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Exploring factors related to preschool teachers' self-efficacy

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ABSTRACT

This study examined how teacher (teaching experience, perceptions of teacher collaboration and teacher influence) and classroom (children's engagement) characteristics predicted teacher self-efficacy for 48 preschool teachers in the U.S. Results showed a significant interaction effect between teachers' perceptions of collaboration and children's engagement in predicting teachers' reported self-efficacy. Specifically, a higher level of children's engagement was associated with a higher level of teacher self-efficacy when teachers worked in preschool with high levels of staff collaboration. Teacher experience and influence in decision-making were not related to teacher self-efficacy. Implications for early childhood teacher education and professional development are discussed.

Federal and state governments invest considerable public funds in preschool programs within the United States (Barnett & Yarosz, 2004), as high-quality preschool programs are related to positive developmental outcomes of young children and their future school success (e.g., Mashburn et al., 2008; Meisels, 2006; NICHD-ECCRN, 2002). Many other countries also have recognized the critical need for an increased investment in preschool education, including China, India, Brazil, Indonesia, and Turkey. For example, China has already invested more than (the equivalent of) $625,000,000 to enroll over 22,000,000 children, aged 3–6 years, in preschool education (Levine, 2005). Despite this increasing investment, recent reports suggest that as many as one-third of U.S. preschool programs are of very low quality (LoCasale-Crouch et al., 2007), a trend that has also been observed outside of the U.S. For instance, the quality of preschool education in Turkey is also not satisfactory (Atay-Turhan, Koc, Isiksal, & Isiksal, 2009). To address this, a great deal of attention is being given to attracting and retaining quality preschool teachers in various countries (Atay-Turhan et al., 2009; Barnett, 2003; Darling-Hammond, 2000; Vecchiotti, 2001). For instance, policymakers in the U.S. have established qualification standards for teachers employed within preschool programs to ensure that children are receiving high-quality experiences (Barnett, 2005; School Readiness Act, 2005). No Child Left Behind legislation defines "highly qualified" teachers as having a bachelor's degree, meeting state licensing or certification standards, and demonstrating competence in the content they teach.

Yet, teachers' qualifications, academic major, and general credentials are not consistently linked to improved classroom quality or children's academic achievement (Early et al., 2006, 2007; Justice, Mashburn, Hamre, & Pianta, 2008; LoCasale-Crouch et al., 2007). One preschool teacher characteristic that has been associated with higher quality classroom instruction and increased child achievement, however, is teacher's sense of self-efficacy (Justice et al., 2008; Guo, Piasta, Justice, & Kaderavek, 2010). Specifically, preschool teachers' self-efficacy was a significant predictor of classroom quality and children's gains in literacy; moreover, teachers' self-efficacy significantly interacted with classroom quality in predicting children's gains in language. Self-efficacy refers to teachers' beliefs that they can bring about desirable changes in pupils' behavior and achievement. Given the apparent value of preschool teachers' sense of efficacy, it is surprising that research examining teachers' sense of efficacy remains limited. Theoretical models of self-efficacy posit that self-efficacy is context-specific and indicate that teacher self-efficacy can be influenced and shaped by a number of contextual variables in school settings (Bandura, 1986). Such contextual variables may include both (a) teacher characteristics, such as teaching experience and sense of community (e.g., Guo et al., 2010; Hoy & Woolfolk, 1993; Lee, Dedrick, & Smith, 1991; Moore & Esselman, 1992; Rosenholtz, 1989), and (b) classroom characteristics, such as children's engagement (e.g., Raudenbush, Rowan, & Cheong, 1992; Ross, Cousins, & Gadalla, 1996).

As teacher self-efficacy is positively related to high-quality teaching practices and children's achievement, it is important to understand contextual factors which may influence self-efficacy

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beliefs. The purpose of the present study was to further examine the relations between characteristics of specific teachers and classrooms and preschool teachers' self-efficacy.

1. Teacher self-efficacy

As the core of social cognitive theory, the concept of self-efficacy refers to an individual's judgment of his/her capability to perform actions at the designated level (Bandura, 1997). Individuals who believe that they will be successful on a given task are more likely to achieve desired results because they allocate substantial effort, persist in the face of setbacks, and develop coping mechanism for managing any negative events (Bandura, 1986, 1997). Self-efficacy is not a global disposition, but is context-specific; the same individual's level of self-efficacy varies from context to context (Bandura, 1986). Furthermore, as presented in social cognitive theory, personal factors and the context interact to influence each other through the process of reciprocal determination (Bandura, 1986, 1997).

