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When early childhood teachers close the door: Self-reported fidelity to a mandated curriculum and teacher beliefs

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ABSTRACT

This study examined the influence of early childhood teachers' beliefs about teaching and self-efficacy beliefs on their self-reported fidelity to a mandated constructivist curriculum. The data were collected from a sample of 308 early childhood teachers from public schools in Turkey. The results of hierarchical regression analyses revealed that early childhood teachers reported a considerably higher level of fidelity to the constructivist curriculum when their beliefs aligned more with the constructivist approach to teaching and had a higher sense of self-efficacy for student engagement and instructional strategies. This impact of teacher beliefs on self-reported fidelity to curriculum implementation was valid regardless of teachers' years of experience, teachers' degree of education, class size, age of the students, length and type of the program, and the existence/nonexistence of a teacher aide in the classroom. Additionally, early childhood teachers' efficacy for instructional strategies moderated the relationship that was found between constructivist beliefs about teaching and self-reported fidelity to learning process. Overall, these findings imply that early childhood teachers' beliefs about teaching and their sense of efficacy in teaching warrant consideration to ensure fidelity to policy documents in educational practice.

Introduction

The study of the mental lives of teachers emerged as a new approach to research on teaching in the mid-1950s (Shulman, 1986). At the heart of this paradigm was a shift from teacher behaviors to teachers' planning, interactive thoughts, decision-making, and also their theories and beliefs (Clark & Peterson, 1986). This increased attention to understanding teachers' cognition in addition to their behaviors (Fang, 1996) relied on the core assumption that teachers' thinking affects the way they behave (Clark & Yinger, 1977). The present study is a part of this strand of research with its keen interest in teacher beliefs. Especially, we attempted to examine the influence of early childhood teachers' beliefs about teaching and self-efficacy beliefs for teaching on their self-reported fidelity to a top-down curriculum innovation in the context of Turkey.

Kagan (1992) stated that teacher beliefs lie at the heart of teaching. The main reason behind this strong argument is that teachers act more on the basis of their beliefs than their knowledge to cope with the unpredictable nature of the teaching profession (Kagan, 1992). Correspondingly, the current discourses about the purposes of teacher education programs touch upon guiding teacher candidates to form, reflect on, and change their beliefs (Richardson, 2003). While beliefs apparently constitute a critical component of teachers' professional identity, the existing literature is considered limited with regard to their role in early childhood education (Lee, 2006; McMullen, 2001; Rivalland, 2007). In this respect, it is expected that the present study expands our current knowledge about the relationship between early childhood teachers' beliefs and classroom practices. By developing an understanding about the belief system of teachers, this study can potentially contribute to improvement of professional preparation in teaching and classroom practices (Pajares, 1992).

Definition of beliefs about teaching and self-efficacy beliefs in teaching

Teacher beliefs basically refer to how teachers make sense of their world (Clark & Yinger, 1977). Pajares (1992) recognized that various meanings are interchangeably used for this construct in the literature such as attitudes, values, judgments, opinions, conceptual systems, personal theories, and repertories of understanding. Among this diversity, Pajares (1992) posited that beliefs are "an individual's judgment of the truth or falsity of a proposition, a judgment that can only be inferred from a collective understanding of

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what human beings say, intend, and do" (p. 316). As beliefs mirror individual judgments, they are, unlike knowledge, subjective, evaluative, and affective (Nespor, 1987). In fact, these features can explain why beliefs that teachers form can greatly influence their decisions, cause disagreement, potentially require reconstruction, and at the same time, be so resistant to change.

As one ingredient of teachers' belief systems, beliefs about teaching are the assertions and claims that teachers and teacher candidates assume to be true about learning, learners, the learning environment, and the content to be learnt (Kagan, 1992). In this study, they pertain to teachers' beliefs about the appropriateness of constructivist and traditional ways of education in early childhood. The other component, teacher self-efficacy beliefs, is derived from the social-cognitive theory of Bandura (1977). Self-efficacy beliefs for teaching stand for the perceived self-images of pre-service and in-service teachers in terms of their abilities to perform actions to fulfill particular teaching tasks (Tschannen-Moran, Woolfolk Hoy, & Hoy, 1998). Especially, in the current study, they address teachers' beliefs about their capabilities in the domains of student engagement, instructional strategies, and classroom management.

Relationship between teacher beliefs and practices in early childhood education

The beliefs that teachers hold about teaching and their self-efficacy beliefs for teaching have a decisive role in the life of a classroom. To date, literature has revealed that early childhood teachers' classroom practices are consistent with their beliefs about teaching (McMullen, 1999; McMullen et al., 2006; Rivalland, 2007; Vartuli, 1999). McMullen et al. (2005), for instance, found a positive association between developmentally appropriate beliefs and practices of early childhood teachers from five different countries. Charlesworth et al. (1993) similarly pointed to the consistency between teacher beliefs and practices and argued that this congruence was stronger especially in the relationship between inappropriate beliefs and inappropriate practices. Teachers' endorsement of child-initiated learning strategies was positively linked with their use of child-initiated practices in early childhood classrooms (Wang, Elicker, McMullen, & Mao, 2008). Similarly, in the study by Stipek and Byler (1997), there was a negative correlation between teachers' child-centered beliefs and their implementation of skills-based education. In their recent review, Wilcox-Herzog, Ward, Wong, and McLaren (2015) noticed that there is at least a moderate level of congruence between what early childhood teachers believe to be important and what they practice in their classrooms. Yet they caution against that this congruence is especially valid for teachers with higher levels of education, specialized training, and for teachers working in settings without structural barriers. In the light of these findings, in this study, it was hypothesized that early childhood teachers would be more likely to show fidelity to the common principles of the national constructivist curriculum when they espoused constructivist beliefs about teaching more strongly than they supported traditional views of education.

