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MOTIVATION AND SOCIAL PROCESSES

Examining the Factor Structure of the Teachers' Sense of Efficacy Scale

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The authors examined the factor structure of the long and short forms of the Teachers' Sense of Efficacy Scale (TSES; M. Tschannen-Moran & A. Woolfolk-Hoy, 2001) for practicing ($n = 102$) and preservice teachers ($n = 270$), comparing the responses to both forms of the TSES, and looked for differences in teachers' efficacy with respect to experience and grade level taught. They found the 3-factor structure—efficacy for classroom management, instructional practices, and student engagement—to be appropriate for practicing teachers, but they found a single efficacy factor to be appropriate for preservice teachers. The long and short forms of the TSES produced similar means and reliability information, suggesting that either form is appropriate for use with preservice or practicing teachers. Last, they found that teachers with 10 or more years of teaching experience and those teaching at the elementary level reported significantly higher levels of efficacy than did preservice teachers or those teaching at the middle or high school levels, respectively.

Keywords: teacher beliefs, teacher efficacy, teacher motivation

TEACHERS' SENSE OF EFFICACY, defined as teachers' beliefs in their abilities to organize and execute courses of action necessary to bring about desired results

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(Tschannen-Moran, Woolfolk-Hoy, & Hoy, 1998), has a rich and varied history that began in the late 1970s. Despite its potential for understanding teachers' cognitions and behaviors, teacher efficacy is an "elusive construct" that is difficult to adequately assess (Tschannen-Moran & Woolfolk-Hoy, 2001, p. 783). This difficulty has been exacerbated by the varied definitions and conceptual frameworks that have simultaneously laid claim to the term *teacher efficacy*, defining it, for example, from the perspective of both locus of control theory (e.g., McLaughlin & Marsh, 1978) and self-efficacy theory (e.g., Gibson & Dembo, 1984).

Several researchers have offered accounts of the study and measurement of teacher efficacy (e.g., Henson, Kogan, & Vacha-Haase, 2001; Tschannen-Moran & Woolfolk-Hoy, 2001). Tschannen-Moran and Woolfolk-Hoy presented a measure to assess teachers' sense of efficacy for teaching—the Teachers' Sense of Efficacy Scale (TSES)—that was consistent with the theoretical conceptualization of the construct offered in the Tschannen-Moran et al. (1998) literature review. This new instrument assessed teachers' efficacy beliefs for completing critical tasks associated with teaching in the areas of student engagement, classroom management, and instructional practices. The TSES has received attention and is used by researchers and teacher educators (e.g., Cao & Nietfeld, 2005; Cheung, 2006; Fives, Hamman, & Oliveraz, 2007).

Although the TSES offers a conceptually sound tool to assess teachers' sense of efficacy, there is a need to replicate prior research with this measure to determine (a) the appropriate application of the factor structure associated with this measure for varied populations and (b) if long-standing findings regarding teachers' efficacy beliefs, assessed with other measures, continue to hold.

Theoretical Framework

Measuring teachers' efficacy beliefs. The conceptualization and operationalization of teachers' sense of efficacy is a critical issue. As discussed elsewhere (e.g., Henson, 2002; Tschannen-Moran & Woolfolk-Hoy, 2001), the construct has been defined from the perspective of locus of control (e.g., Rotter, 1996) and self-efficacy (e.g., Bandura, 1977). In particular, Tschannen-Moran et al. (1998) proposed a new model of teacher efficacy based on Bandura's (1977, 1997) conceptualization of self-efficacy. This model describes the sources of efficacy (i.e., mastery experience, vicarious experience, verbal persuasion, and physiological cues) as influencing task analysis and competence assessments from which efficacy beliefs are derived and, subsequently, as influencing teachers' goals and persistence, which in turn affects teaching behaviors.

Using this model, Tschannen-Moran and Woolfolk-Hoy (2001) developed the TSES to assess teachers' sense of efficacy with respect to the teaching tasks involved in student engagement, classroom management, and instructional practices. They tested the TSES in three separate studies in which the original 52 items were ultimately reduced to two forms of the measure: a 24-item long form

and a 12-item short form. Then they assessed the factor structure, reliability, and validity of the scale.