In the field of education, teacher self-efficacy is defined as a "teacher's belief in his or her own capability to organize and execute courses of action required to successfully accomplishing a specific teaching task in a particular context" (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998, p. 233). This definition reflects the context-specific feature of self-efficacy. Specifically, the self-efficacy of a teacher may be speculated to vary across different classrooms, as different classes often vary in size and the composition of students. Thus, it is important to examine the relations of teacher characteristics and classroom context to teachers' self-efficacy (Tschannen-Moran et al., 1998).

2. Factors associated with teacher self-efficacy

2.1. Teaching experience

Previous researchers have suggested that differences in teacher characteristics may affect teachers' sense of efficacy. Teaching experience may be one teacher characteristic that is related to teacher self-efficacy, but findings have been inconsistent. Some researchers have found a positive relation between teacher self-efficacy and teaching experience among preschool, primary, and secondary teachers (e.g., Cheung, 2008; Hoy & Woolfolk, 1993; Wolters & Daugherty, 2007). For instance, within U.S. educational research, Wolters and Daugherty (2007) found that preschool through 12th grade teachers with more years of teaching experience reported higher levels of efficacy. Similarly, in China, Cheung (2008) found that for both Hong Kong and Shanghai elementary school teachers, longer teaching experience was a significant predictor of higher teacher efficacy. However, other previous studies have failed to demonstrate the positive relation between teaching experience and teacher self-efficacy (e.g., Ghaith & Yaghi, 1997; Greenwood, Olejnik, & Parkay, 1990; Guo et al., 2010). For instance, Guo et al. (2010) reported that having more years of preschool teaching experience was negatively related to teachers' sense of efficacy. Thus, due to these contradictory findings, the direct relation between teaching experience and sense of efficacy requires further investigation, particularly for preschool teachers as this group has rarely been studied in the literature. The present study thus assessed the relation between preschool teachers' teaching experience and their sense of efficacy.

2.2. Teachers' sense of community

Teachers' sense of community includes two dimensions: teacher collaboration (e.g., the level of staff collaboration) and teacher's influence in the decisions (e.g., the level of teacher power or influence in decision-making process). Studies show that teacher self-efficacy is associated with both dimensions of teachers' sense of community (e.g., Hoy & Woolfolk, 1993; Moore & Esselman, 1992; Raudenbush et al., 1992; Shachar & Shmuelevitz, 1997). For example, Raudenbush et al. (1992) reported that high school teachers in U.S. who work in highly collaborative schools have an elevated sense of efficacy. Shachar and Shmuelevitz (1997) also found that for high school teachers in Israel, a more developed level of collaboration among teachers was associated with teachers' increased sense of efficacy. Further, Moore and Esselman (1992) found that teachers in U.S. who had a greater influence in a school-based decision-making had a higher level of self-efficacy. These researchers argued that higher levels of staff collaboration and higher levels of teacher control over decision-making could allow teachers to cope more effectively with difficulties in teaching and thereby promote their level of efficacy.

Teacher collaboration and teacher influence in decision-making appear to be particularly important in the preschool setting, given that these two variables have been suggested to be related to preschool teachers' positive attitude, classroom quality, and children's achievement (Guo, Kaderavek, Piasta, Justice, & McGinty, in press; McGinty, Justice, & Rimm-Kaufman, 2008). However, the relation between these two dimensions of sense of community and preschool teachers' sense of self-efficacy seems to be unexplored in the literature and thus is an aim of the current study.

2.3. Children's engagement

In addition to teacher characteristics, classroom characteristics, such as children's engagement, are likely to affect teachers' efficacy. In fact, the importance of children's engagement has strong theoretical underpinnings (Bandura, 1997) and is supported in empirical work concerning secondary teachers (Newman, Rutter, & Smith, 1989; Raudenbush et al., 1992; Ross et al., 1996). According to sociocognitive theory, mastery experiences have been repeatedly identified as a powerful source in fostering teacher self-efficacy (Bandura, 1997). One measure of mastery experiences is engaging students in classroom lessons. Therefore, teachers' sense of efficacy is strengthened substantially when they perceive that students are highly engaged in class activity. Ross et al. (1996) found that secondary teachers in Canada reported higher levels of efficacy when classes were composed of highly engaged students. In the U.S., researchers also found that secondary school teachers with highly engaged students reported higher levels of efficacy, as compared to teachers with less engaged students (Newman et al., 1989). For the purpose of this paper, we examined the relation between preschool children's engagement and preschool teachers' self-efficacy.