While studies on the relationship between beliefs about teaching and practices mainly center on the consistency between teacher beliefs and practices, studies on teacher self-efficacy beliefs probe the relationship between perceived capabilities of teachers and educational effectiveness. Bandura (1993) strongly underlined that teacher self-efficacy beliefs determine the atmosphere a teacher creates in his or her classroom and the type of learning that takes place in a classroom. The positive effect of teacher self-efficacy on educational practice stems from the fact that teachers with high self-efficacy are more likely than those with the low self-efficacy to engage in a number of important practices including demonstrating a sense of personal accomplishment, holding positive expectations for student behavior and achievements, taking personal responsibility for student learning, showing a sense of control, and engaging democratic decision-making (Ashton, 1984). Especially, in the context of early childhood education, teacher self-efficacy beliefs predict the implementation of developmentally appropriate practices (McMullen, 1999) and children's gains in print awareness (Guo, Piasta, Justice, & Kaderavek, 2010). Also, teacher self-efficacy beliefs are associated with a positive, cooperative, and supportive climate in school environment (Kim & Kim, 2010), and positive teacher-child and teacher-parent relationships (Chung, Marvin, & Churchill, 2005). Given its enhancing effect on teachers and teaching, our hypothesis in this study, consequently, was that early childhood teachers would report a higher level of fidelity to the mandated constructivist curriculum when they had a higher sense of self-efficacy for teaching.

Potential interaction between beliefs about teaching and self-efficacy beliefs

The independent influences of teachers' beliefs about teaching and self-efficacy on their actions are well documented in the literature. To our current knowledge, there seem hardly any studies investigating their potential interactive effect on educational practice. Yet, in the present study, based on the proposition that beliefs compose a system where individual beliefs form interconnections to each other (Rokeach, 1973), it is expected that beliefs about teaching and self-efficacy beliefs about teaching that comprise two components of teachers' beliefs system may be connected and interact with each other.

Of note is that teacher self-efficacy is considered the most important aspect of teacher effectiveness (Berman & McLaughlin, 1977). Bandura (1995) firmly states that self-efficacy beliefs are the most central mechanism of human agency that individuals use to make intentional actions for their functioning. That is, an individuals' performance is profoundly tied to their sense of efficacy (Bandura, 1993). In support of this stance is the positive relationship that was established between teachers' level of self-efficacy and a number of essential aspects of teacher effectiveness such as teacher persistence, enthusiasm, and commitment (Tschannen-Moran et al., 1998). Evidently, teacher efficacy beliefs have a substantial influence on teacher actions. However, the relationship between beliefs about teaching and teacher practices may be weak or even absent considering the evidence that teachers do not necessarily practice what they believe to be important in education (Rentzou & Sakellariou, 2010; Wilcox-Herzog, 2002). In their study where they found a weak and even a non-existing relationship between early childhood teachers' curriculum beliefs and their observed behaviors, Wen, Elicker, and McMullen (2011) posited that "a refined and more important question to ask might be when, how, for whom, and under what conditions are teachers' beliefs and practices consistent?" (p. 962). In this study, in the context of a mandated curriculum that explicitly depict what teachers need to believe, it was hypothesized that teacher self-efficacy beliefs would play the leading role in what teachers do in their classrooms. We consider that a sense of high self-efficacy may become the weapon to trigger teachers to exert higher levels of effort to fulfill their given roles even if their beliefs about teaching are less or even not constructivist.

Purpose of the present study

Early childhood education in Turkey underwent a top-down curriculum transition in 2006. The centralized curriculum for 36- to 72-month-old children is essentially based on the constructivist principles of education (Ministry of National Education [MoNE], 2006). Aligned with this approach, the curriculum that is

implemented nationwide mainly expects early childhood teachers to practice child-centered and play-based activities in their classrooms. The three characteristics that distinguish the mandated curriculum are actualization of content-free objectives in all areas of development, parent involvement, and development of problem-solving and creative skills in children.

Perhaps due to their perception of teachers as technicians rather than decision-makers, reformers in Turkey deemed that early childhood teachers would unconditionally show fidelity to this written curriculum and fulfill their roles in teaching as exactly described in the documents. The literature, however, depicts the gap between intended curriculum and actual curriculum experienced in preschool classrooms in Turkey (Erden, 2010; Kandır, Özbey, & İnal, 2009; Uzun, 2007). Given the paramount role of teacher thinking on curriculum implementation (Fullan, 2007), the present study strives to examine if teacher beliefs account for such discrepancies. Especially, we attempt to investigate if a lower level of fidelity to the constructivist curriculum is associated with the incongruence between early childhood teachers' beliefs about teaching and beliefs embedded in the mandated curriculum, and with early childhood teachers' low levels of self-efficacy for teaching. Namely, the main research questions in this study are as follows: How well do teachers' beliefs about teaching and their self-efficacy beliefs for teaching predict their self-reported fidelity to the mandated curriculum after controlling for other relevant teacher characteristics and school-related factors? Do early childhood teachers' self-efficacy beliefs moderate the relationship between beliefs about teaching and self-reported fidelity to the mandated curriculum?

Method

Participants

The participants of this study were 308 early childhood teachers. They were selected through cluster random sampling from an accessible population of 1445 early childhood teachers that are employed in public schools in seven districts of Ankara, Turkey. In the sample, 76.3% of the early childhood teachers ($n = 235$) were providing service for 5- and 6-year-old children. However, 22.4% of the participants ($n = 69$) were teaching children younger than 5. The participating teachers were working in preprimary classes that are located in elementary schools for 5- and 6-year-old children ($n = 168$, 54.5%) or in independent preprimary schools that are especially designed for 3- to 6-year-old children ($n = 138$, 44.81%). They often taught in half-day programs ($n = 191$, 62%) and in the presence of a teacher aide ($n = 212$, 68.8%).

The participants were all female teachers congruent with the typical makeup of early childhood educators' population in Turkey that is comprised of female teachers by 95% (MoNE, 2010). Their years of experience in teaching were on average 14.04 ($SD = 8.43$), ranging from 1 year to 35 years. The participants' degree of education varied in the sample, including, by majority, early childhood teachers with a Bachelor of Science Degree that is obtained from higher education institutions ($n = 224$, 72.72%). The degrees participants obtained were predominantly in early childhood education ($n = 181$, 58.8%) and child development and education ($n = 87$, 28.2%). The mean size of the classrooms was 20 children ($SD = 4.35$) with a range from 5 to 29 students. Table 1 demonstrates the major characteristics of participating early childhood teachers and their classes.

