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Teachers' knowledge about autism spectrum disorder: The case of Turkey

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ABSTRACT Teachers' knowledge and perceptions about autism spectrum disorder (ASD) is found to be a critical component for the identification and education of children with ASD. This study examined Turkish general education teachers' knowledge and perceptions about ASD. A total of 478 general education teachers across four school types participated in the study. Data were collected using an online survey package. Results showed Turkish general education teachers across all school types and grade levels had limited knowledge and perceptions of autism. Findings show that there is an urgent need to develop professional development or certification programs to train teachers to work with children with ASD. Implications for future research and practice are discussed.

Keywords *Autism, General education teachers, Knowledge, Perception, Treatment,*

Öğretmenlerin otizm spektrum bozukluğu hakkında bilgileri: Türkiye örneği

ÖZ Öğretmenlerin otizm spektrum bozukluğu (OSB) hakkındaki bilgi ve algıları bu çocukların tanılanmaları ve eğitimleri için kritik öneme sahiptir. Bu çalışmada, anaokulu, ilkokul, ortaokul ve lise kademelerinde görev yapan öğretmenlerin OSB hakkındaki bilgi ve algıları incelenmiştir. Çalışmaya bu dört eğitim kademesinde görev yapan 478 genel eğitim öğretmeni katılmıştır. Çalışmanın sonuçları farklı eğitim düzeyinde görev yapan öğretmenlerin OSB hakkında sınırlı bilgiye sahip olduklarını ve öğretmenlerin bilgi düzeylerinin çalıştıkları eğitim kademelerine göre farklılık gösterdiğini ortaya koymuştur. Bulgular, OSBli çocuklara çalışan ve çalışma olasılığı olan öğretmenler için acil bir şekilde mesleki gelişim programlarının geliştirilmesi ve uygulanması gerektiğini göstermektedir. Makalenin sonunda gelecekte yapılacak araştırma ve uygulamalar için öneriler sunulmuştur.

Anahtar Kelimeler *Otizm, Genel eğitim öğretmenleri, Bilgi, Algı, Müdahale,*

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INTRODUCTION

Autism spectrum disorder (ASD) is a neurodevelopmental disorder characterized by persistent difficulties in social communication and interactions across multiple contexts and restricted, repetitive patterns of behavior, interests, or activities that manifest within the early development period (American Psychiatric Association, 2013). Although exact causes of autism are not known, it is generally accepted that autism occurs as a results of abnormalities in brain structure or function and recent studies have been investigating the link between autism and genetic, environmental factors, and medical problems (Autism Society of America, 2015). Autism can be diagnosed reliably by the age of three based on data and information obtained from multiple resources including psychological, educational, or developmental tests, behavior observations, and interviews with family members and caregivers (Autism Society of America, 2016; Rakap, 2017; Shaw & Hatton, 2009).

According to the most recent report of the Centers for Disease Control and Prevention (CDC) on the prevalence of ASD, the disorder occurs in approximately 1 in 68 children and boys are five times more likely to have ASD than girls (Baio, 2014). While there is no cure for ASD, early diagnosis is important as the research evidence suggests that interventions designed to improve functioning of individuals with ASD may be more effective in younger children and optimize long-term effects (Arif, Niazy, Hassan, & Ahmed, 2013; Guthrie, Swineford, Nottke, & Wetherby, 2013; Koegel, Koegel, Ashbaugh, & Bradshaw, 2014; Rakap, 2017; Reichow, Hume, Barton, & Boyd, 2018; Volkmar, Rogers, Paul, & Pelphrey, 2014). Evidence-based interventions that are effective for improving outcomes for children with autism include behavioral interventions, comprehensive behavioral treatment, language training, social skills training, parent training, naturalistic teaching, peer training, and pivotal response training (National Autism Center [NAC], 2015). Moreover, the NAC (2015) identified a number of intervention approaches with emerging evidence about their effectiveness. These include functional communication training, developmental relationship-based treatment, picture exchange communication system, exercise, imitation-based intervention, massage therapy, music therapy, and sign instruction (NAC, 2015).

There has been a documented increase in the prevalence of ASD around the world (Arif et al., 2013; Elsabbagh et al., 2012; Kim et al., 2011) and Turkey as a country with very young population is not exception to this (Rakap, 2017). Although there is no national surveillance system to estimate the numbers of individuals with autism in Turkey, increasingly more children are being diagnosed with autism in recent years and receive educational and developmental services in schools/classrooms specifically designed for children with autism or in inclusive classrooms under the public school system (Cakiroglu & Melekoglu, 2014; Rakap, 2017; Rakap, Balikci, Parlak-Rakap, & Kalkan, 2016). With the escalation in prevalence and increase in the number of children with ASD in public school system, having knowledge of the disorder becomes increasingly important for educators who are likely to work with children with ASD (Koegel & Koegel, 1995; Lane, Carter, Common, & Jordan, 2012).

A number of studies have investigated the knowledge in autism of professional from various fields since late 1980s. Stone (1987) who investigated autism knowledge of pediatricians, clinical psychologists, speech/language pathologists, school psychologists, and other specialists in the field conducted one of the first studies and reported that there were misconceptions in all professional groups; however, the specialists had the most current knowledge. Since the Stone (1987) study, surveys have included knowledge, perceptions, and understanding of other healthcare professionals (Hartley-McAndrew, Doody, & Mertz, 2014; Heidgerken, Geffken, Modi, & Frakey, 2005; Imran et al., 2011; Ozcelik et al., 2015), speech language pathologists (Cascella & Colella, 2004; Schwartz & Drager, 2008), medical students (Shah, 2001), pharmacists (Khanna & Jariwala, 2012), occupational therapists (James, Pizur-Barnekow, & Schefkind, 2014), residents of a college campus (Tipton & Blacher, 2014), pre-service teachers (Hart & More, 2013; Park, Chitiyo, & Choi, 2010; Rakap et al.,

2016; Yasar & Kronin, 2014), and educators (Al-Sharbati et al., 2015, Arif et al., 2013; Helps, Newsom-Davis, & Callias, 1999; Mavropoulou & Padeliadu, 2000; Syriopoulou-Delli, Cassimos, Tripsianis, & Polychronopoulou, 2012; Yumak & Akgul, 2010). These studies reported mixed findings with respect to professionals' knowledge, perceptions, and understanding of autism.

Of these studies, four were conducted with professionals (not inclusive of teachers) in Turkey (Ozcelik et al., 2015; Rakap et al., 2016; Yasar & Kronin, 2014; Yumak & Akgul, 2010). Ozcelik and colleagues (2015) examined knowledge and attitudes of 270 pediatricians and reported that pediatricians did not have through knowledge of Diagnostic and Statistical Manual of Mental Disorders 4 (DSM 4; American Psychiatry Association [APA], 1994) criteria for autism; they were not familiar with comprehensive evaluation techniques used to diagnose children with autism; and they did not feel comfortable giving diagnosis of autism. Yasar and Cronin (2014) investigated knowledge and awareness of autism among 551 pre-service teachers enrolled in 10 different teacher education programs across two universities. Researchers found that pre-service teachers across teacher education programs had inadequate knowledge of autism. Rakap et al. (2016) explored the knowledge in autism of teacher candidates who are likely to have the initial contact with children with autism within public school system in Turkey. Five hundred and four senior pre-service teachers enrolled in four different teacher education programs participated in the study and results indicated that pre-service teachers across programs had limited knowledge of autism including characteristics and diagnosis. Yumak and Akgul (2010) investigated perceptions of autism of 117 elementary school administrators and teachers working in public schools Turkey and found that participants had very limited knowledge of and training in autism, and they did not know how to work with children with autism and therefore could not develop positive attitudes towards children with autism.

This study was designed to examine Turkish teachers' general knowledge and perceptions about autism spectrum disorder, explore their knowledge about evidence-based practices in ASD, and examine their training needs to serve children with ASD. Five primary research questions were addressed: First, what are teachers' beliefs about causes of ASD, diagnostic characteristics of children with ASD, and diagnostics activities used to diagnose ASD? Second, what is the level of teachers' general knowledge about autism? Third, what is the knowledge of teachers about evidence-based practices in ASD? Fourth, what is teachers' perceived efficacy about ASD? Fifth, what were the training needs of teachers in order to serve children with ASD? For each research question, differences among pre-, primary, middle, and high school teachers are also investigated. By investigating differences among various teacher groups, it would be possible to determine the specific needs of teachers working in different school settings. This would allow professionals who provide professional development services and programs to teachers know the areas of assistance teachers need in relation to working with children and students with disabilities.

METHODOLOGY

Participant Recruitment and Procedures

To recruit participants for the present study, 12 cities were randomly selected from the 12 NUTS 1 (Nomenclature of Territorial Units for Statistics) regions of Turkey. One city was selected from each region. Next, 16 schools (4 preschools, 4 primary schools, 4 middle schools, and 4 high schools) were randomly selected from the list of schools in each city, totaling up to 192 school across Turkey. School administrators were contacted by phone to explain the purpose of the study and the right of voluntary participation. Administrators of nine schools across six regions opted out of the study. Therefore, the survey was sent electronically to 4026 teachers in 183 schools. Four hundred seventy-eight teachers completed the survey with a return rate of 11.9%. The survey return rate was relatively

lower in this study in comparison to those of similar studies. However, the present study used random selection to determine study participants as opposed to other studies that used convenient sampling.

Participants included 92 preschools, 105 primary school, 126 middle school, and 155 high school teachers 88 different public schools across 12 different cities in Turkey. Special education teachers were not included in the present study. Of 478 participants, 277 were female and 201 were male. The mean age for participants was 37.3 years (*SD* = 6.2). The highest level of education attained was a bachelor's degree for most participants (82.6%); however, some had a master's (15.1%) or doctoral degree (2.3%). Majority of participants did not have prior experience of interacting with individuals with autism (84.3%). Only 4.2% of participants reported having a family member or friend with ASD and 15.7% reported having teaching experience with individuals with ASD. With respect to training in ASD, 27.8 reported attending at least one training session focused on ASD (e.g., conference, seminar, in-service training). Table 1 presents participant demographics by school type.

Table 1
Participant demographics by school type (%)

	Preschool (*n*=92)	Primary Sch. (*n*=105)	Middle Sch. (*n*=126)	High Sch. (*n*=155)	Overall (*n*=478)
Gender (Female)	88.1	45.7	42.9	44.5	52.7
Education					
Bachelor's	96.7	89.5	76.2	74.8	82.6
Master's	3.3	10.5	20.6	20.6	15.1
Doctorate	0	0	3.2	4.6	2.3
Teaching Experience					
Less than 1 year	8.7	2.9	0	0	2.3
1-5 years	20.7	14.3	9.5	13.5	14
5-10 years	44.6	27.6	23.8	10.3	24.3
10-15 years	21.7	20	26.2	31.6	25.7
More than 15 years	4.3	35.2	40.5	44.5	33.7
Family member/ friend with ASD (Yes)	2.2	5.7	6.3	2.6	4.2
Teaching children with ASD (Yes)	23.9	10.5	14.3	15.5	15.7
Training in ASD (Yes)	47.8	37.1	16.7	18.7	27.8

Instrument

The survey used in the present study was developed based on previous research in this area (Hansen, 2015; Hartley-McAndrew, Doody, & Metz, 2014; Mavropoulou & Padeliadu, 2000; Mitchell & Locke, 2015; Rakap et al., 2016; Stone, 1987) and consisted of four sections. The first section was designed to gather demographic information about participants. This included information about gender, age, teaching experience (in years), highest level of education obtained, experience with individuals with autism, and training in ASD. The second section was designed to explore teachers' knowledge about causes and diagnosis (criteria and testing) of ASD. In this section, teachers were asked three questions: (1) Which of the following factors do you think are among the main causes of autism? (2) Which of the followings do you think are among the diagnostic criteria of autism? and (3) Which of the following do you think is the main activity used to diagnose autism? In order to determine whether teachers knew the top two possible causes of autism, and the top diagnostic activity used to diagnose children with autism, we limited the number of options teachers could select for the first and third question to 2 and 1. For the second question, teachers were asked to select 7 options among 14 provided as we aimed to determine whether they knew all diagnostic traits of autism described in DSM 5 (APA, 2013). The third section focused on investigating teachers' general knowledge and perceptions of ASD. This section included two main questions. The first question measuring teachers' knowledge of autism included 16 statements and teachers were asked to rate each statement as True or False. The second question investigating teachers' perceptions about autism included 9 statements and teachers were asked to read each statement and rate their response using a 4-point Likert scale. The last section was developed to evaluate teachers' knowledge about effective

practices for treatment of children with autism as well as their training needs to serve children with autism more effectively. The first question in this section asked teachers to select 5 evidence-based treatments for autism among 44 treatment options provided. The second question asked teachers about the areas in which they need training in order to work with children with autism. Teachers were allowed to select all options if it was appropriate for their individual needs.