When investigating the association between classroom characteristics and teachers' sense of efficacy, it is important to examine the potential interaction effects among classroom and teacher characteristics. Raudenbush et al. (1992) refer to these as "setting-by-teacher" interaction effects in which the effects of classroom characteristics on teacher self-efficacy are moderated by teachers' personal characteristics. Raudenbush et al. found that the interaction between student academic achievement at the classroom level and teachers' disciplinary specification significantly predicted teachers' self-efficacy; specifically, teachers reported higher self-efficacy in classrooms composed of high achieving students, but this effect was pronounced for math and science teachers and less pronounced for English and social studies teachers of high achieving students. Such findings are important because they suggest not only the importance of classroom characteristics in shaping teachers' self-efficacy, but also the mechanism by which

classroom characteristics exert influence on teachers' self-efficacy (i.e., through their association with teacher characteristics).

In the present study, we investigated three kinds of classroom-by-teacher interactions. The first was the interaction between children's engagement and teachers' experience, whereas the second and third were the interactions between children's engagement and teachers' perceptions of teacher collaboration and decision-making influence, respectively. Previous researchers have suggested that preschool teachers' teaching experience is a significant predictor of classroom quality in the U.S. (e.g., Pianta et al., 2005). Teachers' collaborations and influence have been identified as powerful predictors of classroom instruction (Bird & Little, 1985; Cohen, 1981; Little, 1982, 1990; Marks & Louis, 1997; McGinty et al., 2008). Thus, we speculated that more teaching experience and higher level of teacher influence and collaboration may enable teachers to cope better with difficult situations associated with teaching poorly-engaged children, thus reducing the typical negative effects of low level of children's engagement on teachers' self-efficacy.

3. Summary and study aims

Policymakers, early childhood practitioners, and researchers have suggested that efforts are needed to improve the quality of preschool education for young children and to ensure the quality of preschool teachers (Barnett, 2003; Darling-Hammond, 2000; Vecchiotti, 2001). Previous studies have established the importance of preschool teachers' self-efficacy to classroom quality and to fostering children academic achievement (Guo et al., 2010; Justice et al., 2008). Therefore, better understanding of those factors that influence self-efficacy may be crucial to ensuring the quality of preschool teachers. Identifying attributes of teachers and classrooms that are linked to teacher self-efficacy will provide valuable information to efforts to develop tailored and innovative approaches to increase teacher self-efficacy. However, to our knowledge, very little research has examined the factors associated with preschool teachers' self-efficacy. To fill this critical gap in the literature, we examined teacher and classroom factors associated with preschool teachers' self-efficacy, when controlling for teacher demographics (i.e., gender, race, education level). Two research questions guided our investigation.

(1) Does teaching experience, perceptions of sense of community (i.e., teacher collaboration and decision-making influence), and children's engagement predict preschool teachers' self-efficacy? We hypothesized that teachers' teaching experience, perception of sense of community, and children's engagement would all have positive and significant relations with teachers' self-efficacy.
(2) Are there classroom-by-teacher interactions? Specifically, does the relation between children's engagement and teacher self-efficacy depend upon the characteristics of teachers (teaching experience and sense of community)? We hypothesized that the relation between children's engagement and teacher self-efficacy would be significantly moderated by characteristics of teachers.

4. Method

4.1. Participants

Participants were 48 preschool teachers in 38 preschool centers who were enrolled in a larger study of preschool instructional practices. Centers were affiliated with Head Start ($n = 27$) and state-funded pre-K/Title I ($n = 11$). Within the U.S., Head Start is an early education program sponsored by federal government to reduce socio-economic disparity in school readiness (U.S. Department of Health & Human Services, 2005). State-funded pre-K/Title I is a state-funded prekindergarten program that targets children who exhibit the elevated risk of school failure due to poverty. Similar to Head Start, the primary goal of these state-funded program are to improve the learning and school readiness of young children (Barnett, Lamy, & Jung, 2005). In general, children who participate in such preschool programs are considered to be "at risk".

4.2. Measures

Teachers participated in a series of activities over the entire academic year to achieve the purposes of the larger study. We describe the procedures relevant to the current study. In the fall of the academic year, teachers completed a portfolio of questionnaires, which included questionnaire items tapping teachers' demographics including teachers' gender, race, educational attainment and total years of teaching experience, their sense of self-efficacy, and their perceptions of school community (teacher collaboration and influence at school). In the fall and spring of the academic year, a systematic observation was conducted in each classroom to assess the quality of teacher-child interactions, including the level of children's engagement.