Table 1
The characteristics of participating early childhood teachers and their classes ($N = 308$).

Characteristic	*n*	%
Gender		
Female	308	100
Teachers' years of experience		
1–5 years	66	21.43
6–10 years	54	17.53
11–15 years	56	18.18
16–20 years	57	18.51
21–25 years	39	12.66
26–30 years	33	10.71
31–35 years	3	.97
Teachers' degree of education		
Bachelor of Science Degree	224	72.72
Associate's Degree	53	17.21
Open University Degree	18	5.84
Master of Science Degree	12	3.90
Area of specialization		
Early Childhood Education	181	58.77
Child Development and Education	87	28.25
Other	40	12.99
Age of the students		
Younger than 5 year-old	69	22.40
5 and 6 year-old	235	76.30
Class size		
5–9 students	2	.65
10–14 students	34	11.04
15–19 students	91	29.55
20–24 students	125	40.58
25–29 students	56	18.18
Type of the school		
Elementary school	168	54.55
Independent preprimary school	138	44.81
Length of the program		
Half-day program	191	62.01
Full-day program	115	37.34
Existence (nonexistence) of a teacher aide		
Yes	212	68.83
No	93	30.19

Note. Missing values are not demonstrated on the table.

Measures

The data collection instrument was composed of a personal information form and three subscales, namely the Self-report Curriculum Implementation Scale, the Turkish Version of the Teachers' Sense of Efficacy Scale, and the Teacher Beliefs Survey.

The self-report curriculum implementation scale (CIS)

The CIS was developed as a self-report measure to investigate the extent to which early childhood teachers implement basic requirements that are proposed in national early childhood curriculum. It is based on a 5-point rating scale ranging from never (1) to always (5). Having higher scores on this scale indicates that participating teachers perceive themselves to show a higher level of fidelity to the key principles of the mandated curriculum in their classrooms.

In the scale construction process, content validity, probable factor structure, and wording of the scale were judged by six experts, including faculty members from the field of early childhood education ($n = 3$), curriculum and instruction ($n = 1$), measurement and evaluation ($n = 1$), and also an early childhood teacher ($n = 1$). A pilot study with a sample of 157 early childhood teachers was conducted to further examine the factor structure and internal consistency. Although the exploratory factor analysis with this small set of data did not result in the identification of a meaningful factor structure, it pointed to probable factors, leading to the improvement of several items in terms of language and the exclusion of one item that was considered being unrelated to the probable factors. One item was also deleted because of its low correlation (.05) with the overall scale. The instrument eventually consisted of 24 items and was applied to the target sample.

Table 2
The explanatory factor analysis results for the self-report curriculum implementation scale.

Item	Factor loading		Communality
	Content selection	Learning process	
Including respect for diversity education in activities	**.71**	−.11	.43
Developing a feeling of autonomy in children	**.69**	−.17	.36
Including empathy education in activities	**.64**	.02	.41
Considering balanced development of children in learning process	**.58**	.11	.40
Including activities to develop problem solving skills of children	**.55**	.10	.38
Supporting creative development of children	**.54**	−.01	.20
Taking advantage of daily experiences of children in activities	**.52**	.06	.31
Enabling children to work in cooperation and collaboration with each other	**.52**	−.00	.27
Supporting children to use critical thinking skills	**.49**	.19	.39
Using content in activities as a means to achieve objectives	**.47**	−.06	.19
Evaluating the effectiveness of the curriculum considering its impact on child development	**.43**	.28	.40
Considering prior knowledge level of children before starting activities	**.39**	.01	.16
Including responsibility education in activities	**.36**	.09	.18
Being flexible while implementing the curriculum	**.34**	.05	.14
Supporting children to speak Turkish accurately and well	**.30**	.12	.15
Considering family and environment characteristics while preparing activities	**.30**	.10	.14
Considering individual differences of children in activities	-.14	**.64**	.33
Preparing learning environment consistent with democratic education	.07	**.49**	.28
Involving families effectively into educational practice	.14	**.45**	.29
Implementing activities in a rich and multipurpose learning environment, composed of learning centers	.07	**.45**	.25
Evaluating development of children regularly	.18	**.45**	.33
Offering different choices to children in activities based on their interests and motivations	.24	**.39**	.32
Providing opportunity for the children to learn by trial and doing	.23	**.32**	.24
Eigenvalues	5.84	.80	
% of variance	25.38	3.44	
Cronbach's alpha	.85	.73	

Note: Extraction method: Principal Axis Factoring. Rotation method: Direct Oblimin.

The second exploratory factor analysis of the 24 items was conducted based on the responses of 308 early childhood teachers in the current study. The principal axis factor analysis with direct oblimin rotation was used given that multivariate normality was violated in the data set (Mardia's test, $p < .05$) and some correlation among the factors (.59) was noted (Costello & Osborne, 2005). The data met the assumptions for the Kaiser–Meyer Olkin measure (>.60) and Bartlett's test ($p < .05$) (Field, 2009). A two-factor structure was extracted considering Catell's scree test. One of the items with a loading of .29 was excluded from the analysis because the critical value for factor loading for this sample size was determined as .298 (Stevens, 2002) and also the item did not fit into the identified model.

Table 2 demonstrates factor loadings, communalities, eigenvalues, and percentages of variance, and reliabilities for the final version of the scale with a two-factor structure including 23 items. The factors were named *content selection* and *learning process*. The content selection dimension, including 16 items, is assumed to measure early childhood teachers' self-reported practice in relation to learning objectives and competencies that they address in their classes (e.g., I support children to use critical thinking skills; I try to support creative development of children) and key considerations that they take into account in their selection (e.g., I consider prior knowledge level of children before starting activities; I consider balanced development of children in all areas [psychomotor, social, emotional, language, cognitive, and self-care] in the process of education). The learning process dimension (seven items), on the other side, addresses the self-reported practices of early childhood teachers with regard to key pedagogical considerations of the national curriculum in their classes (e.g., I consider individual differences of children in class activities; I provide opportunities for children to learn by trial-error/doing). The content selection dimension explained 25.38% of the variance in the sample of this study, while it was 3.44% for the learning process. In addition, the dimensions were internally consistent given that the Cronbach's alpha values were .85 for content selection and .73 for learning process (Hair, Black, Babin, & Anderson, 1999).

