficacy; BM = behavior management; ES = emotional support; IS = instructional support; SE = student engagement; IEP = Individualized Education Program; AP = attention/persistence; CM = competence-motivation; LS = learning strategies; SSTSES = Student-Specific Teacher Self-Efficacy Scale.

[a]*b** is standardized coefficient.

*$p \leq .05$. **$p \leq .01$.

consistent from fall to spring of the academic year. Based on correlational analyses and results of the separate predictive models above, there was evidence of some changes in the relation between SSTSES and PLBS from fall to spring. We tested for measurement invariance over time for each of the two measures prior to fitting the predictive models. As noted above, we were able to confirm measurement invariance for SSTSES and partial invariance for the PLBS; however, given convergence issues, we were unable to test for structural invariance over time. As structural equality over time could not be confirmed, the patterns of relations between child characteristics and student-specific TSE should be carefully considered separately for fall and spring.

Discussion

The current study extends the literature on TSE in several key ways. We examined TSE of teachers in inclusive ECSE classrooms, which is a population that has been underrepresented in the literature. In addition, we examined the relations between student-specific TSE and children's characteristics, namely, disability status and children's learning behaviors, which is an area that has not yet been investigated. We discuss two primary findings that generally aligned with our hypotheses. First, teachers had varying levels of TSE for individual children within classrooms, with more variation evident in the fall. Second, children's characteristics were related to TSE. Specifically, disability status was significantly related to student-specific TSE but only in the fall for student engagement. In regard to learning behaviors, attention/persistence was the most consistently related to student-specific TSE, and relations were found in both fall and spring; some relations between TSE, competence/motivation, and learning strategies were also found.

Variability of Teacher Self-Efficacy

As was hypothesized, and in alignment with findings of Zee and colleagues (2016), teachers' feelings of TSE varied for individual children within their classrooms, with greater variation occurring in fall than in spring for all of the domains. Furthermore, teachers reported higher levels of TSE in spring compared with fall. Taken together, these findings emphasize the dynamism of TSE. By the end of the school year, teachers may be well-versed in how to meet the needs of individual children in their classrooms and feel more efficacious in meeting different needs across the spectrum of classroom responsibilities (i.e., instruction, behavior management, student engagement, and emotional support). Bandura (1997) posited that TSE is influenced by mastery and vicarious experiences, social persuasion, and physiological states. As the academic year progressed, teachers' self-efficacy may have crystallized as a result of personal successes with children (mastery experiences); opportunities to learn from others, such as specialists who provided classroom support (vicarious experiences); receiving positive messages about their teaching from students, colleagues, and parents (social persuasion); and experiencing numerous enjoyable teaching moments (physiological state).

Relation Between Children's Characteristics and Student-Specific Teacher Self-Efficacy

TSE differed in relation to children's characteristics but to a more limited degree than hypothesized. Descriptive findings revealed that teachers had lower TSE for children with disabilities than for children without disabilities in both fall and spring. However, once controlling for classroom composition and children's learning behaviors, children's disability status was only related to student engagement in fall. In regard to children's learning behaviors, children's attention/persistence showed the most consistent relation to TSE although children's learning strategies and competence/motivation showed some associations with TSE.

Disability status. Overall, teachers rated themselves as less efficacious with children with disabilities than children without disabilities. This pattern was initially found for all TSE domains in fall and for instructional strategies and student engagement in spring. Yet, after controlling for the percentage of children with IEPs and children's learning behaviors, only one relation between TSE and disability status remained. In fall only, teachers rated themselves as less efficacious in engaging students who had disabilities than children without disabilities. This finding aligns and extends the results indicated by Chung and colleagues (2005) who found that ECE teachers who taught one or more children with disabilities had lower TSE than the full sample of ECE teachers, including teachers who taught only children without disabilities. Our finding shows that it is not simply a matter of differences between teachers, which could not be ruled out by the design used by Chung and colleagues. That is, it is not necessarily that ECE teachers who do and do not teach children with disabilities have different levels of TSE, but that individual teachers have differential levels of efficacy for children with and without disabilities.

It is noteworthy that once we considered classroom composition and children's learning behaviors, the differences in TSE for children with and without disabilities diminished and only the difference in student engagement remains. Engaging students has been shown in prior studies to be the domain in which teachers feel the least efficacious (Tschannen-Moran & Hoy, 2007; Tschannen-Moran & Johnson, 2011). In addition, children with disabilities, on average, demonstrated significantly fewer learning behaviors than children without disabilities, a pattern that has been found in other studies (e.g., Schaefer et al., 2004). As such, teachers may find it initially more challenging to engage students with disabilities. However, as teachers spend more time with children over the course of the year, disability status does not remain a salient characteristic related to their TSE.

Student-specific TSE did not significantly differ for the other three domains of TSE in fall or for any of the domains in spring as related to children's disability status. We conjecture that this may be because this sample of teachers was moderately to very experienced; all teachers had taught at least 3 years, with 62% of teachers having 11 or more years of experience. Less experienced teachers often have lower TSE than more experienced teachers (e.g., Klassen & Chiu, 2010). Perhaps teachers whose TSE differs more dramatically based on children's disability status may be less apt to remain teaching in inclusive environments for an extended number of years.

Learning behaviors. Children's attention/persistence was consistently related to TSE, whereas competence-motivation and learning strategies showed fewer associations to TSE. While no prior studies have examined whether children's learning behaviors predict TSE, previous findings indicate that TSE predicts children's learning behaviors (Reyes et al., 2012; Rhoad-Drogalis et al., 2018; Ross et al., 2001). In regard to attention/persistence, Rhoad-Drogalis and colleagues (2018) found that preschool children had higher levels of attention/persistence when they were enrolled in classrooms where teachers had higher TSE.