4.3. Demographic questionnaire

The information about teaching experience and other demographic variables (gender, race and education level) was obtained from a general teacher questionnaire capturing information about each teacher. Teachers reported an average of 11.54 years (SD = 7.26) of teaching experience, the majority of which was in preschool classrooms ($M = 9.47$ years, SD = 6.70). To measure teacher education level, each teacher answered the question, "What is the highest level of education you have completed?" and chose among 11 options. This education category was recoded to document if a teacher did (1) or did not (0) have a Bachelor's degree. 56% of the teachers in the current study had a Bachelor's Degree or above and 44% had associate degree or high school diploma. With respect to teacher gender, the majority of teachers was female (96%) although there were two males (4%). In terms of race and ethnicity, 67% of teachers was Caucasian, 22% was Black, 2% was Native American, 5% was Hispanic/Latino and 4% was multiracial. This sample has been described in other papers (see Guo, Justice, Kaderavek, & McGinty, in press). For the data analysis, the variable of teacher gender was dummy-coded (1: female and 0: male). The variable of teacher race was divided to three dummy-coded variables (Black versus White; Hispanic/Latino versus White; Other race versus White).

4.4. Teacher self-efficacy questionnaire

A 20-item version of the Teacher Self-Efficacy Scale (TSES; Bandura, 1997) was used to examine teachers' sense of efficacy. This questionnaire assessed teachers' instructional and disciplinary self-efficacy as well as their efficacy to create a positive school climate. Items included questions such as "How much can you do to increase students' memories of what they have learned?" and "How much can you do to get children to follow classroom rules?" The response scale ranged from "Nothing" (score of 1) to "A great deal" (score of 5). The internal consistency reliability (alpha) for the questionnaire items was 0.9. Teachers' responses to all items were averaged to create a self-efficacy score for analyses, with a possible range of 1–5. Descriptive data from the TSES indicated that teachers' perceptions

Table 1
Descriptive statistics for main study variables.

Variables	*M*	SD	Range
Teacher self-efficacy	3.60	0.48	2.45–4.65
Teacher teaching experience	11.54	7.26	0–27
Teacher collaboration	3.85	0.69	2–5
Teacher influence	3.76	0.76	2–5
Child engagement	5.77	0.84	3–7

Note. Teacher self-efficacy from the Teacher Self-Efficacy Scale (TSES; Bandura, 1997); Teacher teaching experience from a general Teacher Questionnaire; Teacher collaboration and Teacher influence from the Teacher's Sense of the School as Community Questionnaire (Battistich et al., 1997); Child engagement from the Classroom Assessment Scoring System-PreK (CLASS; Pianta et al., 2008).

of their self-efficacy were moderately positive ($M = 3.60$; SD = 0.48; see Table 1).

4.5. Teacher sense of community measure

Teachers' sense of community was assessed using the *Teacher's Sense of the School as Community Questionnaire* (Battistich, Solomon, Watson, & Schaps, 1997). This 13-item questionnaire measured two aspects of teachers' perceptions: (a) teacher collaboration with shared educational goals and supportive relationships, and (b) teachers' influence over school decision-making processes. Teachers indicated the extent to which they agreed with each item, based on a 5-point scale (1 = strongly disagree, 5 = strongly agree). Consistent with the previous studies (Guo, Kaderavek et al., in press; McGinty et al., 2008), the current study also found two distinct dimensions: collaboration and decision-making influence. We defined teacher collaboration as teachers' reported level and type of collaboration among teachers within schools and teacher influence as teachers' reported influence in administrative decision-making within school systems. The items on the teacher collaboration included statements such as "Teachers cooperate with each other", and "Teachers work together toward common goals". Items on the teacher influence dimension included statements such as "Administration consults with teachers about decisions", and "Teachers play a part in organizational planning". Results showed that internal consistency for each dimension was adequate (Collaboration: $\alpha = .92$; Influence: $\alpha = .89$). Each teacher's Collaboration and Influence scores were derived by averaging each set of items. As shown in Table 1, teachers' perceptions of collaboration were moderately positive ($M = 3.85$, SD = .0.69); their perceptions of influence were also moderately positive ($M = 3.76$, SD = .0.76).