In their analyses, Tschannen-Moran and Woolfolk-Hoy (2001) used samples of practicing and preservice teachers. Separate analyses for practicing ($n = 255$) and preservice ($n = 111$) teachers yielded a three-factor solution for the practicing teachers but not for the preservice teachers. Instead, for preservice teachers, items loaded on a single factor. Although the lack of differentiation may be due to the smaller sample size, this finding may also be reflective of underlying differences between practicing and preservice teachers.

Thus, it is unclear if the three-factor solution identified by Tschannen-Moran and Woolfolk-Hoy (2001) is appropriate for practicing and preservice teachers alike. In fact, these authors noted that the factor structure is less distinct for preservice teachers and recommended that factor analysis be conducted on data gathered using the TSES. Despite this suggestion, researchers have applied the three-factor structure to data from preservice teachers either without examining the factor structure (e.g., Hamman et al., 2006) or with less stringent factor identification methods, such as the eigenvalues greater than one rule (e.g., Cheung, 2006; Poulou, 2007).

Consequently, we examined the structure of practicing and preservice teachers' responses to the TSES (long and short forms) to determine whether the same three factors would emerge for practicing and preservice teachers with more sophisticated factor analytic procedures (i.e., Horn's [1965] parallel analysis; Thompson & Daniel, 1996).

Influences on Teachers' Sense of Efficacy

Social cognitive theory posits the importance of reciprocal determinism in human functioning (e.g., Bandura, 1997), recognizing the conjoined forces of the person, behaviors, and environment as interactive and interdependent influences on individuals. Factors related to the person include efficacy beliefs, which in turn influence behaviors and are also developed through experiences with the world. Furthermore, beliefs and behaviors influence and are influenced by the environment. Teacher efficacy researchers have long examined the relations between teachers' sense of efficacy and their level of teaching experience. Prior teaching experience can be considered a "mastery experience" and, as such, serves, theoretically, as a powerful source of efficacy beliefs (e.g., Tschannen-Moran et al., 1998). Similarly, the contexts in which teachers teach influence how they interpret the teaching task and evaluate their perceived capabilities.

Experience. In previous investigations of teacher efficacy, researchers perceived preservice teachers to demonstrate higher, perhaps inflated, levels of efficacy that decreased with experience (Brousseau, Book, & Byers, 1988). However, we found mixed results across the research that examined the differences between

preservice and practicing. For example, Gorrell and Dharmadasa (1994) found that although preservice teachers reported higher efficacy for implementing new methods of instruction, experienced teachers reported higher efficacy for classroom management, organization of instruction, and impact on students. In contrast, Campbell (1996) found that practicing teachers in Scotland and the United States reported significantly higher efficacy beliefs than did preservice teachers.

Researchers have compared the efficacy beliefs of practicing teachers with varied years of experience. Some researchers have found no relation between years of experiences and efficacy beliefs (e.g., Ghaith & Shaaban, 1999; Guskey, 1987), whereas others found a negative relation between years of experience and general teaching efficacy beliefs (e.g., Hoy & Woolfolk, 1993; Taylor & Tashakkori, 1995). Recently, Wolters and Daugherty (2007) used the TSES and found that teachers in their first year reported significantly lower self-efficacy for instructional practices and classroom management than did teachers with more experience.

Teaching level. Researchers have also compared the efficacy beliefs by grade or school level taught. Comparable findings have emerged across some published studies that suggest that preservice and practicing elementary teachers have significantly higher efficacy beliefs than do those at the middle or secondary levels (e.g., Midgley, Anderman, & Hicks, 1995; Wolters & Daugherty, 2007). In contrast, others have reported no significant differences in efficacy beliefs by teaching level (e.g., Chester & Beaudin, 1996; Ross, 1994; Soodak & Podell, 1996).

As the teacher efficacy literature moves forward with a more theoretically coherent perspective and measures, it is essential to determine whether common understandings, developed under different theories and measures, are still appropriate. In the following section, we examine efficacy beliefs with respect to experience and grade level taught with a new and more theoretically grounded measure of teachers' sense of efficacy to determine whether previous findings are replicated.