The survey was developed in two stages. In the first stage, the research team developed the survey questions based on the previous research. In this state, two methods were used to collect validity evidence. First, a panel of experts (i.e., four faculty member from the field of special education) evaluated the survey to determine whether (a) each section of the survey is measuring what it intended to measure, (b) the survey represents the content with sufficient depth, (c) the questions are appropriate for the study sample, and (d) the survey is compressive enough to collect information needed to address the study questions. Moreover, experts were asked to rate the intelligibility of the questions using yes/no response options. When a no was selected for intelligibility of a question, respondents were also asked their opinions about how to make the question more understandable. Based on the information obtained from the panel, the survey was revised by removing one question and re-wording two questions. Second, the survey was administered to 40 teachers who were not part of the study sample (filed test). Teachers were asked to complete the survey and rate intelligibility of the questions using yes/no response options. When a no was selected for intelligibility of a question, they were asked to provide their opinions about making the question more understandable. Information obtained from the field test was used to revise the survey further.

In the second stage, to collect reliability evidence, the final version of the survey was piloted with 50 teachers. Participants at this stage were asked to respond the survey twice with 10 days' discrepancy between the two administrations to determine test-retest reliability coefficient, an appropriate measure of reliability for knowledge questions. Moreover, for the third section of the survey where teachers' knowledge and perceived efficacy about ASD was measured by yes/no or Likert-type questions, the internal consistency was determined by calculating split-half reliability and Cronbach's alpha coefficients, respectively. Analyses of test-retest reliability indicated high reliability (r = .94) between the two administrations. In addition, split-half reliability and Cronbach's alpha coefficients were .86 and .89, also indicating high reliability. Teachers who participated in the pilot studies did not participate in the original study.

Data Analysis

For survey items evaluating teachers' general and more specific knowledge about ASD (e.g., causes, diagnostic traits and diagnostic activities, evidence-based practices) and their training needs, frequencies and percentages were calculated by school type. A chi-square test of independence was performed to examine differences among teachers who work in different school types as it was the appropriate statistical analysis to determine significant relationships between two nominal variables. When a significant difference was observed as a result of chi-square test, pairwise comparisons for proportions are conducted with R stats package (R Core Team, 2016) to determine exact location of the difference. False discovery rate procedure was used to adjust p-values for multiple comparisons (Benjamini & Hochberg, 1995). For items focused on teachers' perceived efficacy about ASD, means and range were reported by school type.

FINDINGS

Causes of ASD

Teachers were asked which 2 of 9 causes listed they believed were the primary causes of ASD. Overall, teachers believed genetic (45.2%) and neurological factors (40.6%) were the two primary causes of ASD, with environmental exposures a distant fifth (17.8%). Considerable amounts of teachers selected mental illness (28.2%) and vaccinations (25.6%) as main causes of ASD. Factors such as malnutrition in pregnancy, parenting, dietary/nutritional issues, and drug use of mothers during pregnancy were believed to be one of the primary causes of autism by less than 20% of teacher sample.

Table 2
Percentage of teachers endorsing each option for cause, diagnostic traits, diagnostic activities by school type

	Preschool (*n*=92)	Primary S. (*n*=105)	Middle S. (*n*=126)	High S. (*n*=155)	Overall (*n*=478)	*p*-value
Cause						
Genetic	56.6	67.6	27	38	45.2	<0.001
Neurological	44.6	22.8	48.4	43.8	40.6	<0.001
Mental illness	19.6	24.8	32.6	32.2	28.2	
Vaccinations	10.8	26.6	30.2	29.6	25.6	0.004
Environmental exposure	22.8	21	14.2	15.4	17.8	
Malnutrition in pregnancy	17.4	9.6	17.4	22	17.2	
Parenting	18.4	10.4	16.6	7	12.6	0.023
Dietary/nutritional issues	3.2	8.6	8.8	11	8.4	
Drug use of mother	6.6	8.6	4.8	0.6	4.6	0.018
Diagnostic criteria						
Diagnostic traits						
Poor back-and-forth communication skills	73.9	58.1	48.4	49.7	55.9	0.001
Hyper- or hypo-reactivity to sensory input	63	61	42.1	58.1	55.4	0.005
Poor nonverbal communicative behaviors	82.6	61.9	41.3	45.8	55.2	<0.001
Repeating same behavior over and over	42.4	42.9	54	60.6	51.5	0.009
Intense restricted interests	56.5	39	46.8	52.3	48.7	
Inability make/sustain friendships	63	62.9	40.5	32.9	47.3	<0.001
Strong resistance to change in routines	43.5	52.4	29.4	43.2	41.6	0.004
Non-diagnostic traits						
Consistent disruptive/aggressive behavior	71.7	74.3	83.3	76.1	76.8	
Having severe temper tantrums	59.8	70.5	73	85.2	73.8	<0.001
Inability to focus on tasks	47.8	54.3	63.5	79.4	63.6	<0.001
Fidgeting and squirming constantly	39.1	55.2	56.3	31	44.6	<0.001
Illogical thinking	21.7	39	44.4	41.3	37.9	0.004
Inability to control unwanted thoughts	19.6	20	61.9	22.6	31.8	<0.001
Seeing/hearing things that do not exist	15.2	8.6	15.1	21.9	15.9	0.036
Diagnostic activities						
Psychological, educational, or developmental testing	47.8	46.7	39.7	40.6	43.1	
Behavior observation	21.7	10.5	27.8	22.6	21.1	0.013
Genetic testing	15.2	21.9	15.9	21.9	19	
Medical/physical examination	8.7	5.7	8.7	8.4	7.9	
Family interview	5.4	9.5	5.6	5.8	6.5	
Blood test	1.1	5.7	2.4	0.6	2.3	

Participants selected 2 options for cause of ASD, 7 options for diagnostic criteria, and 1 option for diagnostic activities; therefore, the sum of each column in each section is 200%, 700%, and 100%, respectively. Diagnostic traits were developed based on DSM 5 (APA, 2013).

Top three causes selected were genetic (57%), neurological (45%), and environmental exposures (23%) for preschool teachers; genetic (68%), vaccinations (27%), and mental illness (25%) for primary school teachers; neurological (48%), mental illness (33%), and vaccinations (30%) for middle

school teachers; and neurological (44%), genetic (38%), and mental illness (32%) for high school teachers. Table 2 presents teacher responses with respect to main causes of ASD by school type.

Diagnostic traits of ASD

Teachers were asked which 7 of 14 traits listed they believed were most diagnostic traits of ASD. Of the 14 traits, 7 were diagnostic indicators of ASD while the other 7 were not. As seen in Table 2, three non-diagnostic traits, consistent disruptive/aggressive behaviors (77%), severe temper tantrums (74%), and inability to focus on tasks (64%), were believed to be the top three diagnostic indicators of ASD. Of seven diagnostic traits, four were endorsed by the majority of teachers (i.e., poor back-and-forth communication skills [56%], hyper- or hypo-reactivity to sensory input [55%], poor nonverbal communicative behaviors [55%], and repeating same behavior over and over [52%]). The least commonly endorsed diagnostic trait was strong resistance to change in routines (42%). From seven non-diagnostic traits, three listed above were endorsed by the majority of teachers as indicators of autism. The least commonly endorsed non-diagnostic trait was seeing/hearing things that do not exist (15%).

Majority of preschool and primary school teachers endorsed 5 of 7 diagnostic traits of autism while only 3 and 1 were endorsed by high school and middle school teachers, respectively. With respect to seven non-diagnostic traits, majority of preschool teachers selected two traits as diagnostic indicators of autism, while primary school teachers selected four traits, middle school teachers selected five traits, and high school teachers selected three traits as diagnostic indicators of ASD.

Diagnostic activities for ASD

Teachers were asked to choose 1 among 6 diagnostic activities they believed was used to diagnose ASD. As shown in Table 2, approximately half of participating teachers (43%) selected psychological, educational, or developmental testing, followed by behavior observations (21%) and genetic testing (19%). The least commonly selected diagnostic activities were blood test (2%), family interview (7%), and medical/physical examination (8%). Across teacher groups, psychological, educational, or developmental testing was the top choice (range = 40% for middle school teachers – 48% for preschool teachers), while blood test was the least selected choice (range = less than 1% for high school teachers – 6% for primary school teachers).

General knowledge of ASD

To evaluate teachers' general knowledge of ASD, 16 questions with true/false response options were asked. Many questions were answered correctly by the majority of participating teachers. For example, majority of teachers knew that ASD is more common in boys than girls (80%), children with ASD has atypical play patterns (74%), ASD does not affect children only (82%) or is not fatal over time (88%), ASD is a developmental disorder (69%) and not curable (77%), changing a child's diet would not lessen the severity of ASD (58%), and children with siblings who have ASD are at a higher risk of developing the disorder (63%). Majority of teachers also knew that teachers could not give a preliminary diagnosis of ASD when they believed a child had autism (88%). On the other hand, some misconceptions about ASD and characteristics of children who have the disorder. For example, majority of teachers believed that symptoms of ASD remain stable throughout the individual's life (83%), all individuals with ASD have low IQs (52%), conditions during pregnancy cause autism (65%), eating habits of most children with ASD are typical (60%), and ASD cannot be diagnoses earlier than 24 months (72%). Moreover, approximately half of the participating teachers taught that many individuals with ASD are clumsy and uncoordinated and ASD occurs more commonly among higher socioeconomic and education levels. Table 3 presents teachers' general knowledge of ASD by school type.

Table 3
Percentage of teachers responding "true" to general knowledge of ASD questions by school type

Items	Preschool (*n*=92)	Primary S. (*n*=105)	Middle S. (*n*=126)	High S. (*n*=155)	Overall (*n*=478)	*p*-value
After being diagnosed, symptoms of ASD remain stable throughout the individual's life	77.2	83.8	82.5	85.2	82.6	
All individuals with ASD have low IQs	45.7	61	48.4	52.3	51.9	
ASD is more common in boys than girls	88	73.3	79.4	80.6	80.1	
ASD only affects children	12	22.9	16.7	19.4	18	
ASD can be fatal over time	9.8	17.1	9.5	10.3	11.5	
Children with ASD have typical patterns of play	6.5	30.5	24.6	34.8	25.7	<0.001
Children with siblings who have ASD are at a higher risk of developing the disorder	80.4	67.6	68.3	43.9	62.6	<0.001
Conditions during pregnancy may cause autism	85.9	77.1	53.2	53.5	64.9	<0.001
If a teacher believes a student has ASD, he or she can give a preliminary diagnosis	5.4	17.1	9.5	14.8	12.1	0.047
Many individuals with ASD are clumsy and uncoordinated	43.5	49.5	48.4	54.8	49.8	
ASD is a developmental disorder	78.3	62.9	62.7	71.6	68.6	0.042
ASD is curable	22.8	15.2	25.4	26.5	23	
Eating habits of most children with ASD are typical	50	45.7	73.8	65.2	60.3	<0.001
Changing a child's diet lessens severity of ASD	35.9	45.7	40.5	43.2	41.6	
ASD occurs more commonly among higher socioeconomic and educational levels	25	48.6	54.8	55.5	47.9	<0.001
Autism cannot be diagnosed earlier than 24 months	55.4	74.3	78.6	73.5	71.5	0.002

Appropriate treatments for ASD

Among the 24 treatment methods listed, teachers were asked to select 5 treatments they believed to be effective for individuals with ASD. As shown in Table 4, the most commonly endorsed established treatments were behavioral interventions (64%), comprehensive behavioral treatment (42%), and language training (41%). Among eight emerging treatments, functional communication training (41%), developmental relationship-based treatment (33%), and picture exchange communication system (17.4%) were the most commonly endorsed treatments. From the list of unestablished treatments, facilitated communication (30%), gluten/case-in free diet (23%), and social behavioral learning strategy (22%) were the top three treatments endorsed by teachers. The least endorsed treatments were peer training (15%) and pivotal response training (8%) for established treatments, music therapy (5%) and sign instruction (4%) for emerging treatments, and movement-based intervention (10%) and shock therapy (0%) for unestablished treatments. Table 4 shows percentage of teachers endorsing each option as an appropriate treatment for ASD by school type.