4.6. Children's engagement measure

Children's engagement was assessed by using the Student Engagement dimension of the *Classroom Assessment Scoring System-PreK* (CLASS; Pianta, La Paro, & Hamre, 2008). The CLASS comprises a total of eleven dimensions to measure global classroom quality. For each dimension, trained and reliable observers assign a single score from 1 to 7 to the classroom, spanning a continuum of quality that encompasses low (1, 2 points), medium (3, 4, 5 points), and high (6, 7 points) levels of quality. For the present purpose, we used the Student Engagement dimension score to capture the extent of student engagement with classroom activities. In the present study, CLASS was scored in both the fall and spring of the academic year from videotapes collected during an approximately 2-h standardized classroom observation. Scoring of the collected videotapes was conducted in a lab-based setting by research assistants who had completed CLASS training at the University of Virginia (the CLASS development site) to a reliability criterion established by the tool's authors (see Pianta et al., 2008). For the purpose of this study, the children's engagement scores were averaged scores across two observation points (fall and spring). The difference between the mean spring score ($M = 5.61$) and the mean fall score ($M = 5.96$) was significantly different ($p = .02$), indicating children's engagement increases over the academic year. As shown in Table 1, the mean of the averaged children's engagement scores was 5.77 (SD = 0.84), reflecting a high range engagement level.

5. Results

To examine the first research question, we examined intercorrelations among teacher self-efficacy, teachers' teaching experiences, teacher collaboration and decision-making influence, and children's engagement as presented in Table 2. Teacher collaboration ($r = .39$, $p < .05$) and teacher decision-making influence ($r = .34$, $p < .05$) were both positively associated with teacher self-efficacy. Teacher teaching experience was positively related to children's engagement ($r = .50$, $p < .05$). However, teaching experience and children's engagement were not significantly correlated with teacher self-efficacy.

The first research question sought to determine the unique contribution of teaching experience, teacher collaboration and decision-making influence, and children's engagement to teacher self-efficacy, when controlling for teachers' demographics. To answer this question, regressions models were built using the following procedures. First, we examined several parsimonious models for the purpose of saving degrees of freedom in the final model. As teacher demographic variables may be associated with teachers' self-efficacy, we tested each variable as a predictor in the model separately. The predictors reaching statistical significant ($p < .05$) stayed in the model as covariate variables. Teacher demographic variables (gender, educational attainment, and race) were entered in the model and only one teacher race variable (Black versus White) was a significant predictor of teachers' self-efficacy. Thus, the variable of Black versus White was used as a covariate in the following analyses. Second, in this study, the correlation between children's engagement and teachers' self-efficacy was not significant; the correlation between teacher teaching experience and teachers' self-efficacy was also not significant, but the associations of teacher collaboration and teacher influence to teachers' self-efficacy were significant (see Table 2). Based on these preliminary results, after entering the variable of teacher race (Black versus White) as a covariate in the model, we first entered the variables that were not significantly correlated with teachers' self-efficacy in the models and then the variables that demonstrated the significant association with teachers' self-efficacy. Specifically, a series of five hierarchically ordered regression models was created by sequentially adding (1) teacher race, (2) children's engagement, (3) teaching experience, (4) teacher collaboration, and (5) teacher decision-making influence. Table 3 presents the standardized associations of the predictors of teacher self-efficacy in each of the five models.

Table 2
Intercorrelations among main study variables.

Variables	1	2	3	4	5
1. Teacher self-efficacy	–	.234	.393*	.341*	−.085
2. Teacher teaching experience		–	−.176	.003	.495*
3. Teacher collaboration			–	.687**	.028
4. Teacher influence				–	.011
5. Child engagement					–

*$p < .05$.

Table 3
Summary of hierarchical regression model predicting teacher self-efficacy.

Variable	Step 1		Step 2		Step 3		Step 4		Step 5	
	β	$t(1,39)$	β	$t(1,39)$	β	$t(1,39)$	β	$t(1,39)$	β	$t(1,39)$
Teacher race (Black versus White)	.298*	1.96	.311	1.854	.328	1.916	.316*	1.995	.318	1.81
Child engagement			−.098	−.587	−.117	−.682	−.092	−.577	−.092	−.567
Teacher teaching experience					.115	.664	.005	.033	.006	.035
Teacher collaboration							.405*	2.5	.410	1.697
Teacher influence									−.007	−.028

*$p < .05$.