Research Questions

The following questions guided this investigation: (a) How does the factor structure of the long and short forms of the TSES differ for practicing and preservice teachers? (b) How comparable are practicing and preservice teachers' responses to the long and short forms of the TSES? and (c) Can previous findings in the teacher efficacy literature, with respect to differences by experience and grade level, be replicated when teacher efficacy is assessed by the TSES?

METHOD

Participants

Participants were 102 practicing teachers and 270 preservice teachers. Practicing teachers representing all grade levels from the mid-Atlantic region of the

United States were predominantly female (77.5%), and they self-identified as European American (77.5%) or multiple ethnicities (7.8%). We recruited teachers from graduate courses in teacher preparation and area schools. We visited local schools during scheduled faculty meetings and invited teachers to complete the questionnaire and return them anonymously to a mailbox in the school office.

We recruited 270 preservice teachers from teacher education classes at universities in the mid-Atlantic ($n = 120$), mid-South ($n = 69$), and Southwest ($n = 81$) regions of the United States by contacting instructors in the relevant courses. Participants were primarily female (78.1%) and European American (65.6%), and they planned to teach at all grade levels.

Measure

The TSES instructs respondents to rate their own efficacy for each of three areas of teaching (i.e., classroom management, instructional practices, and student engagement). Respondents answer on a 9-point Likert-type scale ranging from 1 (*nothing*) to 3 (*very little*) to 5 (*some influence*) to 7 (*quite a bit*) to 9 (*a great deal*; for details, see Tschannen-Moran & Woolfolk-Hoy, 2001). The long form of the TSES comprises 24 items (see Table 1), and the short form comprises 12 items from the long form (see Table 2). Our participants completed the long form. In our analyses, we examined the factor structure of the 24-item scale and the subset of 12 items on the short form.

Data Analysis

We analyzed data from the practicing and preservice teachers separately, using identical exploratory factor analytic procedures. To determine the number of factors to extract, we relied primarily on Horn's (1965) parallel analysis instead of the Kaiser-Guttman rule (i.e., eigenvalues greater than one). Thompson and Daniel (1996) recommended Horn's parallel analysis as a more sophisticated factor extraction strategy that has greater merit than more traditional methods. In Horn's parallel analysis, principal components analyses are conducted on multiple randomly generated data sets. The eigenvalues of the factors that emerge from the actual data are compared to mean eigenvalues from the random data. Factors with eigenvalues greater than those of the randomly generated data are considered viable and retained for analysis (i.e., these eigenvalues exceed what would be expected by chance). In this investigation, we compared the eigenvalues from the actual data with the mean eigenvalues from 100 randomly generated data sets. In addition to Horn's parallel analysis, we examined the scree plot and reported how many factors had eigenvalues greater than 1 to highlight how different numbers of factors might be suggested depending on the method used.

After determining the number of factors to extract, we conducted a principal axis factor analysis with varimax rotation, replicating the procedures used by

TABLE 1
Pattern and Structure Coefficients From Principal Axis Factoring of Practicing and Preservice Teacher Data With Varimax Rotation for the Long Form of the TSES