Table 4
Percentage of teachers endorsing each option as an appropriate treatment for ASD by school type

	Preschool (*n*=92)	Primary S. (*n*=105)	Middle S. (*n*=126)	High S. (*n*=155)	Overall (*n*=478)	*p*-value
Established Interventions						
Behavioral interventions	70.7	77.1	46	65.2	63.8	<0.001
Comprehensive behavioral treatment	47.8	16.2	63.5	38.7	42.1	<0.001
Language training	31.5	23.8	43.7	54.8	40.6	<0.001
Social skills training	42.4	19	58.7	35.5	39.3	<0.001
Parent training	20.7	32.4	19	26.5	24.7	
Naturalistic teaching	17.4	37.1	17.5	7.1	18.4	<0.001
Peer training	4.3	1	14.3	31	14.9	<0.001
Pivotal response training	1.1	0	14.3	11	7.5	<0.001
Emerging Interventions						
Functional communication training	44.6	61	38.9	28.4	41.4	<0.001
Developmental relationship-based treatment	27.2	37.1	34.9	32.9	33.3	
Picture exchange communication system	15.2	32.4	24.6	2.6	17.4	<0.001
Exercise	12.0	5.7	16.7	11.6	11.7	
Imitation-based intervention	19.6	9.5	4	0	6.9	<0.001
Massage therapy	0	7.6	4.8	7.7	5.4	0.047

Music therapy	2.2	6.7	4	6.5	5	
Sign instruction	5.4	8.6	4	0	4	0.005
Unestablished Interventions						
Facilitated communication	37	26.7	30.2	28.4	30.1	
Gluten/Case-in-free diet	21.7	31.4	16.7	23.9	23.2	
Social behavioral learning strategy	41.3	15.2	7.9	26.5	22	<0.001
Sensory intervention	22.8	22.9	15.9	18.1	19.5	
Auditory integration training	12.3	14.8	1.7	13.9	11.5	0.002
Concept mapping	1.1	13.3	11.9	16.1	11.5	0.004
Movement-based intervention	5.4	3.8	7.9	18.7	10	<0.001
Shock therapy	0	0	0	0	0	

Participants were asked to select 5 treatment options for ASD. Therefore, the sum of each column in each section is 500%. Practices were categorized based on the report of the National Autism Center (2015).

Perceived efficacy about ASD

Overall, teachers reported that they are knowledgeable about ASD indicated by a mean score of 2.9/4. Mean scores for five of eight remaining statements were also higher than 2, indicating that teachers perceived themselves to be knowledgeable about symptoms (M = 2.8), causes (M = 2.5), diagnosis (M = 2.5), and prevalence (M = 2.5) of ASD. Moreover, teachers reported that they would know if they met a person with ASD (M = 2.6). However, participating teachers also reported that they do not know what happens to individuals with ASD as they age (M = 3.0); they are not aware of treatment options for children with ASD (M = 3.2); and they cannot meet the needs of students with ASD (M = 3.4). Table 5 illustrates teachers' perceptions about ASD by school type.

Table 5
Mean scores and score ranges for teachers' perceived efficacy about ASD by school type

Statement	Preschool (n=92)	Primary S. (n=105)	Middle S. (n=126)	High S. (n=155)	Overall (n=478)
I am knowledgeable about ASD	3.4 (2-4)	2.9 (1-4)	2.9 (1-4)	2.7 (1-4)	2.9 (1-4)
I understand how ASD is diagnosed	2.5 (1-4)	2.6 (1-4)	2.6 (1-4)	2.5 (1-4)	2.5 (1-4)
I know what kind of symptoms individuals with ASD have	2.8 (1-4)	2.6 (1-4)	3.0 (1-4)	2.8 (1-4)	2.8 (1-4)
I know what happens to people with ASD as they age	2.1 (1-4)	2.2 (1-3)	2.0 (1-4)	1.8 (1-3)	2.0 (1-4)
I am knowledgeable about what causes ASD	2.5 (1-4)	2.5 (2-4)	2.2 (1-4)	2.7 (2-4)	2.5 (1-4)
I am aware of treatment options for children with ASD	1.8 (1-3)	1.5 (1-3)	2.0 (1-3)	1.8 (1-3)	1.8 (1-3)
I understand how common ASD is in the general population	2.3 (1-4)	2.5 (1-4)	2.7 (2-4)	2.4 (1-4)	2.5 (1-4)
I believe I would know if I met a person/student with ASD	3.1 (2-4)	2.4 (1-4)	2.7 (2-4)	2.5 (2-4)	2.6 (1-4)
I believe I can meet the needs of students with ASD	1.5 (1-3)	1.4 (1-3)	1.8 (1-4)	1.7 (1-3)	1.6 (1-4)

Response options were Strongly Disagree (1), Disagree (2), Agree (3), Strongly Agree (4). Mean scores are presented above.

Training needs of teachers about ASD

As shown in Table 6, the majority of teachers reported their needs for training in three areas listed: behavior management and positive behavior support (74.1%), evidence-based instructional strategies for children with ASD (54%), and characteristics and nature of ASD (53.6%). Little less than half of the participating teachers reported training needs on identification, assessment, and diagnosis of ASD (47.3%) and interventions for communication and social developments (46.7%). Table 6 shows teachers' training needs by school type.

Table 6
Percentage of teachers selecting each training area by school type

	Preschool (n=92)	Primary S. (n=105)	Middle S. (n=126)	High S. (n=155)	Overall (n=478)	p-value
I would benefit from further training on:						
Characteristics and nature of ASD	65.2	53.3	47.6	51.6	53.6	
Identification, assessment, and diagnosis of ASD	59.8	57.1	26.2	50.3	47.3	<0.001
Evidence-based instructional strategies for children with ASD	76.1	38.1	54.8	50.9	54.0	<0.001
Interventions for communication and social development	51.1	47.6	52.3	38.7	46.7	
Behavior management and positive behavior support	94.6	80.0	49.2	78.1	74.1	<0.001

DISCUSSION and CONCLUSION

Previous studies have shown that teachers' knowledge and perceptions play an important role on the education of children with ASD (Finke, Finke, McNaughton, & Drager, 2009; Vakil, Welton, O'Connor, & Kline, 2009). With the increase in the prevalence of ASD, it is more likely to have children who are diagnosed with ASD or who show symptoms of ASD educated in inclusive classroom settings in public schools. This requires general education teachers to have increased, most recent and evidence-based knowledge about ASD. This study is among the initial studies investigating Turkish general education teachers' knowledge and perceptions about ASD. Specifically, the present study investigated teachers' (a) knowledge about causes, diagnostic traits and activities of ASD, (b) general knowledge and perceived efficacy about ASD, (c) knowledge about evidence-based practices in ASD, and (d) training needs in relation to ASD. Overall, Turkish teachers' knowledge and perceptions about ASD appear to be relatively poor. However, differences among teachers who work in different schools are observed. Below findings are discussed in detail.

The first question aimed to investigate teachers' knowledge about the causes, diagnostic traits and activities of ASD. Findings of the present study with respect to causes of ASD suggest poor knowledge among Turkish teachers. Several international studies also reported low levels of teacher knowledge regarding causes of ASD (e.g., Al-Sharbati et al., 2015; Arif et al., 2013; Mavropoulou & Padeliadu, 2000). Although exact causes of ASD are not known, current research evidence suggests that genetics, neurological and environmental factors play important roles in the genesis of autism (Autism Society of America, 2015). Although teachers selected genetic and neurological factors as the top two causes of ASD, factors such as mental illness, vaccinations, malnutrition, and parenting styles were selected by many teachers as the primary causes. Compared to other teachers, preschool are more likely to select genetic, neurological factors, and environmental exposure as primary causes of ASD and less likely to report mental illness, vaccinations, and nutritional issues as the primary causes. This is somewhat encouraging as preschool teachers are among the professionals who are likely to have the initial contact with children with disabilities.

With respect to diagnostic criteria and activities, majority of preschool and primary school teachers endorsed at least 5 of 7 diagnostic traits correctly and psychological, educational or developmental testing was selected as the top strategy used to diagnose ASD by roughly half of these teachers. While not sufficient, this finding is promising as there is no universal referral system to identify children with ASD in Turkey and it is often a responsibility of professionals who have the initial contact with young children (such as pre- or primary school teacher) to refer suspected children for a comprehensive evaluation (Rakap et al., 2016). However, it should also be noted that the majority of teachers across school types selected aggressive behaviors, temper tantrums, and inability to focus on tasks as diagnostic traits of ASD. This finding aligns with the findings of previous research reporting confusion and uncertainty about the diagnostic traits and characteristics of children with ASD among teachers or other professionals (e.g., Heidgerken et al., 2005; Imran et al., 2011; Mitchell & Locke, 2015) and is somewhat concerning because some children could be mislabeled by their teachers as having ASD while they actually do not have it or have some other impairments.

The second question sought to examine teachers' general knowledge about ASD. Previous research has shown that many professionals including teachers have many misconceptions about ASD (Al-Sharbati et al., 2015; Arif et al., 2013; Hartley-McAndrew, Doody, & Mertz, 2014; Heidgerken, Geffken, Modi, & Frakey, 2005; Helps, Newsom-Davis, & Callias, 1999). Some of these incorrect beliefs might affect the way teachers interact with or teach to children with ASD. For example, over 80% of the teachers in the present study reported symptoms of ASD remain stable over time and more than half of the teacher believed that all children with ASD have low IQs. A teacher with these beliefs might give up on children with ASD by thinking that no matter what she/he does, it would not be beneficial for children with ASD. Also, a teacher who believes that conditions during pregnancy cause

autism may misinform parents seeking information about the genesis of autism and lead them to feel guilty about their child's condition.

The next question focused on teachers' knowledge about evidence-based interventions in ASD. Many teachers who participated in the study endorsed practices determined to be established or emerging by the National Autism Center (2015) as evidence –based (e.g., behavioral interventions, language training, social skills training, and functional communication training). While these correct endorsements are encouraging, many teachers also selected several unestablished interventions (e.g., facilitated communication, gluten/case-in free diet) as evidence-based. Moreover, practices such as naturalistic teaching that are mainly implemented in inclusive settings by general education teachers were endorsed by relatively small proportion of teachers. Although many teachers may not be directly responsible for using these practices to teach children with ASD, having correct and up-to-date knowledge about them is important in informing parents about practices that work for children with ASD.

The fourth question aimed to explore perceived efficacy of teachers about ASD. On average, teachers perceived themselves to be knowledgeable about ASD and reported that they know symptoms and causes of ASD and how it is diagnosed. These findings contradict with the findings with respect to teachers' knowledge about causes, symptoms, and diagnosis of ASD reported earlier. This means that what teachers believe to be correct about causes, symptoms, and diagnosis of ASD may actually be incorrect. This warrants further the need for teacher training on ASD.

Aim of the last question was to investigate training needs of teachers in relation to ASD. Although preschool teachers appeared to have somewhat better knowledge about ASD in comparison to other teachers, they were more willing to participate in training programs focused on all aspects of ASD. Preschool teachers' level of knowledge and willingness to learn new information about ASD is encouraging as early diagnosis and treatment plays a key role in the development and learning of children with ASD (Koegel, Koegel, Ashbaugh, & Bradshaw, 2014). A very large proportion of teachers reported their willingness to attend training for behavior management and positive behavior support to meet the needs of children with ASD. Teachers' request for training in behavior management aligns with their endorsements of non-diagnostic traits such as consistent and aggressive behaviors and severe temper tantrums as diagnostic traits.