The Turkish version of the teachers' sense of efficacy scale (TTSES)

The TTSES, originally developed by Tschannen-Moran and Woolfolk Hoy (2001), was adapted by Çapa, Çakıroğlu, and Sarıkaya (2005) into Turkish. The scale has a long version with 24 items and a short version with 12 items. The short version was administered in this study to reduce the time that was required for participants to complete the data collection instrument. The scale, designed on a 9-point rating scale ranging from "none at all" (1) to "a great deal" (9), attempts to measure teacher self-efficacy in three domains: *efficacy for student engagement* (ESE) (e.g., How well can you motivate students who show low interest in school work?), *efficacy for instructional strategies* (EIS) (e.g., How well can you use different teaching methods in the class?), and *efficacy for classroom management* (ECM) (e.g., How much can you get students to follow classroom rules?). In this manner, the scale addresses general capabilities considered important to good teaching regardless of contexts, levels, and subjects of teachers (Tschannen-Moran & Woolfolk Hoy, 2001). Having higher scores on this scale reveals that teachers perceive themselves to be more self-efficacious in teaching. Capa Aydın, Sungur, and Uzuntiryaki (2009) provided satisfactory evidence for the construct validity and reliability of the short version of the scale in their study. In their study, the fit indices were .99 for Tucker Lewis Index (TLI), .99 for Comparative Fit Index (CFI), and .07 for Root Mean Square Error of Approximation (RMSEA). They also found that the coefficient alpha values were .75 for ESE, .75 for EIS, and .81 for ECM.

A confirmatory factor analysis was performed with the data that were obtained from participating early childhood teachers in this study. The initial three-factor model of the 12-item TTSES was found unsatisfactory considering that the chi-square value was significant ($\chi^2(51, N = 308) = 219.58$, $p < .05$). The RMSEA (.10) also did not satisfy the acceptable criteria of a good model fit (Byrne, 2010). The model was improved by allowing error terms on the same

factors to covary (for items 1 and 8, 6 and 7, 6 and 8, 5 and 10, 3 and 4, and 2 and 3) considering the modification indices. The chi-square value of this respecified model ($\chi^2(45, N = 308) = 142.14, p < .05$) presented improvement in the model, but was still significant. This finding was disregarded due to the sensitivity of chi-square value to sample size (Byrne, 2010). The Goodness of Fit Index (GFI) (.93), the CFI (.94) and the RMSEA (.08), however, provided reasonable evidence to consider the three-factor model of the TTSES acceptable for this sample of early childhood teachers (Byrne, 2010). The relative chi-square index (3.16) was also less than 5, which meets the criterion for acceptance (Schumacker & Lomax, 2004).

All parameters in this model were significant, which indicates the contribution of each item to the confirmed structure. The factor loadings of the items that were between .60 and .68 for ESE; between .71 and .80 for EIS; and between .63 and .84 for ECM revealed that they were a good component of the corresponding factor. Moreover, the factors were highly correlated with each other. The correlation between ESE and EIS was .93; between ESE and ECM was .93; and between EIS and ECM was .81. The Cronbach's alpha values demonstrated a reasonable degree of reliability in the sample (.76 for ESE, .83 for EIS, and .81 for ECM).

The teacher beliefs survey (TBS)

The TBS was originally developed by Woolley, Benjamin, and Woolley (2004) and adapted by Duru (2006) into Turkish. The survey includes 17 items on a 6-point Likert-type scale ranging from "strongly disagree" (1) to "strongly agree" (6). In this study, the version, which was revised by Gürbüztürk and Şad (2009), was utilized to gauge early childhood teachers' beliefs about teaching on the basis of two dimensions: *constructivist teaching* (CT; e.g., One of the most effective ways to plan educational and instructional activities is to get the opinion of the students) and *traditional teaching* (TT; e.g., The teacher should make the choices for students since they will not know what to learn). Gürbüztürk and Şad (2009) offered evidence for the construct validity and reliability of this two-factor structure of the survey in their study. Namely, the results of the exploratory factor analysis that they carried out with 318 pre-service teachers indicated that the two-factor structure of the scale was meaningful and explained 35.2% of the variance in their sample. They also found out that the internal consistency coefficients, .77 for CT and .63 for TT, were reasonably acceptable.

In the present study, the wordings of some items were revised without making any difference in their meaning to improve the structural unity and clarity of the survey and make it relevant for early childhood education. A confirmatory factor analysis was also conducted to yield support for its construct validity for the sample of this study. The initial model was considered to fit well because it met the acceptable criteria for the GFI (.92), the RMSEA (.06), and the relative chi-square (2.06) indices. However, it improved as the error terms on the same factor (for items 12 and 14, and 11 and 13) were covaried. The respecified model had a better fit because of the progress in the GFI (.93), the CFI (.93), the RMSEA (.05), and the relative chi-square (1.77) values. All items significantly contributed to the corresponding factor with loadings ranging from .52 to .67 for traditional teaching and from .44 to .69 for constructivist teaching. The two factors, constructivist and traditional teaching, were also moderately correlated (.46) with each other. The survey was reasonably internally consistent because the Cronbach's alpha values were .79 for traditional teaching and .82 for constructivist teaching.

Procedures

The ethical permissions from the University Ethics Committee and the Ministry of National Education were obtained to collect data from early childhood teachers at target public schools. The data collection process lasted approximately four weeks during the spring term of the schools. The data were collected by the researchers in the school settings.