		Practicing teachers (n = 102)			*Preservice teachers (n = 270)*			
		3-factor solution			*1-factor solution*	*3-factor solution*		
Item from the TSES		*1*	*2*	*3*	*1*	*1*	*2*	*3*
15.	How much can you do to calm a student who is disruptive or noisy?	**.83**	.18	.08	**.79**	**.66**	.39	.26
3.	How much can you do to control disruptive behavior in the classroom?	**.77**	.12	.08	**.65**	**.56**	.24	.30
16.	How well can you establish a classroom management system with each group of students?	**.69**	.24	.24	**.77**	**.62**	.33	.35
13.	How much can you do to get children to follow classroom rules?	**.67**	.14	.30	**.70**	**.55**	.23	**.42**
19.	How well can you keep a few problem students from ruining an entire lesson?	**.66**	.40	.15	**.66**	**.65**	.33	.10
21.	How well can you respond to defiant students?	**.61**	.36	.24	**.76**	**.71**	.31	.23
1.	How much can you do to get through to the most difficult students?	**.52**	.20	.45	**.58**	.35	**.50**	.12
5.	To what extent can you make your expectations clear about student behavior?	**.50**	.13	.09	**.66**	**.48**	.23	**.44**
8.	How well can you establish routines to keep activities running smoothly?	**.46**	.24	.25	**.68**	**.52**	.25	.39
24.	How well can you provide appropriate challenges for very capable students?	.15	**.78**	.14	**.46**	.16	.08	**.68**
11.	To what extent can you craft good questions for your students?	.12	**.67**	.14	**.67**	**.45**	**.41**	.18
18.	How much can you use a variety of assessment strategies?	.29	**.65**	.24	**.71**	.29	**.51**	**.48**
20.	To what extent can you provide an alternative explanation or example when students are confused?	.32	**.61**	–.07	**.72**	.32	.34	**.65**
10.	How much can you gauge student comprehension of what you have taught?	.31	**.60**	.23	**.62**	**.49**	.33	.21
23.	How well can you implement alternative strategies in your classroom?	.22	**.57**	.49	**.73**	**.52**	.39	.32
7.	How well can you respond to difficult questions from your students?	.21	**.56**	.12	**.59**	.38	.38	.24
2.	How much can you do to help your students think critically?	.07	**.54**	.18	**.66**	.24	**.48**	**.49**
12.	How much can you do to foster student creativity?	.15	**.53**	.35	**.65**	.19	**.61**	.37

(Continued)

TABLE 1
Pattern and Structure Coefficients From Principal Axis Factoring of Practicing and Preservice Teacher Data With Varimax Rotation for the Long Form of the TSES *(Continued)*

	Practicing teachers (n = 102)			*Preservice teachers (n = 270)*			
	3-factor solution			*1-factor solution*	*3-factor solution*		
Item from the TSES	*1*	*2*	*3*	*1*	*1*	*2*	*3*
17. How much can you do to adjust your lessons to the proper level for individual students?	.36	**.52**	.45	**.71**	**.56**	**.41**	.21
6. How much can you do to get students to believe they can do well in school work?	.05	.20	**.69**	**.72**	**.44**	**.42**	.39
22. How much can you assist families in helping their children do well in school?	.10	.09	**.65**	**.68**	**.43**	**.44**	.30
4. How much can you do to motivate students who show low interest in school work?	.30	.13	**.64**	**.61**	.33	**.60**	.10
14. How much can you do to improve the understanding of a student who is failing?	.41	.28	**.61**	**.72**	.38	**.55**	.32
9. How much can you do to help your students value learning?	.26	.37	**.45**	**.67**	**.40**	**.59**	.14
Eigenvalues	9.68	2.19	1.83	11.52	11.52	1.23	1.07
Variance explained (%)	40.33	9.14	7.62	47.98	47.98	5.13	4.47

Note. Items with bolded coefficients were used in the calculation of means, standard deviations, and reliability coefficients. TSES = Teachers' Sense of Efficacy Scale (M. Tschannen-Moran & A. Woolfolk-Hoy, 2001).

TABLE 2
Pattern and Structure Coefficients From Principal Axis Factoring of Practicing and Preservice Teacher Data With Varimax Rotation for the Short Form of the TSES

		Practicing teachers (n = 102)			*Preservice teachers (n = 270)*			
		3-factor solution			*1-factor solution*	*3-factor solution*		
Item from the TSES		*1*	*2*	*3*	*1*	*1*	*2*	*3*
15.	How much can you do to calm a student who is disruptive or noisy?	**.79**	.08	.24	**.80**	.41	**.70**	.25
3.	How much can you do to control disruptive behavior in the classroom?	**.76**	.09	.17	**.65**	.26	**.64**	.22
13.	How much can you do to get children to follow classroom rules?	**.69**	.30	.11	**.71**	.29	**.68**	.26
16.	How well can you establish a classroom management system with each group of students?	**.68**	.26	.29	**.78**	.47	**.52**	.34
6.	How much can you do to get students to believe they can do well in school work?	.09	**.71**	.11	**.74**	**.51**	.46	.28
22.	How much can you assist families in helping their children do well in school?	.05	**.63**	.09	**.69**	**.57**	.28	.34
4.	How much can you do to motivate students who show low interest in school work?	.29	**.62**	.14	**.60**	**.57**	.31	.11
9.	How much can you do to help your students value learning?	.28	**.51**	.25	**.65**	.63	.26	.22
18.	How much can you use a variety of assessment strategies?	.24	.29	**.70**	**.69**	.45	.25	.55
20.	To what extent can you provide an alternative explanation or example when students are confused?	.26	–.04	**.63**	**.68**	.22	.31	.80
23.	How well can you implement alternative strategies in your classroom?	.17	.51	**.58**	**.73**	**.58**	.32	.34
11.	To what extent can you craft good questions for your students?	.10	.20	**.57**	**.63**	**.43**	.32	.34
Eigenvalues		4.87	1.62	1.31	6.35	6.35	.85	.80
Variance explained (%)		40.55	13.50	10.95	52.88	52.88	7.10	6.63