Limitations

There are at least five limitations of this study readers must be aware of while interpreting the findings. First, although reaching a nationally representative sample was aimed, a relatively small number of teachers (when compared to actual number of general education teachers in Turkey) agreed to participate in the present study, which might have affected generalizability of study findings. Second, special education teachers were not included in the sample because the aim of the study was to investigate knowledge and perceptions of general education teachers. However, data collected from special education teachers could have been used as criterion. Third, an online survey was used to collect data for the present study. Although with the developments in technology, web-based surveys are increasingly used to collect data in recent years, it is possible for respondents to falsify their demographic information and use the internet to obtain information about the questions asked in the survey, which, in turn, undermines the reliability and accuracy of the results and the validity of conclusions drawn from the findings (Braunsberger, Wybenga, & Gates, 2007; Lefever, Dal, & Matthíasdóttir, 2007). Moreover, online surveys might have low response rate and high coverage error (i.e., the difference between defined target population and who actually responded to the survey; Couper, 2000).

Another limitation was related to the way survey questions were asked. Teachers were given a list options to choose for the majority of questions which allow them to guess when they did not know the answer. It could have been better if they were asked to list, for example, diagnostic traits, causes, or

evidence-based practices. The last limitation was related to determining error with respect to non-respondents (Lindner, Murphy, & Briers, 2001). Teachers choosing to participate in the study might have better knowledge and perceptions about ASD and those who did not want to participate in the present study are simply not be interested in autism and therefore, have less knowledge about ASD and related issues addressed in the study.

Future Directions: Implications for Teacher Training and Research

Most obvious implication of the findings of this study with respect to teacher training is the need for professional development programs to increase teachers' awareness and knowledge in various topics and issues related to ASD. Attempt to equip teachers with the most current and evidence-based knowledge should begin while they are in pre-service teacher training programs by enriching teacher education curriculum with special education courses and continue with in-service training programs focused on ASD. Probst and Leppert (2008) suggest that information about characteristics of children and students with ASD and intervention approaches to support development and learning of these children should be integrated into the teacher training curricula. Without a well-organized effort to train teachers and other professionals, the concerns with respect to teacher qualifications and shortage of professionals who are specialized in ASD will continue.

In Turkey, general and special education teacher preparation programs are separated from each other and faculty and students in each group (except a small number of students who qualify for double majors in a general education area and special education) have little or no opportunities to interact and cooperate. As a long-term solution to teacher preparation, at minimum, preschool and primary school teacher preparation programs should be unified with special education teacher preparations programs, so that teacher candidates take courses and obtain practical experiences to work with children both with and without disabilities. The unified teacher preparation aligns with the current education policy to include more children with disabilities in general education programs and curricula. However, until this major change to how general and special education teachers are prepared in Turkey is made, general education teacher preparation programs should include more focus on special education. Currently, many teacher education programs only offer an introductory special education course in which ASD and related topics are discussed and taught for several weeks. This course may be adequate to raise general awareness about disabilities and inclusion, but it is definitely not sufficient to increase specific knowledge and awareness about ASD among teacher candidates from different programs (Rakap et al., 2016). General education teacher preparation programs should provide pre-service teachers with opportunities to gain knowledge and skills about main characteristics of children with ASD including causes and diagnostic traits, early intervention and evidence-based instructional practices, cooperative program planning, social skills interventions, and transition planning (Eren & Brucker, 2011).

For professional development efforts to be effective, development of knowledge and skills began during in-service training must be sustained during in-service teaching (Sindelar, Brownell, & Billingsley, 2010). Therefore, continued professional development opportunities should also be provided to teachers and other professional who work with children with ASD in the field. A major barrier to the development and implementation of pre- and in-service training programs for teachers and other professionals who work with children with ASD faced in Turkey and other countries around the world is the scarcity of higher education personal specialized in ASD (Rakap et al., 2016). As a result, many teacher preparation programs across the nation are not able to offer courses on autism not only to general education pre-service teachers but also special education pre-service teachers. To overcome this barrier and reach teachers who are not close to the universities or other organizations offering ongoing professional development on ASD, web-based professional development or certification programs can be designed by the ASD experts. Studies investigating effects of web-based professional development programs in helping teachers develop and improve their competencies,

knowledge, and skills about ASD report encouraging findings (Rakap, Jones, & Emery, 2015). Thus, a professional development program developed by autism experts and approved by the Ministry of National Education can be valuable resource for pre- and in-service teachers who work with children with ASD and want to increase their knowledge and skills about autism.

Future research should replicate the findings of the present study with a larger sample of teachers using additional research methods (e.g., qualitative) and tools (e.g., interviews or observations). Future research efforts should also focus on developing web-based professional development or certification programs on autism and investigating their effects on practices of teachers who work with children with ASD.

Over the last two decades, the number of children diagnosed with ASD has dramatically increased. As a result, more children and students with ASD participate in general education (Syriopoulou-Dell et al., 2012). Teachers' knowledge and perceptions about ASD is found to be a critical component for the diagnosis and education of children with ASD (Mesibov, Shea, & Schopler, 2004). Findings of the current study showed that Turkish general education teachers who participated in the current study are not appropriately trained to work with children with ASD. The lack of adequate training in the area of ASD warrants the development of professional development or certification programs to train in-service teachers and other professionals to support development and learning of children with ASD.

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TÜRKÇE GENİŞLETİLMİŞ ÖZET

Otizm spektrum bozukluğu (OSB), belirtileri erken çocukluk döneminde ortaya çıkan, genellikle etkilerini ömür boyu sürdüren, bireylerin sosyal etkileşim ve iletişim kurma becerilerini olumsuz yönde etkileyen, sınırlı ilgi ve tekrarlanan davranışlara neden olan nöro-gelişimsel bir bozukluktur (American Psychiatric Association, 2013). Son yıllarda tüm dünyada OSB tanısı alan bireylerin sayısında önemli bir artış görülmeye başlamıştır (Arif vd., 2013; Elsabbagh vd., 2012; Kim vd., 2011). Ülkemizde otizmli bireylerin sayısını belirlemeye yönelik ulusal bir tarama sistemi bulunmamasına rağmen tüm dünyadaki artışa paralel olarak ülkemizde de otizmli bireylerin sayısında artış olduğu düşünülmektedir (Rakap, 2017). Bu bağlamda, eğitimini resmi özel eğitim okullarında ya da kaynaştırma sınıflarında alan otizmli çocuk sayısı günden güne artmaktadır (Rakap, 2017). Resmi okullarda eğitimsel ve gelişimsel destek alan otizmli çocukların sayısının artmasıyla birlikte otizmli çocuklarla çalışan ya da çalışma olasılığı olan öğretmenlerin otizm ve otizmli çocukların eğitimi hakkında bilgi sahibi olması önem kazanmaktadır (Koegel & Koegel, 1995; Lane, Carter, Common, & Jordan, 2012).

Uluslararası alanyazında, otizmli çocuklar ile çalışan uzmanların otizm hakkındaki görüşlerini inceleyen çalışmaların 1980'li yıllardan beri yürütüldüğü görülmektedir (örn., Stone, 1987). Ulusal alanyazında ise benzer çalışmalara 2010 yılı ve sonrasında rastlanmaktadır (Ozcelik vd., 2015; Rakap vd., 2016; Yasar & Kronin, 2014; Yumak & Akgul, 2010). Bu bağlamda yürütülen dört çalışmanın üçünde, çocuk doktorlarının ya da öğretmen adaylarının otizmle ilgili bilgi düzeyleri incelenirken sadece bir çalışmada (Yumak & Akgul, 2010) okul yöneticileri ve ilkokul öğretmelerin bilgi düzeyleri ve tutumları incelenmiştir. Yumak ve Akgul (2010), ilkokul öğretmenlerinin otizm hakkında çok sınırlı bilgiye ve eğitime sahip olduklarını ve dolayısıyla otizmli çocuklarla nasıl çalışacaklarını bilmediklerini rapor etmiştir.

Bu çalışma, genel eğitim öğretmenlerin otizm hakkındaki genel bilgi ve bakış açılarını incelemek, otizmde bilimsel dayanaklı uygulamalarla ilgili bilgi düzeylerini belirlemek ve otizmli çocuklarla çalışmak için mesleki gelişim ihtiyaçlarını belirlemek amacıyla tasarlanmıştır. Çalışma kapsamında, anaokulu, ilkokul, ortaokul ve lise kademelerinde görev yapan öğretmenler arasında ilgili değişkeler bağlamında farlılıklar da incelenmiştir. Çalışmaya, 12 farklı ilde yer alan 88 okulda görev yapan 92 okulöncesi, 105 ilkokul, 126 ortaokul ve 155 lise öğretmeni katılmıştır.

Çalışma kapsamında araştırma ekibi tarafından öğretmenlerin otizm ve ilişkili konular hakkında bilgi düzeylerini belirlemek amacıyla uluslararası alanyazında kullanılan ölçekler temel alınarak bir ölçek geliştirilmiş, ölçek hakkında özel eğitim alanında görev yapan dört akademisyenden uzman görüşü alınmış ve ölçeğin psikometrik özellikleri incelenmiştir. Ölçek dört kısımdan oluşmaktadır. Birinci kısımda öğretmenlerle ilgili demografik bilgiler, ikinci kısımda öğretmenlerin otizmin nedenleri ve tanılanmasıyla ilgili bilgi düzeyleri, üçüncü kısımda öğretmenlerin otizmle ilgili genel bilgileri ve dördüncü kısımda öğretmenlerin otizmde bilimsel dayanaklı uygulamalarla ilgili bilgi düzeyleri ve eğitim ihtiyaçları hakkında veri toplanması amaçlanmıştır. Ölçeğin test-tekrar test güvenirliği r = .94 olarak belirlenmiştir. R istatistik paketi kullanılarak ortalama, sıklık ve yüzde analizi yapıldıktan sonra ki-kare testi ile farklı eğitim kademesinde görev yapan öğretmenlerin bilgi düzeyleri arasındaki faklar incelenmiştir.

Otizmin nedenleri bağlamında bulgular, öğretmenlerin %40'ından fazlasının genetik ve nörolojik nedenleri otizme neden olan temel faktörler olarak belirlediğini göstermektedir. Okulöncesi sınıflarında görev yapan öğretmenlerin %57'si genetik ve %45'ide nörolojik faktörlerin otizme neden olduğunu belirtirken diğer kademelerde çalışan birçok öğretmenin akıl hastalıklarının ve aşıların otizme neden olduğuna dair inanışlarının olduğunu görülmektedir. Tanılayıcı kriterler bağlamında, otizmli çocuklarda sıklıkla görülen fakat tanılama kriterlerinden olmayan yıkıcı ve zarar verici

davranışlar (%77), ağır düzeyde sinir krizleri (%74) ve odaklanamama (%64) davranışları en çok seçilen davranışladır. Bulgular, okulöncesi ve ilkokul öğretmenlerinin büyük çoğunluğunun 7 tanılama kriterinden 5'ini doğru bildiğini göstermektedir. Öğretmenlerin otizmle ilgili genel bilgi düzeylerine bakıldığında, katılımcıların büyük çoğunluğunun sorulan sorulara doğru cevap verdiği görülmektedir (Örneğin, otizmin erkeklerde daha yaygın olarak görülmesi [%80], otizmli çocukların atipik oyun örüntüsüne sahip olmaları [%74] ve otizmin ölümcül olmaması [%88]). Ancak, öğretmenlerin otizmle ilgili bazı yanlış bilgilere de sahip olduğu görülmektedir (Örneğin, otizmin belirtilerinin ömür boyu aynı kalması [%83], hamilelik sırasındaki koşulların otizme neden olması [%65], otizmli tüm bireylerin düşük zeka puanına sahip olması [%52]). Otizmde bilimsel dayanaklı uygulamalar ile ilgili bilgi düzeyleri incelendiğinde, öğretmenlerin %64ünün etkililiği araştırmalar tarafından kanıtlanan davranışsal müdahaleleri seçtiği, ancak yardımlı iletişim (%30) ve gluten/kasein diyeti (%23) gibi etkisiz müdahalelerin de birçok öğretmen tarafından bilimsel dayanaklı uygulama olarak seçildiği görülmektedir.