Data analysis

Descriptive statistics were generated for the dimensions of teacher self-efficacy beliefs, beliefs about teaching, and self-reported fidelity to the curriculum. For each of these variables, one-way within-subject ANOVA was conducted to test if the mean scores of the participants in the dimensions significantly differ from each other. As the sphericity assumption was met in each case, we used the *F*-ratios in reporting the results of these analyses (Field, 2009). Also, hierarchical regression analyses were performed to examine the relationship between teacher characteristics (i.e., teachers' years of experience and teachers' degree of education), school-related factors (i.e., class size, age of the students, school type, length of the program, and existence/nonexistence of a teacher aide for the class), beliefs about teaching (i.e., constructivist beliefs and traditional beliefs), teacher self-efficacy beliefs (efficacy for student engagement, efficacy for instructional strategies, and efficacy for classroom management) and the two dimensions of the self-reported fidelity to the mandated curriculum (i.e., content selection and learning process). The order in which the variables were entered into the analyses was determined by differentiating the variables of major importance from nuisance variables (Tabachnick & Fidell, 2012). Since teacher beliefs including beliefs about teaching and teacher self-efficacy beliefs constituted the core of the present study, they were entered into the equation later than teacher characteristics and school-related factors. Also, interaction terms between dimensions of beliefs about teaching and teacher self-efficacy beliefs were included in the analyses in the last step to test if there was any moderator effect. To this end, product terms were formed using centered scores of the variables to eliminate multicollinearity problems (Aiken & West, 1991).

In the interpretation of the results, alpha value was adjusted to .025 (.05/2) to eliminate Type 1 error because of the presence of two dimensions of the curriculum implementation as the outcome variable. The teachers' degree of education with four levels required dummy coding. Three dummy coded variables were created using Bachelor of Science Degree as the baseline category to make comparisons. As a preliminary step, the data were screened to assess if they met the assumptions for hierarchical regression analyses for each outcome variable. The sample size formulas for sample adequacy, the normality plot for normality of residuals, the scatterplot of the residuals for homoscedasticity and linearity, Durbin–Watson values for independence of errors, Cooks' distance values for outliers, and tolerance and variance inflation factor scores for multicollinearity overall provided evidence that the present data reasonably met the acceptable criteria to conduct analyses (Field, 2009; Tabachnick & Fidell, 2012). SPSS software was used to conduct the statistical analyses.

Results

Early childhood teachers' perceptions of their self-efficacy, beliefs about teaching, and fidelity to the curriculum

On average, early childhood teachers in this study reported a high level of self-efficacy for teaching with all mean scores at the higher end of the scale. The mean values on a 9-point scale were 7.65 ($SD = .86$) for efficacy for student engagement, 7.45 ($SD = 1.00$) for efficacy for instructional strategies, and 7.31 ($SD = .94$) for efficacy for classroom management. These values for three dimensions of teacher self-efficacy were overall statistically different, F (2,

Table 3
The intercorrelations for the dimensions of the self-report curriculum implementation and predictor variables.

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Content selection	.52*	.51*	.44*	.38*	.08	.12*	.01	−.02	.08	−.04	−.07	.12*	.02	−.01
Learning process	.50*	.49*	.40*	.32*	.10	.21*	−.01	.05	.06	.03	−.08	.21*	.05	.05
Predictor variables														
1. Efficacy for student engagement	–													
2. Efficacy for instructional strategies	.70*	–												
3. Efficacy for classroom management	.69*	.68*	–											
4. Constructivist beliefs	.31*	.27*	.23*	–										
5. Traditional beliefs	.06	.08	.10	.38*	–									
6. Teachers' years of experience	.15*	.11	.12*	.10	.13*	–								
7. Class size	−.12*	−.09	−.10	−.02	.04	−.02	–							
8. Class of children younger than 5 vs. class of 5-6 year-old children	.01	−.05	.01	−.01	−.03	.19*	.04	–						
9. Independent preprimary school vs. elementary school	−.06	.06	−.00	−.04	−.09	−.43*	.16*	−.41*	–					
10. Full-day program vs. half-day program	.00	−.06	−.03	−.04	.09	.26*	−.10	.29*	−.78*	–				
11. Existence of a teacher aide vs. nonexistence of a teacher aide	−.11	−.12*	−.01	−.03	.01	.13*	.15*	.07	−.12*	.06	–			
12. Associate's Degree vs. Bachelor of Science Degree	.14*	.08	.13*	−.04	.04	.46*	−.00	.02	−.19*	.20*	.02	–		
13. Open University Degree vs. Bachelor of Science Degree	−.02	.02	.04	−.02	−.02	−.13*	−.04	−.20*	.11	−.06	.01	−.11*	–	
14. Master's Degree vs. Bachelor of Science Degree	.05	−.02	−.01	−.02	−.15*	−.06	−.09	.03	−.02	−.02	−.10	−.09	−.05	–

* $p < .025$.

614) = 31.92, $p < .05$, partial $\eta^2 = .09$. The follow-up pairwise comparisons with Bonferroni correction especially indicated that early childhood teachers' perceptions of their capabilities as teachers were significantly higher in the domain of student engagement compared to their level of efficacy for instructional strategies and classroom management. Moreover, they reported significantly higher self-efficacy in the domain of instructional strategies than in the domain of classroom management.

In addition, participating teachers on average showed the tendency to favor both constructivist beliefs ($M = 5.08$, $SD = .59$) and traditional beliefs about teaching ($M = 4.24$, $SD = .88$). However, the difference in the mean scores of the teachers on constructivist and traditional beliefs were statistically significant, $F(1, 307) = 297.39$, $p < .05$, partial $\eta^2 = .49$. This result suggested that early childhood teachers valued constructivist beliefs significantly more than they valued traditional teaching.

Considering the early childhood teachers' self-reported fidelity to the curriculum, the mean score for implementation of content selection ($M = 4.32$, $SD = .41$) was significantly lower than the mean score for implementation of learning process ($M = 4.57$, $SD = .32$), $F(1, 307) = 180.62$, $p < .05$, partial $\eta^2 = .37$. These findings overall revealed that participating teachers reported practicing the key principles of the national early childhood curriculum frequently. Yet they reported significantly higher fidelity to the mandated curriculum in the domain of learning process than they did in content selection.