Note. Items with bolded coefficients were used in the calculation of means, standard deviations, and reliability coefficients. TSES = Teachers' Sense of Efficacy Scale (M. Tschannen-Moran & A. Woolfolk-Hoy, 2001).

Tschannen-Moran and Woolfolk-Hoy (2001). We identified factors by examining the rotated factor matrix and assigned items with pattern/structure coefficients greater than |.40| to the respective factor. If an item had pattern/structure coefficients greater than |.40| on two or more factors, we assigned it to the factor with the largest coefficient. We examined the reliability of the data for each factor by calculating Cronbach's alpha. We also calculated the means and standard deviations for each factor and compared efficacy means with respect to experience and teaching level.

RESULTS

Factor Structure for Practicing Teachers

Long form. Horn's (1965) parallel analysis of the data and the scree plot indicated that a three-factor solution was most appropriate, even though six factors had eigenvalues greater than 1. The three factors together accounted for 57.09% of the variance in the data (see Table 1).

The rotated pattern/structure coefficient matrix is reported with factor assignments of items in Table 1. Five items had a pattern/structure coefficient of |.40| on more than one factor. We assigned these items to the factor with the higher coefficient. Examination of the items revealed that they grouped around the same dimensions identified by Tschannen-Moran and Woolfolk-Hoy (2001; i.e., Factor 1: classroom management; Factor 2: instructional practices; and Factor 3: student engagement; see Table 1), with three exceptions. We assigned Items 2 and 12, which Tschannen-Moran and Woolfolk-Hoy assigned to the student engagement factor, to the instructional strategies factor in our investigation. The third exception was Item 1, which Tschannen-Moran and Woolfolk-Hoy assigned to the student engagement factor. In our analysis this item had a higher pattern/structure coefficient for the classroom management factor (i.e., .55) and a pattern/structure coefficient of .45 for student engagement. Following our decision rule, we assigned this item to the classroom management factor.

In our opinion, these discrepancies can be justified on the basis of the content of the items. Fostering students' critical thinking and creativity could be viewed as an aspect of instructional practices. In addition, Item 1 is vague about what *difficult students* is meant to signify. The students could be difficult because they present a classroom management issue, they are unmotivated, or as suggested by the pattern/structure coefficients, because of a combination of both.

Short form. We used identical procedures to analyze data from the short form of the TSES for our sample of practicing teachers. Once again, Horn's parallel analysis and the scree plot suggested a three-factor solution, accounting for 64.99% variance in the data (see Table 2).

Principal axis factor analysis with varimax rotation for the 12 items revealed that all items had at least one structure/pattern coefficient greater than |.40| on one of the three factors (see Table 2). One item (i.e., Item 23; see Table 2) had structure/pattern coefficients greater than |.40| on more than one factor and was assigned to the factor with the largest coefficient. Patterns in the structure/pattern coefficients were similar for the short and long forms, and similar factors were identified (i.e., Factor 1: classroom management; Factor 2: student engagement; Factor 3: instructional practices), mirroring Tschannen-Moran and Woolfolk-Hoy's (2001) findings. Practicing teacher data for the factors from both the long and short forms were reliable (see Table 3).

Factor Structure for Preservice Teachers

Long form. For the preservice teachers, although three factors had eigenvalues greater than 1, Horn's (1965) parallel analysis and the scree plot supported the extraction of one factor. The single factor accounted for 47.98% of the variance in the data. All items had pattern/structure coefficients greater than |.40| on the factor (see Table 1), and the data associated with these factors were reliable (i.e., $\alpha = .95$).