The first regression model demonstrated that teachers' race (Black versus White) was significantly associated with teachers' self-efficacy ($\beta = .298$, $t(39) = 1.96$, $p = .05$). The second regression model showed that when child engagement was added, it demonstrated a weak, non-significant association with teacher self-efficacy ($\beta = -.098$, $t(39) = -.587$, $p = .56$). The third model demonstrated that when teachers' teaching experience was added to the model, teaching experience demonstrated a non-significant association with teacher self-efficacy ($\beta = .115$, $t(39) = .664$, $p = .51$) and uniquely explained about 1% of variance in teacher self-efficacy ($R^2\Delta = .013$ $p > .10$). The results of the fourth model demonstrated that teacher collaboration was a significant predictor of teacher self-efficacy ($\beta = .405$, $p = .02$) and uniquely explained 15% of the variance in teacher self-efficacy ($R^2\Delta = .15$, $p < .05$), above that accounted for by children's engagement and teachers' teaching experience.

The fifth and final model examined the unique contribution of teacher decision-making influence in predicting teacher self-efficacy, when teacher race, children's engagement, teacher teaching experience, and teacher collaboration were all included in the model. Collectively, this model explained 26% of the variance in teacher self-efficacy ($R^2 = .27$, $F(4,30) = 2.21$, $p = .09$). Note that in this final model, the significant association between teacher collaboration and teacher self-efficacy was reduced to a non-significant level (from $\beta = .405$, $p = .02$ to $\beta = .41$, $p = .10$). Individual predictor coefficients from this final model indicated that none of the predictors were significantly associated with teacher self-efficacy.

The second research question sought to determine whether the relation between children's engagement and teacher self-efficacy was dependent upon teaching experience or perceptions of teacher collaboration and decision-making influence. For hypothesis testing, three classroom-by-teacher interaction terms were studied: (1) children's engagement × teaching experience, (2) children's engagement × teacher collaboration, (3) children's engagement × teacher decision-making influence. Three hierarchical regression models were tested in which each interaction term was individually tested in a model that also considered the main effects of children's engagement and teacher variables (teacher race, teacher teaching experience, teacher collaboration and teacher influence). Table 4 presents the results for each of these models.

The first model, regressing the children's engagement × teaching experience interaction on teacher self-efficacy, showed that the unique contribution of the children's engagement × teacher teaching experience interaction above main effects of child engagement and teacher variables was not significant ($R^2 = .01$, $F\Delta(5,29) = 1.80$, $p = .13$). The second model, regressing the children's engagement × teacher collaboration interaction on teacher self-efficacy after controlling for the effects of children's engagement and teacher variables, demonstrated that the children's engagement × teacher collaboration interaction was a significant predictor and uniquely explained 9% of the variance in teacher self-efficacy ($F\Delta(5,29) = 2.873$, $p = .04$). Fig. 1 illustrates the nature of this interaction. As shown, higher levels of children's engagement was associated with higher levels of self-efficacy for teachers who perceived higher levels of teacher collaboration in their preschool programs. The third model investigating the children's engagement × teacher decision-making influence interaction failed to achieve statistical significance.

6. Discussion

In the present study, we reasoned that preschool teachers' self-efficacy would be contextually situated, such that the characteristics of teachers and classrooms would be associated with teachers' self-efficacy. Our results confirmed the influence of these contextual variables. Two major findings emerged from our study. First, correlation analysis showed that teachers' self-efficacy was significantly correlated with both dimensions of teachers' sense of community, namely teachers' perceptions of staff collaboration and their decision-making influence. Second, hierarchical multiple regression analysis demonstrated a significant interaction between teachers' perceptions of staff collaboration and children's engagement in predicting teachers' self-efficacy, when controlling for teachers' race. However, neither teachers' teaching experience nor their decision-making influence was a significant predictor of teachers' self-efficacy.

The first major finding demonstrated the significant correlation among teachers' self-efficacy, teachers' sense of collaboration and their decision-making influence. As teachers' sense of community (e.g., teacher collaboration, teacher influence) maps important aspects of organizational climate, this finding highlights the importance of workplace climate for preschool teachers. Thus, we argue that preschool teachers may benefit by working in the schools where they feel connected to others and autonomous.

The second major finding of this study was that preschool teachers' self-efficacy was predicted by the interaction between teachers' sense of collaboration and children's engagement. There

Table 4
Summary of regression models examining main and interaction effects of child engagement and teacher variables on teacher self-efficacy.

Step	R^2	ΔR^2	ΔF
Main Model			
1. Teacher race (Black versus White)	.089	.089*	3.826*
2. Child engagement	.103	.014	1.847
3. Teacher teaching experience	.116	.013	1.357
4. Teacher collaboration	.268	.152*	2.752*
5. Teacher influence	.268	.000	2.128
Model 1			
6. Child engagement × Teacher teaching experience	.279	.011	1.802
Model 2			
7. Child engagement × Teacher collaboration	.360	.092*	2.624*
Model 3			
8. Child engagement × Teacher decision-making	.302	.034	2.018

*$p < .05$.