The inter-correlations among teacher characteristics, school-related factors, teacher beliefs, and self-reported fidelity to the curriculum

Table 3 shows the inter-correlations between predictor variables and the two dimensions of the self-reported practice of the curriculum. The results indicated that all domains of teacher self-efficacy beliefs, constructivist beliefs about teaching, teachers' years of experience, and having an Associate's Degree vs. Bachelor of Science Degree were significantly and positively associated with early childhood teachers' self-reported curriculum implementation in content selection and learning process. These correlations particularly revealed that there was higher fidelity to the curriculum when teachers reported a higher level of self-efficacy, supported constructivism more, were more experienced in teaching, and had an Associate's Degree rather than a Bachelor of Science of Degree.

The predictors of self-reported fidelity to the curriculum in content selection

Table 4 displays the results of regression analyses both for content selection and learning process based on the self-report of early childhood teachers. The results of the hierarchical regression analysis for content selection in the first step revealed that school-related factors did not predict early childhood teachers' self-reported curriculum implementation with respect to content selection in their classrooms, $F(5, 295) = .58$, $p > .025$. The second step with the addition of teacher characteristics also did not yield a significant model, $F(9, 291) = 1.542$, $p > .025$. The total variance explained by the model was .01 in the first step and .05 in the second step.

In the third step, holding the effect of school-related factors and teacher characteristics constant, beliefs about teaching was a significant predictor of self-reported fidelity to the curriculum in content selection ($F(11, 289) = 6.23$, $p < .025$), explaining an additional variance of 15% in the sample. In this model, the contribution of constructivist beliefs was considerably significant, uniquely making up 14% of the variance. The positive correlation indicated that early childhood teachers reported a higher level of fidelity to the national curriculum in relation to content selection when they were more constructivist in their beliefs about teaching. There was not, however, any statistically significant influence of traditional beliefs in the model.

In the fourth step, the model with the addition of teacher self-efficacy beliefs was not only significant, but also a better predictor, $F(14, 286) = 12.84$, $p < .025$. After controlling for the effect of school-related factors, teacher characteristics, and beliefs about teaching, teacher self-efficacy beliefs corresponded to an additional variance of 19%. Efficacy for student engagement and efficacy for instructional strategies were significant predictors in this model, each making a unique contribution of 2% to the total variance, while the influence of efficacy of classroom management was statistically non-significant. Thus, it was concluded that early childhood teachers showed higher fidelity to the curriculum in content

Table 4
The summary of the hierarchical regression analyses for self-reported practice of content selection and learning process.

	Content Selection						Learning Process					
Variable	*B*	SE *B*	*β*	sr^2	R^2	ΔR^2	*B*	SE *B*	*β*	sr^2	R^2	ΔR^2
Step 1: School-related factors					.01	.01					.01	.01
Class size	.00	.00	.01	.00			.00	.00	−.00	.00		
Class of children younger than 5 vs. class of 5-6 year-old children	.02	.05	.02	.00			−.03	.06	−.03	.00		
Independent preprimary school vs. elementary school	.07	.06	.10	.00			.06	.08	.08	.00		
Full-day program vs. half-day program	.02	.06	.03	.00			.04	.08	.04	.00		
Existence of a teacher aide vs. non-existence of a teacher aide	−.04	.04	−.06	.00			−.06	.05	−.07	.01		
Step 2: Teacher characteristics					.05	.04					.11	.10*
Teachers' years of experience	.01	.00	.16	.02			.01	.00	.26*	.04		
Associate's Degree vs. Bachelor of Science Degree	.07	.06	.08	.00			.16	.07	.14*	.00		
Open University Degree vs. Bachelor of Science Degree	.05	.08	.04	.00			.14	.10	.08	.00		
Master's Degree vs. Bachelor of Science Degree	.02	.10	.04	.00			.16	.12	.08	.01		
Step 3: Beliefs about teaching					.19	.15*					.21	.10*
Constructivist beliefs	.22	.03	.41*	.14			.23	.04	.33*	.09		
Traditional beliefs	−.03	.02	−.08	.00			−.02	.03	−.03	.00		
Step 4: Teacher self-efficacy beliefs					.39	.19*					.38	.17*
Efficacy for student engagement	.09	.03	.24*	.02			.13	.04	.26*	.03		
Efficacy for instructional strategies	.08	.02	.24*	.02			.10	.03	.24*	.03		
Efficacy for classroom management	.02	.02	.05	.00			−.01	.03	−.02	.00		
Step 5: Beliefs about teaching × self-efficacy beliefs					.41	.02					.42	.04*
Traditional beliefs × efficacy for student engagement	−.05	.03	−.12	.00			−.06	.04	−.10	.00		
Constructivist beliefs × efficacy for student engagement	.08	.06	.10	.00			−.16	.07	.16	.01		
Traditional beliefs × efficacy for instructional strategies	.02	.03	.05	.00			−.01	.04	−.02	.00		
Constructivist beliefs × efficacy for instructional strategies	−.07	.05	−.11	.00			−.19	.06	−.25*	.02		
Traditional beliefs × efficacy for classroom management	.05	.05	.08	.00			.15	.07	.17	.01		
Constructivist beliefs × efficacy for classroom management	−.04	.03	−.11	.00			−.04	.04	−.07	.00		

* $p < .025$.

selection if they had a higher sense of efficacy in student engagement and instructional strategies. This model, accounting for 36% of the adjusted variance in the sample, had a large effect size (Cohen, 1988).

In the last step, the product terms between the dimensions of beliefs about teaching and self-efficacy beliefs in teaching explained an additional variance of 2%. This effect did not result in a statistically significant improvement in the model, $F(6, 280) = 1.83$, $p > .025$. Thus, it was concluded that the influence of beliefs about teaching on early childhood teachers' self-reported fidelity to the curriculum regarding content selection did not differ with respect to their level of self-efficacy for teaching.