As a follow-up analysis, we examined the pattern/structure coefficients for a three-factor solution with varimax rotation. As presented in Table 1, nine items (i.e., 38% of the items) had pattern/structure coefficients greater than |.40| on more than one factor, and the coefficients were often similar. Further, when the three-factor solution was used to assign items to factors, the emergent factors were not theoretically meaningful (i.e., classroom management, instructional practices, and student engagement items were assigned to the same factors). We interpreted this as additional evidence that factor structure for preservice teachers is less distinct and that a one-factor solution is a more appropriate representation for preservice teachers.

Short form. Analysis of data from the short form yielded similar results for preservice teachers, with a single factor accounting for 52.88% of the variance in the data. All items had pattern/structure coefficients greater than |.40| on the factor (see Table 2), and the data associated with the factors were reliable (i.e., $\alpha = .92$).

As with the long form, we extracted a three-factor solution for the data from the short form and applied varimax rotation (Table 2). Four items (i.e., 33.33% of the items) had pattern/structure coefficients greater than |.40| on more than one factor. Although the factors were more meaningful for the short form of the TSES than they were for the long form, items related to classroom management, instructional practices, and student engagement had pattern/structure coefficients greater than |.40| on the first factor.

TABLE 3
Practicing Teacher Descriptive Statistics and Within-Participants Comparisons (Paired *t* Tests) for the Long and Short Forms of the TSES

	Descriptive statistics								*Within-participants comparisons*								
	Long form				*Short form*				*Classroom management*			*Instructional practices*			*Student engagement*		
Sense of efficacy beliefs subscales	*No. of items*	*M*	*SD*	α	*No. of items*	*M*	*SD*	α	*t*	*p*	*d*	*t*	*p*	*d*	*t*	*p*	*d*
Classroom management	9	7.39	0.95	.89	4	7.51	1.02	.85	—	—	—	2.74	.007	0.24	9.02	<.001	0.83
Instructional practices	10	7.16	0.97	.89	4	7.26	1.01	.74	2.73	.007	0.28	—	—	—	6.53	<.001	0.25
Student engagement	5	6.54	1.10	.81	4	6.60	1.26	.78	7.93	<.001	0.85	5.80	<.001	0.59	—	—	—
Total score	24	7.12	0.85	.93	12	7.11	0.84	.86									

Note. For all *t* values, $df = 101$. TSES = Teachers' Sense of Efficacy Scale (M. Tschannen-Moran & A. Woolfolk-Hoy, 2001). For the within- participants comparisons matrix, values above the diagonal pertain to the long form of the TSES; values below the diagonal pertain to the short form of the TSES. The TSES is scored on a 9-point Likert-type scale ranging from 1 (*nothing*) to 3 (*very little*) to 5 (*some influence*) to 7 (*quite a bit*) to 9 (*a great deal*), with higher scores indicating stronger feelings of efficacy.

Within-Group Comparisons of Practicing and Preservice Teachers' Sense of Teaching Efficacy

Practicing teachers. The composite means and standard deviations for the three-factor solution for our practicing teachers' responses to the long and short forms of the TSES (see Table 3) were similar to those reported by Tschannen-Moran and Woolfolk-Hoy (2001). In addition, scores for our sample were highly correlated across forms, rs $> .94$, $p < .001$, providing support for the use of either form. Practicing teachers differed in their sense of teaching efficacy for the three areas assessed, and differences were apparent in means from both the long and short forms (see Table 3). Specifically, practicing teachers were most efficacious with respect to classroom management and least efficacious with respect to student engagement.

Preservice teachers. The mean composite score for the single factor for our preservice teachers' responses to the long and short forms of the TSES were comparable (long form: $M = 7.10$, $SD = .97$; short form: $M = 7.10$, $SD = 1.01$) and strongly correlated, $r = .98$, $p < .001$. Our preservice teachers also demonstrated a similar level of teaching-efficacy beliefs as did preservice teachers in other investigations (Fives et al., 2007).