Yukarıda belirtilen bulgulara karşın birçok öğretmenin kendisini otizm hakkında bilgili gördüğü bulunmuştur (M = 2.94/4). Daha açık belirtmek gerekirse, öğretmenlerin kendilerini otizmin semptomları (M = 2.8), nedenleri (M = 2.5), tanılanması (M = 2.5) ve yaygınlığı (M = 2.5) hakkında bilgi sahibi olarak gördükleri bulunmuştur. Aynı zamanda öğretmenler, otizmli bireylere yaşları ilerledikçe ne olduğunu bilmediklerini (M = 3.0); otizmli bireyler için var olan müdahale tekniklerini bilmediklerini (M = 3.2) ve otizmli öğrencilerin ihtiyaçlarını karşılayamayacaklarını (M = 3.4) belirtmişlerdir. Öğretmenlerin büyük çoğunluğu davranış yönetimi ve olumlu davranış desteği (%74.1), bilimsel dayanaklı uygulamalar (%54), otizmin doğası (%53.6) ile otizmin değerlendirilmesi ve tanılanması (%47.3) konularında mesleki gelişime ve eğitime ihtiyaç duyduklarını belirtmişlerdir.

Çalışmanın bulguları, genel olarak öğretmenlerin otizm hakkındaki bilgi ve algılarının düşük olduğunu, ancak farklı kademelerde çalışan öğretmenlerin bilgi düzeyleri arasında farklılıklar bulunduğunu ortaya koymuştur. Örneğin, okulöncesi öğretmenlerinin otizmin nedenleri ve tanılayıcı kriterleri, sınıf öğretmenleri ise sadece otizmin tanılayıcı kriterleri konusunda diğer kademelerde çalışan öğretmenlere kıyasla daha bilgili olduğu bulunmuştur. Ayrıca çalışmanın bulguları, farklı kademelerden öğretmenlerin otizm ve bilimsel dayanaklı uygulamalar ile ilgili yanlış bilgilere ve inanışlara sahip olduğunu ortaya koymuştur. Dahası, öğretmenlerin otizm hakkında sahip olduklarını düşündükleri bilgiler ile gerçek bilgi düzeyleri arasında da farklar olduğu bulunmuştur. Çalışmaya katılan öğretmenlerin büyük çoğunluğu otizm ve otizmli çocukların eğitimi konusunda mesleki gelişime ihtiyaç duyduklarını belirtmişlerdir. Çalışma sonucunda elde edilen bulgular doğrultusunda, öğretmenlerin otizm ve otizmli çocuklar ile çalışma konularında bilgi ve beceri düzeylerini artıracak mesleki gelişim ve eğitim programlarının geliştirilmesine olan ihtiyaç açık bir şekilde görülmektedir.

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Does equating matter in value-added models?

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ABSTRACT The purpose of this study was to examine the effect of equated and non-equated data on value-added assessment analyses. Several models have been proposed in the literature to apply the value-added assessment approach. This study compared two different value-added models: the unadjusted hierarchical linear model and the generalized persistence model. The former model assumes equated tests while the latter one relaxes this assumption. Two different data sets (equated and non-equated) were analyzed with both models. Value-added estimates for both models based on a statewide examination (equated) and a countrywide examination (non-equated) data were generally consistent. School rankings showed differences between the two models. The practical implication of this study is that although there were small differences in school rankings, a model requiring an equating assumption can be applied to a non-equated data set in a case when equating between test forms is not possible.

Keywords *Value-added assessment, Hierarchical linear model, Generalized persistence model, Test equating,*

Katma-değerli değerlendirme modellerinde eşitleme önemli mi?

ÖZ Bu çalışmanın amacı, eşitlenmiş ve eşitlenmemiş verilerin katma-değerli değerlendirme analizlerine etkisini incelemektir. Katma-değerli değerlendirme yaklaşımını uygulayabilmek için literatürde birçok model önerilmiştir. Bu çalışma, iki farklı katma değerli değerlendirme modeli karşılaştırmıştır: düzeltilmemiş hiyerarşik doğrusal model (UHLMM) ve genelleştirilmiş süreklilik (GP) modeli. Birinci model eşitlenmiş testler için kullanılırken, ikincisi bu varsayımı esnetir. Her iki modelde iki farklı veri seti (eşitlenmiş ve eşitlenmemiş) analiz edildi. Her iki model için eyalet çapında yapılan bir sınav (eşitlenmiş) ve ülke çapında yapılan bir sınav (eşitlenmemiş) verilerine dayanan katma-değer kestirimleri genellikle tutarlı bulundu. Okul sıralamalarında iki model arasında bazı farklılıklar gözlendi. Bu çalışmanın pratik çıkarımı, okul sıralamasında küçük farklılıklar olmasına rağmen, test formları arasında eşitlemenin mümkün olmadığı durumlarda eşitlenmemiş bir veri seti gerektiren bir modelin uygulanabileceğidir.

Anahtar Kelimeler *Katma-değerli değerlendirme, Hiyerarşik doğrusal model, Genelleştirilmiş süreklilik modeli, Test eşitleme,*

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INTRODUCTION

The effectiveness of a school or a teacher has been debated for decades. How to identify a qualified teacher or an effective school constitutes a major problem in education? The focus of our study which emerged from this problem on value-added analysis (VAA) is a recent approach to determining school/teacher effectiveness. In this process, various approaches have been developed for the evaluation of the school effectiveness such as using school's overall achievement scores and data envelopment analysis (Bessent & Bessent, 1980) that take into account teachers' proficiency levels in teaching. Since the problem of "effectiveness" contains many variables (Marzano, 2003), only measurable benefits can be expressed in an unbiased manner. In this context, "student achievement" can be considered the most important indicator of school effectiveness (Balcı, 1988).

The assessment of student learning is a major policy issue in the field of education (Ercikan, 2006). As is well known, there are many factors that affect student achievement. Among a number of factors, teacher and school effects in students' test score gains can be detected by a recent statistical approach to assessment of student learning (Sanders et al., 2002). Hanushek (1972) first used VAA in an accountability system. Sanders and his colleagues implemented VAA in the Tennessee Value Added Accountability System (TVAAS), a statewide testing system (Sanders & Horn, 1994; Sanders & Rivers, 1996; Sanders et al., 1997; Wright, Horn, & Sanders, 1997).

Sanders et al. (1997) defined a teacher value-added score as the differences between the predicted level of achievement and current achievement in a classroom taught by the teacher. In this definition, the magnitude of differences in the predicted and observed test scores is assumed to reflect teacher and school effectiveness. If the measured score is higher than the predicted score, it is interpreted to mean that the teacher and school "add" to student achievement, otherwise, they detract from student achievement.

A number of Value-Added Models (VAMs) have been developed to track individual students' academic growth over years and in different subjects so that teachers' contributions to that growth can be estimated (Braun, 2005). In this way, these models are intended to control for student-level socio-demographic variables (e.g., age, gender, and ethnicity) that may have effects on student achievement. The purpose of VAMs is to obtain accurate and reliable comparisons of student achievement across schools regardless of large demographic or ability differences in student populations. Some VAMs rely on fixed school effects while others rely on random school effects. For instance, early VAM applications (e.g., Hanushek, 1972; Murnane, 1975) assume fixed effects models, whereas, more recent applications (e.g., the TVAAS layer model) assume random effects models (McCaffrey, Lockwood, Koretz, & Hamilton, 2003). The former methods are based on regression models (Tekwe et al., 2004), while the latter use more complex statistical models such as mixed models or hierarchical models (Aitkin & Longford, 1986; Raudenbush & Bryk, 1986) to assess school and teacher effects (Şen, Kim, & Cohen, 2017).

Estimating teacher effectiveness based on student achievement using VAMs requires longitudinal data in order to track the impacts of prior educational inputs on future achievement (Mariano et al., 2010). In order for test scores to be used to estimate growth, however, they need to be vertically equated and scaled to a common metric (Ballou et al., 2004; Briggs & Domingue, 2013; Doran & Cohen, 2005). Therefore, one challenging issue in modeling longitudinal data is the need for equating test scores as most standardized tests consist of different items varying in difficulty. This is a crucial point because inferences based on VAMs should be made with respect to the validity standards (Hill, 2009). Concerns have been raised about the limitations of vertical scaling and equating in part because latent constructs are subject to changes at each grade level. Furthermore, equating constructs that shift across grades can result in biased and distorted value-added teacher effectiveness (Braun & Wainer, 2007;

Martineau, 2006). Another issue that may affect the estimates of VAMs is the choice of vertical scaling methodology as this can affect the subsequent results from a given VAM (Briggs & Domingue, 2013; Briggs & Weeks, 2009).

The majority of VAMs require equating between consecutive grades, while some VAMs relax it by simply requiring scores across grades be linearly related (Shaw, 2012). In the absence of vertically scaled data sets, some possible alternative methods have been proposed for use with VAA. Mariano et al. (2010) and McCaffrey et al. (2003; 2004) proposed the variable persistence model for data with non-constant variances and covariances obtained from different developmental scales. It is also the case, however, that inferences about teacher effectiveness may be biased due to measurement error in previous test scores (Shaw, 2012). Reckase (2004) noted that comparing results across years does not provide unbiased estimates if different skills and academic domains are included in a VAA. A number of models have been introduced to deal with aforementioned issues (Broatch & Lohr, 2012; Lockwood et al., 2007; Mariano et al., 2010). Some of these VAMs ignore construct shift entirely and directly carry out analyses with vertically scaled test scores, while some VAMs model construct shift with vertically scaled test scores, and some other VAMs ignore vertically scaled test scores completely. There is no research reported, however, comparing the sensitivity of VAMs based on equated and non-equated data sets.

Two approaches to VAA were investigated in this study, the unadjusted hierarchical linear model (UHLMM; Tekwe, et al., 2004) and the generalized persistence model (GP model; Mariano et al., 2010). Results from these two models were compared to determine whether they were consistent with one another and the two models differed with respect to school rankings?

METHODOLOGY

In this study, two different data sets (equated and non-equated) were analyzed. Equated data for this study were taken from a vertically scaled statewide mathematics test administered to 8^{th} graders from 2002 and 2003 in a large Southeastern state in USA. As these data were vertically scaled, they were consistent with models requiring equating. This test is a part of a criterion-referenced test that aims to assess student achievement in the high-order cognitive skills represented in the state standards in reading, mathematics, writing, and science. Three types of questions – multiple choice items, graded response items, and performance tasks – were used in this test. Non-equated data for this study were taken from the 2015 November and 2016 April administrations of a countrywide exam in Turkey, namely, the Exam for the Transition from Basic Education to Secondary Education (also known as TEOG; Ministry of Education). The exam scores from the Grade 8 mathematics section of this test were used for analyses under a non-equating condition. The exams consist of 20 multiple choice questions and data were collected from schools in a province located in southeastern Turkey. Twenty schools were randomly selected from each of the two data sets. The samples consisted of 9,811 students for the vertically equated statewide examination data set and 941 students for the countrywide examination data set.

VAMs Used in This Study

Unadjusted hierarchical linear model and generalized persistence model were used to examine the effect of vertical equating on value-added estimates. A brief explanation about these models is presented below.

Unadjusted hierarchical linear model

The UHLMM uses unadjusted change scores with a random intercept. This model consists of a two-level HLM described by the following equations;

Student-level model,

$$d_{ijs} = \beta_{0is} + \varepsilon_{ijs} \quad (1)$$

where d_{ijs} is the change score, β_{0is} is a random intercept associated with the school i, and ε_{ijs} represents random error.