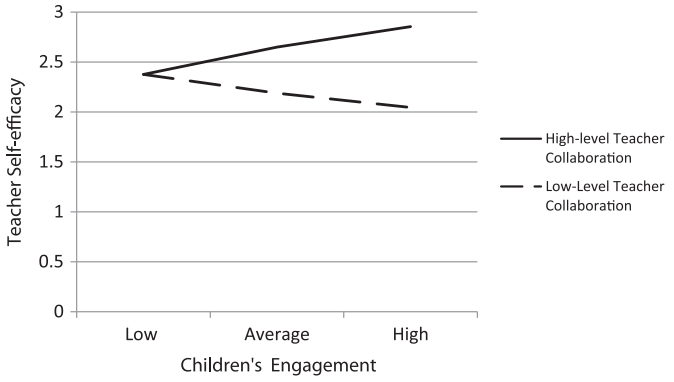

Fig. 1. Interactions between teacher collaboration × child engagement. *Note.* Interaction between teacher collaboration × child engagement on teacher self-efficacy. High-level teacher collaboration is 1SD. Low-level teacher collaboration is −1SD. Children's engagement falls at the 25th (low), 50th (average), and 75th (high) percentiles.

are two potential interpretations of this finding. First, this finding suggests that teachers' sense of collaboration is essential in fostering teachers' self-efficacy, which expands the growing literature supporting the importance of encouraging professional collaboration among teachers (e.g., Desimone, Payne, Fedoravicius, Henrich, & Finn-Stevenson, 2004; Guo, Kaderavek, et al., in press; McGinty et al., 2008; Woolfolk Hoy & Spero, 2005). As previous researchers explained, teachers who work in schools encouraging teacher collaborations have many opportunities to talk with colleagues, evaluate each other's teaching practices (e.g., Bird & Little, 1986; McLaughlin & Talbert, 2001) and thereby increase the level of teachers' self-efficacy. Teachers' collaboration appears critically important for preschool teachers, given the unique and specific challenges linked to preschool teaching environment, such as lack of perceived career reward and lack of preparation (Manlove, 1993; Townley, Thornburg, & Crompton, 1991). Collaborating with colleagues may compensate these challenges. Collaboration provides each other with reinforcement and validation and expands their knowledge of content and pedagogy, all of which increase teachers' sense of efficacy.

Second, this significant interaction could suggest that children's engagement explains the intersection between teachers' sense of collaboration and teachers' self-efficacy. We found that children's engagement is positively associated with teachers' self-efficacy only for teachers who perceive higher levels of collaboration. This finding is important, given that it supports theoretical claims about sources of efficacy beliefs and provides the empirical evidence to support setting-by-effect on teachers' self-efficacy, proposed by Raudenbush et al. (1992). With respect to theoretical claims, it supports the theoretical assumption that the level of children's engagement, as a measure of mastery experiences, is a powerful source of building efficacy (Bandura, 1997). We might presume that children are actively engaged in classroom activities, which may make teachers perceive that their teaching performance is successful. Such perception boosts teachers' efficacy beliefs. With respect to empirical evidence, this finding supported that teachers' sense of efficacy may result from the interaction effects involving teachers' professional collaboration and children's engagement. Collaboration may provide a means by which teachers develop strategies to effectively engage children, and when children are highly engaged, teachers feel more self-efficacious. When children have low engagement or interest, this may "increase demands" on teachers (Ross et al., 1996) and undermine their sense of efficacy. However, higher levels of professional collaboration within the school can provide a way for teachers to learn more effective strategies to promote children's engagement.

Given our recent findings demonstrating a significant, but negative, relation between teaching experience and self-efficacy (Guo et al., 2010), we were surprised that in the current sample of preschool teachers, this finding was not replicated. Indeed, as we described before, research findings have been inconsistent in determining whether a relation between experience and efficacy exists. We argued that more year of teaching experience may not actually improve teachers' teaching skills (e.g., classroom management) as well as their sense of efficacy. Our finding suggested further investigation of the progresses of teachers' efficacy beliefs across stages of teaching career.