Comparisons of Efficacy Beliefs Across Experience and Grade Levels

Experience: Practicing teachers versus preservice teachers. Comparison of the mean total scores for the practicing and preservice teachers on the TSES long and short forms indicated that there were no statistically significant differences—long form: $t(370) = -0.14$, $p = .89$, $d = 0.02$; short form: $t(370) = -0.07$, $p = .94$, $d = 0.01$. Because of factor structure differences for practicing and preservice teachers, we cannot statistically compare the sense of efficacy for the three subscales.

Experience: Years of teaching. Given the range of experience in our practicing sample (i.e., 1–40 years; M age = 10.45 years; SD = 8.33 years), we examined the data for more fine-grained differences in teaching experience. We formed five groups, each based on the number of years that individuals had taught (e.g., preservice, 1–2 years, 3–5 years, 6–10 years, 10+ years). For the preservice and 10 or more years groups, we randomly selected 20 individuals to create groups that were approximately equal in terms of length of service. Using years of experience as the independent variable, we conducted two analyses of variance (ANOVAs) with the long and short forms' total TSES score, respectively, as the dependent variable. In each analysis, there was a significant effect for years of teaching experience—long form: $F(4, 101) = 3.48$, $p = .01$,

TABLE 4
Means, Standard Deviations, and Comparisons of Practicing and Preservice Teachers' Scores on the Long and Short Forms of the TSES, by Years of Experience

	TSES total scores				
	Long form			*Short form*	
Years of experience	*n*	*M*	*SD*	*M*	*SD*
Preservice	20	6.58[b]	0.09	6.54[b]	0.16
1–2 years	19	6.75	0.86	6.84	0.86
3–5 years	19	6.82	0.64	6.78	0.62
6–10 years	24	7.13	0.93	7.10	0.93
10+ years	20	7.50[a]	0.75	7.52[a]	0.78

Note. TSES = Teachers' Sense of Efficacy Scale (M. Tschannen-Moran & A. Woolfolk-Hoy, 2001). The TSES is scored on a 9-point Likert-type scale—ranging from 1 (*nothing*) to 3 (*very little*) to 5 (*some influence*) to 7 (*quite a bit*) to 9 (*a great deal*)—with higher scores indicating stronger feelings of efficacy. Superscripts indicate statistically significant mean values at the $p \leq .01$ level.

$\eta^2 = .13$; short form: $F(4, 101) = 3.49$, $p = .01$, $\eta^2 = .13$. Follow-up post hoc analyses indicated that teachers with 10 or more years of experience were significantly more efficacious than were preservice teachers, long form: $d = 1.72$; short form: $d = 1.74$. There were no other significant differences among groups (see Table 4). These findings (a) contradict the perception that preservice teachers are more efficacious than are practicing teachers and (b) support Soodak and Podell's (1997) finding that teachers with more years of experience had significantly greater personal teaching efficacy than did those only in their initial years of teaching.

Grade-level differences in efficacy. Similar to previous researchers (e.g., Midgley et al., 1995; Wolters & Daugherty, 2006), we found differences in practicing teachers' efficacy beliefs related to the grade level taught (see Table 5). Elementary teachers demonstrated significantly stronger efficacy beliefs for student engagement than did middle or secondary teachers (long form: ds ≥ 0.56; short form: ds ≥ 0.68). Notably, a gender or grade-level confound may exist. The elementary teachers were primarily female, and there were more males at the middle and secondary levels.

DISCUSSION

We explored the factor structure of practicing and preservice teachers' responses to the long and short forms of the TSES. We also investigated whether differences

TABLE 5
Means, Standard Deviations, and Comparisons of Practicing Teachers Scores on the Long and Short Forms of the TSES, by Grade Level