School-level model,

$$\beta_{0is} = \gamma_{0s} + \xi_{is} \quad (2)$$

where γ_{0s} is the mean of the random intercepts, β_{0is} and ξ_{is} are the random effect and random error for school i on the random intercept for subject area s, respectively. β_{0is} and ξ_{is} are assumed to be independent**.** The single equation form can be written as

$$d_{ijs} = \beta_{0s} + \xi_{is} + \varepsilon_{ijs}. \quad (3)$$

Generalized persistence model

The GP model is a general multivariate model for estimating teacher or school effects based on a longitudinal data set, which was developed by Mariano et al. (2010), it was intended to accommodate both school effect decay and scale changes. The GP model estimates are computed from a Bayesian framework for non-equated longitudinal data set. A student's year *t* score depends on an overall year *t* mean for all students, plus a cumulative sum of the current year and past year schools' effects, plus a random residual error term for the student in the current testing year. y_{it} is the achievement score of student *i* in year *t* and the GP model for this score is

$$y_{it} = \mu_t + \left(\sum_{g=1}^{t} \sum_{j=1}^{J_g} \phi_{igj} \theta_{g[jt]} \right) + \varepsilon_{it}, \quad (4)$$

where μ_t is the overall mean for the year, ϕ_{igj} equals 1 if student was taught by school *j* in year *g*, and 0 otherwise. Therefore, the products of $\phi_{igj}\theta_{g[jt]}$ provide the school effects for the current and prior grades, and ε_{it} is the residual error term.

Results of the UHLMM and GP models based on the equated and non-equated data sets were compared in this study. As mentioned, the UHLMM requires equated test scores while the GP model relaxes this assumption. UHLMM analyses were conducted with SAS software using the code provided by Tekwe et al. (2004); GP model estimations were conducted using GPvam R package (Karl et al., 2012).

RESULTS

Value-added estimates from each VAM used in this study are shown in Table 1. The UHLMM provides value-added estimates as best linear unbiased predictors (BLUP), while the GP model provides empirical best linear unbiased predictors (EBLUP). As shown in Table 1, value-added estimates for the statewide test from both models appeared to be consistent in terms of sign for most of the schools except for Schools 3, 4, 6, 9, 13, and 20 (presented in bold). Similarly, value-added estimates for the countrywide test from both models appeared to be consistent in terms of sign for most of the schools except for Schools 8, 13, 15, 17, and 20 (presented in bold). However, the magnitude of the school estimates varied.

Table 1
Estimates of the school effects obtained from two VAMs based on grade 8 statewide and countrywide math test results

Statewide Test					Countrywide Test				
School ID	UHLMM		GP		School ID	UHLMM		GP	
	BLUP	SE	EBLUP	SE		BLUP	SE	EBLUP	SE
5	45.58	8.44	20.71	8.72	12	2.47	1.79	1.12	1.23
2	23.65	7.86	17.57	8.47	4	1.79	1.86	0.67	1.26
10	21.38	9.32	26.53	9.10	3	0.82	1.78	0.59	1.23
9	**19.24**	**8.85**	**-2.79**	**8.89**	6	1.39	1.97	0.52	1.29
3	**10.66**	**8.82**	**-4.46**	**8.88**	1	0.98	1.81	0.43	1.24
12	8.84	7.98	9.59	8.52	7	1.07	1.79	0.29	1.23
8	6.99	7.57	7.96	8.36	**17**	**-0.26**	**1.81**	**0.25**	**1.24**
4	**2.11**	**9.00**	**-6.89**	**8.96**	**15**	**-0.78**	**1.19**	**0.14**	**1.08**
20	**0.46**	**8.34**	**-5.50**	**8.68**	**20**	**-0.13**	**1.83**	**0.09**	**1.25**
6	**-0.09**	**8.88**	**4.34**	**8.91**	5	0.39	1.65	0.08	1.19
19	-0.85	8.37	-2.55	8.69	2	0.21	1.67	0.00	1.20
7	-4.83	8.53	-0.73	8.75	**8**	**0.25**	**1.93**	**-0.02**	**1.28**
13	**-5.79**	7.82	**1.65**	8.46	**13**	**0.35**	**1.79**	**-0.09**	**1.23**
15	-8.79	9.09	-8.54	9.00	11	-1.43	1.85	-0.33	1.25
18	-13.06	7.68	-10.34	8.39	18	-0.59	1.87	-0.38	1.26
11	-14.58	7.62	-2.93	8.37	10	-0.66	1.87	-0.47	1.26
14	-14.76	7.42	-2.27	8.29	16	-1.12	1.85	-0.58	1.25
17	-16.93	9.06	-17.09	8.98	19	-1.16	1.64	-0.66	1.19
16	-19.55	7.48	-6.04	8.32	9	-1.76	1.08	-0.75	1.06
1	-39.67	7.66	-20.49	8.39	14	-1.83	1.79	-0.93	1.23

School IDs are sorted by UHLMM; inconsistent results (in terms of signs) between two models are presented in bold.

Value-added scores are typically used for school ranking. The schools were ranked based on the value-added scores obtained from two different models. The school ranks based on the UHLMM and GP model are presented in Table 2. As shown in Table 2, school rankings based on statewide test data showed differences between UHLMM and GP models. Only the least successful school (i.e., School 1) was found to be the same in both models. The three most successful schools were the same but they were in different orders for the two models. School rankings for the countrywide test data also showed differences between UHLMM and GP models (see Table 2). As shown in Table 2, twenty-five percent of the schools (Schools 12, 4, 1, 9, and 14) were ranked the same by both models (presented in bold). Although other schools' ranks did differ, the school rankings appeared to be close to each other from both models. Spearman rank correlations were calculated between the ranks obtained from both models. The correlations were .699 and .878 for the statewide (equated) data and the countrywide (non-equated) data, respectively.

Table 2
School ranks obtained from the two VAMs based on grade 8 statewide and countrywide math test results

Ranking	Statewide Test School ID		Countrywide Test School ID	
	UHLMM	GP	UHLMM	GP
1	5	10	**12**	**12**
2	2	5	**4**	**4**
3	10	2	6	3
4	9	12	7	6
5	3	8	**1**	**1**
6	12	6	3	7
7	8	13	5	17
8	4	7	13	15
9	20	14	8	20
10	6	19	2	5
11	19	9	20	2
12	7	11	17	8
13	13	3	18	13
14	15	20	10	11
15	18	16	15	18
16	11	4	16	10
17	14	15	19	16
18	17	18	11	19
19	16	17	**9**	**9**
20	**1**	**1**	**14**	**14**

Consistent rankings between two models are presented in bold.

DISCUSSION and CONCLUSION

In this study, equated statewide test data and non-equated countrywide test data were analyzed with both UHLMM and GP models. In general, the estimated effects of most of the schools are compatible for both data sets. On the other hand, school rankings showed differences between the UHLMM and GP model for both data sets. The school rankings based on the two VAMs were closer for the non-equated data set than for the equated data set. The correlation of school effects across models also appeared to be stronger in the non-equated data (i.e., the countrywide test data) than in the non-equated data (i.e., the statewide examination test data). Thus, the differences between results of the UHLMM and GP model appeared to be smaller for the non-equated data set. One possible explanation for the differences between two data sets may be due to the equating effect. As a result, it can be concluded that practitioners should be careful about the model choice. When test scores are equated, then the data should be analyzed with the UHLMM. When data are not equated, then tests can be estimated by either the UHLMM or GP model. As the test score equating is a tedious process and is not always possible in the real testing applications (e.g., the lack of anchor items), practitioners may prefer either the UHLMM or GP model. These results are consistent with Yıldırım and Şen's (2018) study. Yıldırım and Şen (2018) have compared the GP model to the UHLMM under non-equated data set and they found that tests can be estimated by either the UHLMM or GP model for non-equated data set.

Test equating is an important process if one wants to compare results from different forms of the same test. This is likewise important when the test scores from multiple years are to be compared. However, this issue has not been studied sufficiently for comparison of value-added assessments. A relatively small number of studies have been reported examining scaling effects on value-added estimates (e.g., Briggs & Domingue, 2013; Briggs & Weeks, 2009; Briggs, Weeks, & Wiley, 2008). Briggs and Weeks (2009), for example, examined the effect of different scaling methods on school level

estimates, and they found that scaling did have an effect on the estimates. Similarly, in the present study showed, there were differences observed in terms of school-level value-added estimates and in school rankings between equated and non-equated data sets. Briggs and Domingue (2013) note that choices in vertical scaling may also have an effect on teacher and school effects. Although only one data set with vertical scaling was examined in this study, results provide evidence that test equating may have an effect on model selection and school estimates. Although vertical scaling appears to be important for growth models, vertical equating using IRT does not guarantee an equal interval scale in value-added assessment applications (Ballou, 2009).

Several VAMs have been developed for determining teacher and school effectiveness. Each model has some strengths and weaknesses. Persistence models are different from gain score models in that they incorporate persistence of school effects. Another possible explanation for the difference between the two data sets in this study may be due to school effect estimates that are sensitive to different modeling specifications, such as the persistence of school effects. Although VAMs appear to provide an objective tool for use in educational accountability systems, these models should be used cautiously along with other tools to determine effective and ineffective schools (Beardsley, 2008).

Thinking of a different perspective, some countries such as Turkey and the US give a key role to private schools and tutoring centers for high-stakes tests. It could be particularly helpful for parents to decide which school or tutoring center they should send their children. In this regard, ranking of these schools and centers based on its effectiveness could be considered as an alternative procedure because tracking students' academic growth can be explained by teachers' contributions using VAMs. Furthermore, considering the performance salaries of teachers in these private institutions (Boran, Atalmis, & Sagir, 2015), the importance of using VAMs cannot be ignored.

In this study, models were compared using empirical data sets for two consecutive years for a single subject (i.e., mathematics). VAM applications are also potentially biased if school- and student-related covariates are excluded, although some VAMs can statistically control school- and student-related variables. Research on the effects of equating on value-added scores might benefit by inclusion of covariates for school- and student-related variables.

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Yıldırım, İ., & Şen, S. (2018). Katma-değerli değerlendirme modellerinde test eşitleme durumunun incelenmesi. In S. Dinçer, (Ed.), *Değişen dünyada eğitim* (pp. 125–134). Ankara: Pegem Akademi.

TÜRKÇE GENİŞLETİLMİŞ ÖZET

Bir okulun veya öğretmenin etkililiğinin değerlendirilmesi yıllardır tartışılmaktadır. Bu bağlamda, "öğrenci başarısı", okul etkililiğinin en önemli göstergesi olarak düşünülebilir (Balcı, 1988). Öğrenci öğrenmesinin değerlendirilmesi, eğitim alanında önemli bir politika konusudur (Ercikan, 2006). Bilindiği gibi, öğrenci başarısını etkileyen birçok faktör vardır. Bu faktörler arasında, öğrencilerin sınav puanlarındaki öğretmen ve okul etkileri, öğrenci öğrenmesinin değerlendirilmesine yönelik yeni bir istatistiksel yaklaşımla tespit edilebilmektedir (Sanders ve ark., 2002). Sanders, Saxton ve Horn (1997) öğretmenin katma değer puanını, öğretmenin derslerini yürüttüğü bir sınıftaki beklenen başarı düzeyi ile mevcut başarı arasındaki fark olarak tanımlamıştır. Bu tanımda, tahmin edilen ve gözlemlenen test puanlarındaki farklılıkların büyüklüğünün, öğretmen ve okul etkililiğini yansıttığı varsayılmaktadır. Ölçülen puan tahmin edilen puandan yüksekse, öğretmen ve okulun öğrenci başarısına "eklediği" anlamına geldiği, aksi halde öğrenci başarısını azalttığı söylenebilmektedir.