In addition, our study demonstrated teachers' perception of their decision-making influence was not a significant predictor of their level of self-efficacy, which is not consistent with previous studies suggesting the importance of teacher influence in fostering teachers' self-efficacy (e.g., Hoy & Woolfolk, 1993; Lee et al., 1991). However, it is in accordance with previous research indicating teacher self-efficacy beliefs do not inevitably result from teacher influence over decision-making (Conley, 1991; Malen, Ogawa, & Kranz, 1990; Smylie, 1994). Indeed, Marks and Louis (1997) suggested that teacher influence over decision-making has two components: formal influence (e.g., ability to participate in decisions) and actual influence (e.g., "voice" that one's opinions are listened to and affect the outcomes of decision), and they argued that the latter is more important than the former in promoting teachers' self-efficacy. As our measure only captured the teacher's ability to participate in decision-making, it is possible that the concept of teacher influence in our study may not capture the decision-making variable that is related to teachers' sense of efficacy.

7. Limitations

To conclude, this study explored the relations of teacher and classroom characteristics to teachers' self-efficacy. A number of limitations warrant note. First, in interpreting the findings of this correlational study, it is important to note that our sample only included teachers in publicly-funded preschool classrooms serving at risk children. Therefore, it is not clear whether these findings about teachers' self-efficacy can be generalized to other settings, such as programs serving children of a different demographic. Replication of our findings with preschool programs which enroll a more general population of children is an important next step in future research.

Second, the results of this study are limited by the measure of teacher self-efficacy. This measure only assessed individual teachers' self-efficacy. However, collective self-efficacy is another type of teachers' self-efficacy, which represents the judgment of teachers in the school as a whole about their ability to "organize and execute the courses of action required to have a positive effect on students" (Goddard, Hoy, & Woolfolk, 2004, p. 4). Given that students' achievement and school types have been shown to be associated with teachers' collective efficacy (Chong, Klassen, Huan, & Kates, 2010), a future study should examine teacher and classroom characteristics on preschool teachers' collective efficacy. At the same time, our methods involved self-administered questionnaires to assess teachers' self-efficacy and their sense of community. A more accurate picture of the subtle relations among teachers' self-efficacy and other teacher or classroom variables might have been obtained by focus-group interviews. Future investigation may interview teachers to gather the information about if teachers' efficacy beliefs vary from one classroom to another and if they do, to identify which features of their classrooms that make a difference.

Third, similar to any correlational study, we cannot assume that the observed relations among teacher and classroom and teachers' self-efficacy are causal in nature. In addition, our analysis did not test the reciprocity effects of teacher and classroom characteristics on teachers' sense of efficacy. Future investigation should utilize experimental and longitudinal methods to identify the causal and reciprocity effects.

8. Implications and conclusions

As teacher efficacy continues to be a potent construct in studies of teachers' instructional practices (Guskey, 1987), examining the context variables that are associated with teacher efficacy will improve our understanding of this construct and its influence on teaching and children's learning process. The current study underscored the importance of teacher collaboration and children's engagement in supporting preschool teachers' sense of efficacy.

The present study may have important, albeit preliminary, implications for early childhood policymakers, administrators, and educators. Current reforms in early childhood education have focused primarily on improving the training of preservice or inservice preschool teachers and attracting quality candidates in various countries. For example, early childhood advocates in both U.S. and New Zealand are calling for all preschool teachers to have at least bachelor degree majoring in early childhood education (Barnett, 2003; Dalli & Te One, 2003). Yet, our study opens up a new approach for preschool quality efforts. We recommend that promoting collaboration between preschool teachers may be a potential avenue to support and improve teachers' efficacy and deserves further investigation. In fact, McGinty et al. (2008) found marked intra-program variation in teachers' perception of collaboration. For example, their work showed that Head Start teachers perceived lower levels of teacher collaboration when compared to teachers in State/Title I programs. Hence, preschool reforms aimed at increasing the opportunities for teachers' professional collaboration may be needed. In addition, given the importance of children's engagement in explaining the association between preschool teachers' sense of collaboration and teachers' self-efficacy, we recommend that preschool teachers employ effective teaching strategies in engaging children in tasks. Specifically, providing accurate feedback, offering students with challenging academic tasks and communicating positive and high expectations may help to increase children's engagement and learning (Linnenbrink & Pintrich, 2003).

To sum, our research findings are encouraging, despite being a modest first step in examining factors related to teacher efficacy in preschool sector. The research efforts in the field of early childhood teacher quality should continue investigating specific features of the teaching context that may make a difference in the formation and enhancement of teachers' self-efficacy and the support that could help build strong efficacy beliefs among teachers.

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