The predictors of self-reported fidelity to the curriculum in learning process

The results of the hierarchical regression analysis for learning process dimension demonstrated that the first step (including only school-related factors) did not predict early childhood teachers' self-reported practice of the curriculum for learning process, $F(5, 295) = .63$, $p > .025$. The second step, testing the influence of teacher characteristics after controlling for the effect of school-related factors was, however, significant, $F(9, 291) = 4.07$, $p < .025$, explaining an additional variance of 10% in the sample. In this model, teachers' years of experience and holding an Associate's Degree vs. Bachelor of Science Degree were significant predictors, uniquely explaining 4% and 2% of the total variance, respectively. Specifically, early childhood teachers reported higher levels of fidelity to the curriculum with respect to learning process when they were more experienced and had an Associate's Degree rather than a Bachelor of Science of Degree.

In the third step, controlling for school-related factors and teacher characteristics, beliefs about teaching significantly predicted early childhood teachers' stated curriculum implementation in relation to learning process, $F(11, 289) = 7.06$, $p < .025$, accounting for an additional variance of 10% in the data set. Constructivist beliefs about teaching made a significant contribution to this model by uniquely explaining 9% of the variance; however, there was not any significant influence of traditional beliefs on the model. This result indicated that the national curriculum was reported to be practiced in terms of learning process to a greater extent when early childhood teachers supported constructivist beliefs more strongly in the education of preschool children.

In the fourth step, teacher self-efficacy beliefs significantly predicted stated implementation in the domain of learning process, $F(14, 286) = 12.66$, $p < .025$. Holding all other variables in the equation constant, self-efficacy beliefs explained an additional variance of 17% in the model. Efficacy for student engagement and instructional strategies, but not efficacy for classroom management, were significant predictors in this model. Each uniquely made a contribution of 3% to the total R squared. This model, which accounted for 35% of the adjusted variance in the sample, had a large effect size (Cohen, 1988).

In the last step, the product terms between beliefs about teaching and teacher self-efficacy beliefs significantly improved the model, explaining an additional variance of 4%, $F(6, 280) = 3.20$, $p < .25$. The interaction between efficacy for instructional strategies and constructivist beliefs about teaching was the only significant predictor in this step, uniquely accounting for 2% of the variance in the model. This finding revealed that early childhood teachers' level of efficacy in the domain of instructional strategies changed the nature of the significantly positive relationship that was found between early childhood teachers' agreement with constructivist beliefs and their self-reported fidelity to the curriculum in learning process dimension. The examination of the 3×3 interaction plot (i.e., *high*: one standard deviation above the mean, *medium*: the mean, *low*: one standard deviation below the mean) and the

simple slope values revealed that early childhood teachers with both low and medium levels of efficacy for instructional strategies reported significantly higher fidelity to the curriculum in the domain of learning process when they agreed more strongly with constructivist beliefs, whereas the direction of this relationship was negative and also non-significant in the group of teachers with high levels of efficacy.

Discussion

The current study showed that early childhood teachers' beliefs about teaching and self-efficacy beliefs considerably influenced their self-reported fidelity to the mandated curriculum in Turkey. Early childhood teachers reported that they often practiced the curriculum in the way it is intended, but the extent of their implementation considerably improved when they agreed with constructivist beliefs about teaching more strongly and had a higher sense of self-efficacy particularly in the domains of student engagement and instructional strategies. Furthermore, a considerable interplay was found between constructivist beliefs and efficacy for instructional strategy with regard to stated implementation of learning process. Among teacher characteristics, teachers' years of experience and their degree of education significantly influenced their self-reported fidelity to the curriculum in the domain of learning process, but not for content selection. Specifically, early childhood teachers who were more experienced in teaching and had a two-year Associate's Degree rather than a four-year formal undergraduate degree reported fidelity to the mandated curriculum to a higher extent. School-related factors including class size, age of the students, school type, length of the program, and existence/nonexistence of a teacher aide for the class did not have any significant influence on the self-reported fidelity to the early childhood curriculum.

First, it is promising that participating early childhood teachers indicated practicing the national curriculum to a great extent even though previous studies have addressed several barriers to its implementation (Erden, 2010; Kandır et al., 2009). This finding suggests that children who are taught by this sample of teachers are likely experiencing developmentally appropriate practice, congruent with the guidelines outlined by the National Association for the Education of Young Children (2009). However, caution is warranted because this result reflected what early childhood teachers reported to practice, but not what they indeed did in their classrooms.

Perhaps more importantly, the findings underlined the pivotal role of teacher beliefs in educational practice. Aligned with a great majority of research on the consistency between teachers' beliefs about teaching and their actions (Lewin & Grabbe, 1945; McMullen, 1999; Pajares, 1992; Rivalland, 2007; Stipek & Byler, 1997; Vartuli, 1999), in the current study, early childhood teachers' endorsement with constructivist beliefs enhanced their self-reported fidelity to the mandated curriculum which embraces constructivist roots. This finding might suggest that early childhood teachers who espouse constructivism show an increased willingness to develop a sense of ownership of the mandated curriculum in response they have an improved engagement in implementing it. If they are expected to practice a curriculum incongruent with their beliefs about education, there might be greater likelihood for teacher resistance because "a new god is introduced who has to fight with the old god, now regarded as devil" (Lewin & Grabbe, 1945, p. 60). In such situations, in contrast to the expectations of educational reformers, teachers may simply select to be opportunist and not to risk themselves to change (House, 1996).

Given that teacher self-efficacy beliefs for instructional strategies moderated the positive relationship that was found between constructivist beliefs and stated implementation of learning process, we additionally conclude that teachers' agreement with constructivist beliefs is more critical for the implementation of a constructivist curriculum especially when teachers do not perceive themselves as highly capable in employing instructional strategies. As expected, the impact of teachers' beliefs about teaching on their self-reported fidelity to curriculum in the domain of learning process appeared to fade out for teachers with a high level of efficacy. It might be because highly efficacious teachers, regardless of their beliefs about teaching, are successful in responding to the demands of a mandated curriculum as they are more likely to be goal-oriented, committed to achievement, hard-working, and resilient (Bandura, 1997).