	Grade level									
	Elementary school (n = 36)		*Middle school (n = 34)*		*High school (n = 32)*		*Test statistics*			
Variable	*M*	*SD*	*M*	*SD*	*M*	*SD*	*F*	*dfs*	*p*	η^2
Long-form subscales										
Classroom management	7.21	0.99	7.35	0.79	7.62	1.02	1.62	2,101	.20	.03
Instructional practices	7.06	0.99	7.03	0.82	7.40	1.07	1.52	2,101	.22	.03
Student engagement	7.00[a]	1.04	6.25[b]	0.81	6.34[b]	1.28	5.25	2,101	.007**	.10
Total score	7.11	0.91	6.99	0.62	7.26	0.98	0.87	2,101	.42	.02
Short-form subscales										
Classroom management	7.33	1.03	7.49	0.95	7.72	1.08	1.23	2,101	.30	.02
Instructional practices	7.08	1.06	7.10	0.88	7.54	1.04	2.18	2,101	.12	.04
Student engagement	7.15[a]	1.02	6.25[b]	0.81	6.36[b]	1.30	7.62	2,101	.001**	.13
Total score	7.19	0.93	6.94	0.60	6.94	0.60	1.03	2,101	.36	.02

Note. TSES = Teachers' Sense of Efficacy Scale (M. Tschannen-Moran & A. Woolfolk-Hoy, 2001). The TSES is scored on a 9-point Likert-type scale—ranging from 1 (*nothing*) to 3 (*very little*) to 5 (*some influence*) to 7 (*quite a bit*) to 9 (*a great deal*)—with higher scores indicating stronger feelings of efficacy. Superscripts indicate statistically significant mean values at the $p \leq .01$ level.

**$p \leq .01$.

identified with previous measures were identifiable with the TSES. Although our investigation is limited by a relatively small sample of practicing teachers and a lack of focus group data on individuals' interpretation of the TSES items, this investigation has important implications for research and practice.

Most notably, our investigation suggests that preservice teachers' efficacy beliefs are not as differentiated as those of practicing teachers. Whereas a clear three-factor solution emerged for practicing teachers, indicating distinct efficacy beliefs with respect to classroom management, instructional practices, and student engagement, a one-factor solution emerged for the preservice teacher data. When a three-factor solution was applied to the preservice teacher data, multiple items had double loadings and the factors were not theoretically meaningful. These findings were anticipated and understandable. Preservice teachers are less experienced than practicing teachers with respect to classroom management, instructional practices, and student engagement.

These results also underscore the importance of using the guidelines suggested by Thompson and Daniel (1996). Specifically, for the preservice teachers the traditional means to determine the number of factors to extract (i.e., eigenvalues greater than 1) suggested factors that were not theoretically meaningful. In contrast, the Horn's parallel analysis resulted in factors that were theoretically meaningful for both practicing and preservice teachers.

Collectively, these findings have important implications for the assessment of teacher efficacy. We recommend that researchers who use the TSES with preservice populations to analyze the data using the guidelines forwarded by Thompson and Daniel (1996). If there is not enough data for such analyses, the results of our investigation suggest that a one-factor solution is more appropriate for preservice teachers' responses. However, the three-factor conceptualization of teacher efficacy appears to be appropriate for practicing teachers. Further, either the long or short form can be used with both practicing and preservice teachers.

Examination of group differences in the efficacy beliefs of preservice and practicing teachers revealed some significant differences that have implications for practice. Specifically, practicing teachers have the strongest efficacy beliefs for classroom management tasks and the lowest efficacy beliefs for student engagement tasks. Also, elementary teachers reported significantly higher efficacy beliefs for student engagement than did middle- and secondary-level teachers. These findings suggest that all practicing teachers could benefit from efficacy-enhancing instruction or professional development in the area of student engagement, and teachers of older students may need more explicit preparation in this area.

We found that practicing teachers with 10 or more years of experience reported higher efficacy beliefs than did the preservice teachers we sampled. The specific nature of the items on the TSES may have garnered a more accurate assessment of efficacy beliefs than did previous measures. However, across our sample, efficacy beliefs were somewhat high, which suggests that the TSES may be experiencing

a ceiling effect. A 0–100 scale, as recommended by Bandura (2006), may provide more differentiation in teachers' efficacy beliefs.

The findings from this investigation are important to anyone researching or working closely with preservice or new teachers (e.g., teacher educators, principals, mentors). Our results underscore the preservice teachers' naive understanding regarding the nature of teaching. Preservice teachers seem to view teaching as more of a global phenomenon than a highly complex task. Those individuals who work with preservice teachers should recognize this global perspective as part of the nature of a developing belief structure and use it as a starting point for learning experiences.

AUTHOR NOTES

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