Her bir öğrencinin akademik gelişimini yıllar boyunca ve farklı konularda izlemek için bir dizi Katma-Değerli Model (KDM) geliştirilmiştir, böylece öğretmenlerin bu büyümeye katkısı tahmin edilebilmektedir (Braun, 2005). KDM'lerin amacı, öğrenci popülasyonundaki büyük demografik veya yetenek farklılıklarını göz önünde bulundurarak, okullardaki öğrenci başarısının doğru ve güvenilir karşılaştırmasını elde etmektir. KDM'leri kullanarak öğrenci başarısına dayalı olarak öğretmen etkililiğini tahmin etmek, eğitim çıktılarının gelecekteki başarı sonuçları üzerindeki etkilerini izlemek için boylamsal veriler gerektirebilir (Mariano, McCaffrey & Lockwood, 2010). Ancak, test puanlarının büyümeyi tahmin etmede kullanılması için, bu puanların ortak bir metriğe eşitlenmesi (ör. Dikey [vertical]) ve ölçeklendirilmesi gerekmektedir (Ballou, Sanders, & Wright, 2004; Briggs & Domingue, 2003; Doran & Cohen, 2005). Bu nedenle, boylamsal verileri modellemede zorlayıcı bir konu farklı madde güçlük değerlerine sahip standart testlerin eşitlenmiş olmasıdır. KDM'lerin çoğunluğu ardışık sınıflar arasında eşitlik gerektirirken, bazı KDM'ler basitçe notların doğrusal olarak ilişkili olmasını gerektirerek bu varsayımı esnetmektedir (Shaw, 2012). Dikey olarak ölçeklenmiş veri kümelerinin yokluğunda, Katma-Değerli Değerlendirme (KDD) yaklaşımında kullanılabilecek bazı alternatif yöntemler önerilmiştir. Mariano, McCaffrey ve Lockwood (2010), McCaffrey, Lockwood, Koretz ve Hamilton (2003) ve McCaffrey, Lockwood, Koretz, Louis ve Hamilton (2004), farklı gelişimsel ölçeklerden elde edilen sabit olmayan varyanslar ve kovaryanslara sahip veriler için süreklilik modellerini (persistence models) önermişlerdir.

Yukarıda belirtilen konuların ele alınması için bir dizi model tanıtılmıştır (Broatch & Lohr, 2012; Lockwood ve ark., 2007; Mariano ve ark., 2010). Bununla birlikte, KDM'lerde test eşitleme durumunu karşılaştırmaya yönelik kapsamlı bir araştırmaya rastlanmamıştır. Bu çalışmada KDD çerçevesinde iki yaklaşım araştırılmıştır: düzeltilmemiş hiyerarşik doğrusal model (UHLMM; Tekwe ve ark., 2004) ve genelleştirilmiş süreklilik modeli (GP modeli; Mariano ve ark., 2010). Bu iki modelin sonuçları, birbirleriyle tutarlı olup olmadıklarını ve iki modelin okul sıralamasına göre farklılık gösterip göstermediğini belirlemek için karşılaştırılmıştır. Tekwe ve ark. (2004) tarafından sağlanan kodu kullanarak SAS yazılımı ile UHLMM analizleri yapılmıştır. GP modelinin tahminleri GPvam R paketi kullanılarak gerçekleştirilmiştir (Karl, Yang & Lohr, 2012). UHLMM, en iyi doğrusal yansız tahmin ediciler (BLUP) olarak katma değerli tahminler sağlarken, GP modeli ampirik en iyi doğrusal yansız tahmin edicileri (EBLUP) sağlar.

Bu çalışmada, eşitlenmiş eyalet geneli test verileri ve ülke çapında uygulanan eşitlenmemiş test verileri, hem UHLMM hem de GP modelleri ile analiz edilmiştir. Genel olarak, okul etkilerinin tahminlerinin işaretleri her iki veri seti için uyumlu bulunurken okul etki büyüklüklerinin tahmini değerleri farklılık göstermiştir. Öte yandan, okul sıralamaları UHLMM ve GP modeli arasında her iki veri kümesi için farklılıklar göstermiştir. İki KDM'ye dayanan okul sıralamaları, eşitlenmemiş veri kümesinde eşitlenmiş veri kümesine göre daha yakın çıkmıştır. Modeller arasındaki okul etkilerinin korelasyonu eşitlenmemiş verilerde (yani, eşitlenmemiş TEOG test verileri) eşitlenmiş verilerden

(yani, eyalet çapında sınav test verileri) daha güçlü olduğu görülmüştür. Bu nedenle, eşitlenmemiş veri seti için UHLMM ve GP modelinin sonuçları arasındaki fark daha küçük görünmektedir. İki veri seti arasındaki farklar için olası bir açıklama, eşitleme etkisine bağlı olabilir. Sonuç olarak, uygulayıcıların model seçimi konusunda dikkatli olmaları gerektiği sonucuna varılabilir. Test puanları eşitlendiğinde, veriler UHLMM ile analiz edilmelidir. Test verileri eşit olmadığı zaman, testler UHLMM veya GP modelleriyle tahmin edilebilir. Test puanının eşitlenmesi yorucu bir süreç olduğundan ve gerçek test uygulamalarında yapılması her zaman mümkün olmadığı için (örneğin, ortak maddelerin eksikliği), uygulayıcılar bu durumlarda UHLMM veya GP modelini tercih edebilirler.

Test eşitleme, aynı testin farklı formlarının sonuçları karşılaştırmak isteniyorsa önemli bir süreçtir. Bu, birden çok yıldaki test puanlarının karşılaştırılması gerektiğinde de aynı şekilde önemlidir. Bununla birlikte, bu konu katma-değerli değerlendirmelerinin karşılaştırılması için yeterince incelenmemiştir. Katma değerli tahminler üzerinde ölçekleme etkilerini inceleyen nispeten az sayıda çalışma rapor edilmiştir (örneğin, Briggs & Domingue, 2013; Briggs & Weeks, 2009; Briggs, Weeks, & Wiley, 2008). Briggs ve Weeks (2009) farklı eşitleme yöntemlerinin okul etkisi tahminleri üzerindeki etkisini incelemiştir. Briggs ve Weeks (2009) çalışması, eşitlemenin tahminler üzerinde bir etkisi olduğunu bulmuştur. Benzer şekilde, bu çalışmada, okul düzeyinde katma-değerli tahminler ile eşitlenmiş ve eşitlenmemiş veri setleri arasındaki okul sıralamasında farklılıklar olduğu görülmüştür. Bu çalışmada, test eşitlemenin model seçimi ve okul tahminleri üzerinde bir etkiye sahip olabileceğine dair kanıt sunulmaktadır.

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Examining the contributions of support and class belonging to preservice teachers' career motivation in Turkey

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ABSTRACT This study aims to examine the contribution of the perceived support and sense of class belonging to pre-service teachers' career motivation. A total of 670 pre-service teachers majoring in various teaching areas including science, social studies, Turkish and mathematics at a state university in Aegean Region participated in the study. Self-report questionnaires including the FIT-Choice Scale, the Psychological Sense of School Membership Scale, and the Support Scale were used as data collection tools. Hierarchical multiple regression analysis was utilized to determine the extent to what level of the variance explained in the motivational factors and the perception about teaching by support and sense of class belonging. Results of analysis showed statistically significant relations between sense of class belonging and the FIT-Choice scale. Additional to this, it was found to be statistically significant relations between the support types and the FIT-Choice scale, while support from instructors was the strongest predictor of motivation. Future directions and implications were discussed.

Keywords: *Sense of belonging, Support, Teacher career motivation, Teacher education,*

Türkiye'de destek ve sınıfa aitlik algısının öğretmen adaylarının öğretmenlik mesleğine yönelik motivasyonuna katkısının incelenmesi

ÖZ Bu araştırmada, öğretmen adaylarının sınıfa aitlik ve algılanan destek düzeylerinin öğretmenlik mesleğine yönelik motivasyona katkısının incelenmesi amaçlanmıştır. Araştırmaya, Ege Bölgesindeki bir devlet üniversitesinde, fen bilgisi, sosyal bilgiler, Türkçe ve matematik öğretmenliği alanlarında öğrenim gören toplam 670 öğretmen adayı katılmıştır. Veri toplama araçları olarak Öğretmenin Seçimine Etki Eden Faktörler, Okula Aidiyet Duygusu ve Destek Ölçekleri kullanılmıştır. Veriler hiyerarşik çoklu regresyon analizi tekniği ile çözümlenmiştir. Analiz sonuçları, sınıf aidiyeti duygusu ile öğretmenlik mesleğine yönelik motivasyon arasında istatistiksel olarak anlamlı ilişkiler olduğunu göstermiştir. Buna ek olarak, destek türleri ile öğretmenlik mesleğine yönelik motivasyon arasında istatistiksel olarak anlamlı ilişkiler olduğu ve öğretim üyelerinden alınan desteğin öğretmenlik mesleğine yönelik motivasyonun en güçlü belirleyicisi olduğu belirlenmiştir. Eğitimsel uygulamalar ve öneriler tartışılmıştır.

Anahtar Kelimeler: *Aitlik algısı, Destek, Öğretmen kariyer motivasyonu, Öğretmen eğitmi,*

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INTRODUCTION

Teachers are at the center of every educational system and thus, the quality of teachers directly and indirectly influences the quality of teaching and learning in the classroom. Being an effective teacher does not only mean to have the required knowledge and skills but also having a positive attitude and motivation for the teaching profession, which is necessary to fulfill the demanded responsibilities (Heinz, 2015; Watt, Richardson, & Wilkins, 2014). Thus, teachers are expected to see the teaching profession more than a strictly job. Therefore, what motivates people to become a teacher, how they view the teaching profession and what aspirations they have towards career development are important topics to be addressed in order to increase the quality of teachers in the classroom (Cheng, Tang, & Cheng, 2015; Eren & Tezel, 2010).

In recent years, pre-service teachers' career motivation has gained the attention of many researchers because beliefs and attitudes that preservice teachers bring into their profession shape their success in their future professional lives (Fokkens-Bruinsma & Canrinus, 2012; Heinz, 2015; Watt & Richardson, 2012; Watt, Richardson, & Wilkins, 2014). Thus, it is important to examine factors contributing to pre-service teachers' career motivation. In the literature, research has identified that individual variables including gender, self- and task-perceptions and values contribute to individuals' decisions to choose teaching as a career (Watt et al., 2014). In addition to this, adapting the social cognitive theory, recent theories and research addressing teacher motivation have highlighted that socio-contextual factors may influence individuals' teaching career motivation and to retain them in the teaching profession (Flores & Day, 2006; Heinz, 2015). The quality of social networks, communication and interaction with other peers and their teacher educators, therefore, may contribute to pre-service teachers' career motivation. That is because teachers' motivation and attitudes towards teaching profession are shaped by their experience during teacher education in college (Heinz, 2015; Watt & Richardson, 2012; Watt et al., 2014).

In this study, the authors intend to examine the contributions of two socio-contextual variables, supports and class belonging, to pre-service teachers' career motivation because previous studies have reported these two socio-contextual variables significantly predicted teachers' job satisfaction and self-efficacy (Freeman, Anderman, & Jensen, 2007; Skaalvik & Skaalvik, 2011). Support refers to individuals' perception of assisting with issues, care and love they receive from others, whereas belonging stands for the feeling of being respected, accepted and supported by others. We have not located any study examining the contributions of these socio-contextual variables to pre-service teachers' teaching career motivation. The findings from this study would have important implications for the effectiveness of teacher education programs and the higher education policy at colleges.

Motivation for Teaching as a Career

In broad terms, motivation refers to an individual's values, expectations, goals, and beliefs about their abilities. Many different frameworks have been theorized to explore motivation in educational settings (e.g., expectancy-value model). In teacher education literature, one widely used framework for investigating teachers' career motivation is the Factor Influencing Teaching Choice (FIT-Choice) framework theorized by Watt and Richardson (2007). Based on Eccles's and his colleagues' expectancy-value theory, FIT-Choice is a multidimensional approach to explore individuals' motivation for having preferred teaching as a career and their perceptions related to the teaching professions. The FIT-Choice involves three major dimensions including self, value and task. Self includes individuals' perceptions about abilities to fulfill teaching. Value includes individuals' intrinsic, subjective attainment and utility values. Finally, task is to choose teaching for task demand and task return.

FIT-Choice has been utilized to investigate pre-service teachers' career motivation in Turkey and other countries including the United States of America and Australia. For instance, Kilinc, Watt and Richardson (2012) studied Turkish pre-service teachers' career motivation and perceptions about the teaching profession in Turkey. A total of 1577 pre-service teachers from different subject areas were administrated to the FIT-Choice scale. Turkish pre-service teachers in their study reported the altruistic social utility value as the most influential factor because of which they had chosen the teaching profession. In another study, Eren and Tezel (2010) examined the roles of the professional engagement and the career development aspiration on pre-service teachers' career motivation. A total of 423 pre-service teachers participated in their study. Eren and Tezel (2010) reported that the professional engagement predicted teachers' career motivations including intrinsic career value, ability and making social contribution.