It may be that teachers use children's visible learning behaviors, such as observing the degree to which children are paying attention and persisting in tasks, as a source of input that may influence their self-efficacy. According to Bandura's (1997) theory, social persuasion encompasses evaluative feedback from others. The degree to which students are attentive and completing tasks is likely a critical feature for teachers when assessing their self-efficacy. Learning strategies are also visible behaviors, and they relate to TSE in emotional support but only in spring. It is unclear why learning strategies only relates to one domain of TSE and only later in the school year. It may be that teachers believe that children's learning strategies at the beginning of the year are a result of a new classroom environment for the child; for instance, a teacher may reason that a child who asks for help a lot may do so because of feelings of insecurity with a new teacher and in a new classroom. Hence, teachers may view these behaviors as more malleable, and their self-efficacy could be less affected by children's learning strategies.

In both fall and spring, teachers reported lower self-efficacy for managing the behavior of children who were perceived as more competent or motivated. This negative relation is surprising and difficult to interpret. It is unknown whether these children were engaging in more challenging behavior and as such were more difficult for teachers to manage their behavior.

Limitations and Future Research Directions

Several limitations regarding the sample require mention. The sample size of teachers was small, limiting generalizability of findings. The teachers in this study were

moderately to very experienced. It is of interest to examine whether the same results would emerge if novice teachers were included in the sample, especially as studies indicate that less experienced teachers have lower TSE than more experienced teachers (e.g., Klassen & Chiu, 2010). In addition, children with severe disabilities were not represented. Furthermore, due to the small sample and missing data related to specific *type* of child disability, we were constrained to globally examine differences in student-specific TSE based on whether a child did or did not have a disability. Clearly, children with disabilities are not homogeneous; children with different types of disabilities have unique characteristics and needs. Thus, future research could consider whether and how TSE varies with different populations of children with disabilities (e.g., autism spectrum disorder), including children with more severe disabilities.

Other limitations pertain to measurement procedures. We used teacher report to measure both TSE and children's learning behavior, which is problematic because of shared variance (Hartz et al., 2017). Future research should include observations of children's behavior. In addition, as noted earlier, the PLBS psychometrics were slightly concerning, specifically for the learning strategies domain. PLBS items were highly intercorrelated, with the original suggestion for the scales based on some items being used twice on different scales (McDermott et al., 2002). Our analyses confirmed only partial invariance for the PLBS scales. While the number of items indicating invariance were within acceptable limits (Dimitrov, 2010), future research should consider how to more accurately measure children's learning behaviors. One solution may to be to consider the PLBS as one scale. Internal reliability for the total scale was strong for the full sample ($\alpha = .89$) and for the subsamples ($\alpha = .88$ and .87 for children with and without disabilities, respectively). Finally, we did not modify the SSTSES, which was developed and previously used with school-age teachers. Although internal reliability for each subscale was very high (.93–.97), indicating that the items in each subscale were assessing the same construct (e.g., instructional support), we cannot assume that all items were equally ecologically valid in inclusive ECSE classrooms. Further work should be done to validate the measure in a variety of early childhood settings.

Although we have conjectured why these characteristics of children influence (or do not influence) TSE at different points in the year, this clearly is an area for future research exploration. Conducting follow-up interviews would shed light on why teachers feel more self-efficacious with some students than others. Investigators could probe the ways in which the sources of self-efficacy framed by Bandura (1997; for example, mastery and vicarious experiences) influence TSE. In addition, other sources of self-efficacy could be considered, such as teacher–student relationships. Teacher–student relationships are important for TSE (Mashburn et al., 2006; Spilt et al., 2011; Zee et al., 2017). As teacher–student relationships are related to children's disability status (Demirkaya & Bakkaloglu, 2015) and their learning behaviors (O'Connor et al., 2011; Rhoad-Drogalis et al., 2018), future research could also examine the degree to which teacher–student relationships interact with children's characteristics to influence TSE.

Implications for Practice

Given that TSE is related to improved teacher and child outcomes (e.g., Zee & Koomen, 2016), it is important to help teachers feel self-efficacious with the diverse students who are enrolled in their classrooms. Feeling a part of a supportive learning community can promote teachers' self-efficacy (Takahashi, 2011). As noted by Hoy and Burke-Spero (2005), preservice teachers have an existing support system in their teacher preparation program, but the availability of a support structure for inservice teachers is less consistent. In addition, increasing teachers' skills through high-quality professional development is related to enhanced TSE (Morris et al., 2017). Thus, developing structures in schools, such as professional learning communities, whereby teachers can deepen their pedagogical knowledge in a supportive environment would likely have effects on their TSE. As an example, Takahashi (2011) found that teachers felt more self-efficacious about instructional practices when they participated in a community of practice with their colleagues. Teachers could help each other monitor their feelings of TSE and collectively discuss strategies to improve skills and confidence in areas in which they felt less self-efficacious. For instance, in the current study, teachers felt less efficacious in engaging students with disabilities and with children who were less attentive/persistent. Teachers could collectively discuss ways in which to increase student engagement, which promotes more attentive/persistent behavior. Teachers can increase children's active engagement in instruction through routinely embedding opportunities for children to respond and differentiating instruction through ensuring that activities are well-suited to children's skills and offering children choice in instructional activities (e.g., Kern & Clemens, 2007; Shogren et al., 2004).

Conclusion

This study builds on and extends prior work showing that TSE is a nuanced construct. Teachers have different feelings of self-efficacy depending on the domain being measured and the characteristics of the children that they are teaching. By better understanding contextual factors, targeted preservice and in-service training can be developed

to enhance TSE. Increasing TSE has important implications for retaining a satisfied workforce and optimizing student outcomes.

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