The positive relationship between teacher self-efficacy beliefs and self-reported fidelity to the curriculum was consistent with an accumulated body of research that has associated it with teacher effectiveness (Bandura, 1993; Berman & McLaughlin, 1977; Gregoire, 2003; Guskey & Passaro, 1994; Tschannen-Moran & Woolfolk Hoy, 2001). In this study, early childhood teachers with a high level of self-efficacy were more likely to state that they implemented the mandated curriculum regardless of their constructivist beliefs. "If people believe they have no power to produce results -the condition of having low self-efficacy-, they will not attempt to make things happen" (Bandura, 1997, p. 3). In this study, we believe that a higher level of self-efficacy for teaching made teachers expend more efforts to practice the constructivist curriculum as intended. A lower level of self-efficacy could hamper a teacher's coping ability with stress and anxiety to implement a top-down curriculum. That efficacy for classroom management did not significantly influence self-reported fidelity to curriculum implementation reveals that abilities for a teacher to implement a curriculum are distinct from the abilities to manage a classroom. This demonstrates that different domains of teacher self-efficacy may be related to different sorts of educational outcomes.

That more experienced early childhood teachers stated practicing the curriculum more frequently particularly concerning learning process might be meaningful given the positive correlation established between teachers' years of experience and their self-efficacy beliefs (Fives & Buehl, 2010; Klassen & Chiu, 2010; Tschannen-Moran & Woolfolk Hoy, 2007). As teachers with higher years of experience may have a greater chance to improve their sense of efficacy in teaching by means of mastery experiences, vicarious experiences, and verbal persuasions (Bandura, 1997), they might in turn be more able to implement the curriculum. As the field of education has a strong practical dimension, this influence of teaching experience may be more evident in the implementation of learning process, relying more on teachers' applied knowledge compared to the implementation of content selection.

The finding that early childhood teachers who had an Associate's Degree rather than a Bachelor of Science Degree reported a higher level of fidelity to the curriculum was in contrast with the expectation that teachers with higher educational degrees would be of higher quality; therefore, they would be more likely to implement the constructivist curriculum as intended. One possible reason of this result might be that there may not be a strong relation between teachers' degree of education and educational quality (Early et al., 2007; Goldhaber & Brewer, 2000; Wayne & Youngs, 2003). However, we consider that it may misleading to link this finding to teachers' qualifications because of lack of data in this domain. Indeed, because early childhood teachers with Bachelor of Science degrees may be more qualified, they could resist any pressures including implementing a top-down curriculum that shifts their roles from being decision makers to being technicians. In the sample of this study, the most obvious difference between early childhood teachers with Associate's and Bachelor of Science degrees was their years of experience in teaching. The

participating teachers with Associate's degrees were on average almost twice as experienced in teaching compared to teachers with Bachelor of Science degrees; maybe therefore, they were more likely to practice the curriculum. Also, it can be argued that teachers spending more time with children in early childhood classes improved their efficacy and consequently better aligned their practice with the constructivist curriculum.

There was not any significant influence of school-related factors on early childhood teachers' self-reported fidelity to the mandated curriculum in this study. It was especially unexpected that class size did not have any impact on stated practice of the national curriculum although it was considered as an obstacle to educational practice in Turkey in previous studies (Erden, 2010; Kandır et al., 2009; Uzun, 2007). This finding underlines that the role of teachers is much more important than the role of context of teaching in curriculum implementation. In the present study, it seems that early childhood teachers who had in general a high level of efficacy in teaching were effective in the management and arrangement of external conditions in accordance with the requirements of the constructivist curriculum regardless of the level they teach, and the type of school and program they are employed in.

Implications

Overall, the results in this study emphasized the key role of teachers in curriculum implementation. The influence of teacher-related factors such as teacher beliefs, years of experience, and degree of education considerably surpasses the influence of school-related factors in the implementation of the national curriculum in the context of Turkey. Therefore, the current study first and foremost implies that to actualize the aims of the curriculum as intended, early childhood teachers need to be the primary source of attention and investment. It is now clear that early childhood teachers would be more likely to fulfill their intended roles as constructivist teachers as they support constructivist beliefs more strongly and have a higher sense of efficacy for teaching. Noticeably, understanding the beliefs of pre-service and in-service early childhood teachers and helping them construct their beliefs consistent with expectations and develop a positive image about their capabilities would contribute to educational practice. Thus, it can be recommended that teacher education and professional development programs focus on teacher beliefs as much as teacher knowledge and skills.

Moreover, the differences between early childhood teachers with Associate's and Bachelor of Science degrees in the practice of the constructivist curriculum should be studied further in future studies. Indeed, having a wide range evidence about influence of two and four-year teacher training programs on the qualifications of early childhood teachers can contribute to making better decisions about the present status of teacher education programs. In our study, the most obvious difference among these two groups of teachers was their years of experience. Given the contribution of experience to early childhood teachers' sense of efficacy and curriculum implementation, early childhood teacher education programs could be designed with more and better authentic learning opportunities for teacher candidates to practice their teaching skills. It is critically important that early childhood teachers are provided with necessary support through effective and continuous feedback mechanisms to help them maintain and enhance their sense of efficacy in teaching

This study has several limitations. First, the results are based on the correlations and do not imply any cause-effect relationships. Also, the fidelity to curriculum implementation was measured based on the self-report of early childhood teachers in this study. Thus, there is likelihood that participating teachers might have felt that they needed to report what is desirable. In other words, the findings could manifest the "intentions" of teachers, but not their true behaviors (Wilcox-Herzog & Ward, 2004). The self-report data about the extent of curriculum implementation need to be validated in future studies with the use classroom observations. Moreover, in the measurement of early childhood teachers' practices, future studies should consider the quality of early childhood teachers' actions in addition to their frequency. How well early childhood teachers practice the curriculum could explain a larger variance in educational outcomes than how often they practice it. Furthermore, our model is limited in explaining the complex relationships that are likely to occur among teacher education, teacher experience, beliefs about teaching, self-efficacy beliefs, and curriculum implementation. We recommend that future studies test alternative statistical models to explore the sophisticated pathways through which teacher beliefs exert its influences on the practice of curriculum.

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