Sense of Belonging

Sense of belonging is about to what degree students feel personally accepted, respected and included by others in the classroom or in the school (Goodenow, 1993). The teacher education programs (e.g., schools of education) are the social environment that preservice teachers are recruited for in the teaching profession. The quality of social relations among peers in teacher education programs then becomes an important variable that may contribute to their social well-being, motivation and learning (Cheng et al., 2015). Students with a low level of belonging are likely to show a lower interest and engagement, whereas those with a high level of belonging are expected to exhibit more involvement and participation in classroom activities (Freeman et al., 2007; Gummadam, Pittman, & Ioffe, 2016).

Research addressing sense of belonging has examined the relations of sense of belonging with educational outcomes including engagement, academic motivation and academic achievement. We have not located any study examining the relations between pre-service teachers' sense of belonging and teaching as a career motivation. Yet, studies have reported sense of belonging are related to students' academic motivation (e.g., Gummadam et al., 2016), and in-service teachers' job satisfaction (e.g. Skaalvik & Skaalvik, 2011). Gummadam et al. (2016), for instance, examined the relations amongst sense of belonging, depression, self-worth and social acceptance. Analysis revealed that sense of school belonging was positively associated with self-worth ($\beta = .40$, $p < .001$), scholastic competence ($\beta = .30$, $p < .001$), and social acceptance ($\beta = .37$, $p < .001$); yet, it was negatively related to depression ($\beta = -.48$, $p < .001$). In another study, Freeman et al. (2007) studied the relations of class belonging with academic motivation and perceptions of instructors' characteristics. A total of 238 college students participated in the study. Freeman and her colleagues found the positive relations of class belonging with self-efficacy ($\beta = .58$, $p < .001$), intrinsic motivation ($\beta = .38$, $p < .001$) and task value ($\beta = .46$, $p < .001$). The reports from these studies suggest that sense of belonging is an important variable that may contribute to pre-service teachers' motivation for the teaching profession.

Support

Support refers to an individual's perception in terms of being cared and assisted by other people. A supportive social network is necessary for pre-service teachers to maintain their physical and psychological well-being (Heinz, 2015). Research has reported that supports from different sources including classmates, instructors and families, generally make students less stressful and increase their sense of belonging (Anderman, 2002). Furthermore, support from classmates and instructors was related to higher academic achievement (Buhs, 2005). For instance, Zumbrunn, McKim, Buhs and Hawley (2014) examined the relations amongst support, motivation, sense of belonging, engagement and academic achievement among college students. The authors found that the support positively predicted the sense of belonging ($\beta=0.52$, $p < .001$) and motivational constructs including task value ($\beta=0.28$, $p <$

.001). In addition to this, sense of belonging significantly contributed to self-efficacy (β=0.43, $p < .001$) and task value (β=0.30, $p < .001$). In another study, Skaalvik and Skaalvik (2011) studied the relations of socio-contextual variables including support and sense of belonging with teachers' job satisfaction and motivation to leave the profession. The authors found that the support from family, peers and supervisory predicted sense of belonging and job satisfaction. Additionally, sense of belonging was related to emotional exhaustion and job motivation. Overall, these studies indicate that support from people including peers, instructors and families may help pre-service teachers feel better and less stressful.

Rationale of the Present Study

Recent studies on teachers' career motivation have highlighted that teachers' initial teacher education experience is one of the main factors that contribute to what they are and what the kinds of teachers they would become (Heinz, 2015). Understanding the roles of such socio-contextual variables on pre-service teachers' career motivation would be important implications for teacher education policy, and planning and curriculum designs in teacher education programs. Thus, the purpose of this study was to examine the contributions of the socio-contextual factors including support and sense of belonging to pre-service teachers' career motivation in Turkey. With this overarching aim, the present study sought to address the following research questions:

To what extent did pre-service teachers' perceived support from classmates, instructors and family statistically significantly predict their teacher career motivation in Turkey?

To what extent did pre-service teachers' sense of class belonging statistically significantly predict their teacher career motivation in Turkey?

METHODOLOGY

A quantitative survey design was employed to address the purposes of the study. Self-report questionnaires were used to collect data. Hierarchical multiple regression analyses were utilized to address the aforementioned research questions.

Sample

Convenience sampling strategy was used in this study. Because of its convenience to the researchers, pre-service teachers who were at the teacher education program in a state university in the Southwestern Turkey were invited to take a part in the study. A total of 670 pre-service teachers (449 females and 221 male) voluntarily participated in the study (See Table 1). The participants were from various subject areas including science teaching (209 participants), mathematics (137 participants), social studies (156 participants) and Turkish language studies (168 participants). The data were collected in April 2017. The data collection tools were administered to the participants in their classrooms under the supervisions of their teachers, and 30 minutes were given to complete the instruments.

Table 1
The demographical features of participants

	Science		Social studies		Mathematics		Turkish	
	Female	Male	Female	Male	Female	Male	Female	Male
Freshmen	53	11	24	22	29	7	38	16
Sophomore	34	18	21	20	25	10	22	23
Junior	47	9	11	16	27	5	36	20
Senior	29	8	17	25	28	6	8	5
Total	163	46	73	83	109	28	104	64

Data Collection Tools

Self-report questionnaires including FIT-Choice Scale, the Psychological Sense of School Membership Scale (PSSMS), and Type of Support Scale, were used as the data collection tools.

The FIT-Choice Scale was established by Watt and Richardson (2007) to assess pre-service teachers' career motivation, based on the FIT-Choice framework. The FIT-Choice Scale was adapted into Turkish by Eren and Tezel (2010) and used by researchers in the Turkish context (e.g., Kilinc et al., 2012). The FIT-Choice Scale consists of eighteen dimensions that can be put into two groups as a) motivational factors and b) perceptions about teaching (Kilinc et al., 2012). Motivational factors include twelve sub-dimensions as time for family, job transferability, ability, job security, prior teaching and learning experiences, work with children/adolescents, intrinsic career value, make social contribution, fallback career, enhance social equity, social influences and shape future of children/adolescents. Perceptions about teaching include six sub-dimensions as social dissuasion, salary, high demand, expert career, social status and satisfaction with choice. As a 7 Point-Likert scale, the FIT-Choice consists of a total of 59 items.

Psychological Sense of School Membership Scale (PSSMS) was used to assess pre-service teachers' sense of belonging. The PSSMS was developed by Goodenow (1993) and adapted into Turkish culture by Sari (2012). In the literature, studies have used two versions of the PSSMS to measure sense of class belonging and school belonging. In this study, the class version of the PSSMS was used because pre-service teachers were more likely to spend more time in their classes. As a five-point Likert scale, the PSSMS consists of 18 items in two sub-dimensions as sense of belonging and feeling of rejection.

Three different sources of support that pre-service teachers possibly perceived were identified. These were support from classmates, support from instructors and support from family. Three items developed by Skaalvik and Skaalvik (2011) were adapted to assess each type of support.

Data Analysis

To analyze the collected data, several analysis procedures were followed. First, to check the validity and reliability of the data collection tools, the confirmatory factor analysis and the reliability analysis were run. Table 2 displays the Cronbach alpha values for the internal consistency reliability values of each sub-scale and bivariate correlation between variables whereas Table 3 shows the results of the confirmatory factor analysis for the validity of data collection tools. Minimum and maximum values of factor loadings of each sub-scales were given in appendix. These results indicated that the data collections tools were reliable and valid. Then, mean scores and standard deviations were computed. Because the FIT-Choice Scale includes eighteen sub-dimensions, we averaged the mean scores under two groups a) motivation for teaching and b) perceptions about teaching (Kilinc et al., 2012). Lastly, hierarchical multiple regression analysis was used in SPSS 22 software to determine the extent to what

level of variance in motivational factors and perception about teaching explained by exogenous variables.

Table 2
Cronbach's alpha and correlations of variables

	α	1	2	3	4	5	6
Motivation for teaching	.75						
Perception about teaching	.78	.28*					
Sense of belonging	.84	.24*	.21*				
Feeling of rejection	.82	-.46*	-.24*	-.19*			
Supports from classmates	.75	.43*	.39*	.27*	-.34*		
Supports from instructors	.77	.50*	.40*	.19*	-.33*	.44*	
Supports from family	.78	.29*	.37*	.24*	-.16**	.31*	.28*

*Note: *p < .01, **p < .05*

Table 3
Results of confirmatory factor analysis

Instrument	χ^2	*df*	CFI	RMSEA
FIT-Choice scale	2412.55	1399	0.92	0.06
PSSMS	1212.09	745	0.97	0.04
Support scale	572.41	245	0.97	0.04

Note. CFI = Comparative Fit Index, RMSEA = Root Mean Square Error of Approximation.

FINDINGS

The mean scores and standard deviation for variables in the study were presented in Table 4. As seen in Table 4, the mean scores of pre-service teachers' motivation for teaching as a career were between moderate and high in the seven-point scale (1-low, 4- moderate, 7-high). The mean score of motivation for teaching (*M* =5.34, *SD*= 1.57) was slightly higher than the mean score of perceptions about teaching (*M* =5.18, *SD*= 1.17). Addition to this, the mean scores of supports and sense of belonging were between moderate and high in the five-point scale. Among support types, pre-service teachers reported that the highest mean value was for support from family (*M*=3.84, *SD*= 1.23), whereas the lowest mean value was for support from instructors (*M*=3.22, *SD*= 1.31).

Table 4
Descriptive statistics for the variables in the study

		Mean (*SD*)	Skewness	Kurtosis
FIT-Choice scale [a]	Motivational factors	5.34 (1.57)	-0.87	0.72
	Perception about teaching	5.18 (1.17)	0.75	-0.54
	Total	5.28 (1.32)	0.58	-0.75
PSSMS [b]	Sense of belonging	3.51 (1.18)	-0.76	0.14
	Feel of rejection	2.63 (1.11)	-0.44	0.65
	Total	3.33 (1.01)	-0.99	-0.78
Support scale [b]	Supports from classmates	3.61 (1.11)	-0.87	0.12
	Supports from instructors	3.22 (1.31)	-0.73	-0.61
	Supports from family	3.84 (1.23)	-0.21	-0.81
	Total	3.51 (1.18)	-0.76	0.14

Note: [a] 1-7 Likert type, [b] 1-5 Likert type

To address research questions, two separate hierarchical multiple regression analyses were run. The first one was to examine the predictions of sense of class belonging and support types to motivation for

teaching and the second one was to test the predictions of sense of class belonging and support types to perceptions about teaching. Hierarchical multiple regression analyses enable researchers to enter predictor variables in predetermined blocks. In hierarchical multiple regression analyses, first support types were entered and then sense of class belonging variables were entered into the regression model. The logic for this order was that sense of class belonging is related to students feeling being accepted and respected in the classroom (Goodenow, 1993). Therefore, support type may be superior to sense of belonging.

The results of hierarchical multiple regression analysis were presented in Table 5 and Table 6. The results of regression analysis showed that there were some statistically significant contributions of support and sense of belonging on the FIT-Choice scales. According to Table 5, the first model including only support from classmate, instructors and family explained a significant amount, 31%, of the variance in the motivation for teaching (F (3, 666) = 101.76, p <.001). Additionally, analysis of revealed that the standardized regressions coefficients of support from classmate, instructors and family with motivation for teaching were statistically significant (β= .23, p < .01, β= .37, p < .01, and β= .11, p < .01, respectively). When the unique contributions of support types were examined, it was found that support from instructors had the largest contribution on motivation for teaching (sr^2=.11, p< .01) followed by support from classmate (sr^2=.04, p < .05) and support from family (sr^2=.02 p<.01).

Table 5
Result of hierarchical regression analysis the contributions of variables on motivation for teaching

	Model 1			Model 2		
Model 1	β	t	sr^2	β	t	sr^2
Supports from classmates	.23	6.22*	.04*	.15	4.10*	.02*
Supports from instructors	.37	10.18*	.11*	.30	8.68*	.07*
Supports from family	.11	3.26*	.02*	.10	2.88*	.01**
Model 2						
Sense of belonging				.07	2.08**	.01**
Feel of rejection				-.28	-8.45*	.07*
R^2	.31			.39		
R^2 Changes				.07		
F (df)	101.76(3)*			84.19(5)*		

Note: *p < .01, **p < .05

Table 6
Result of hierarchical regression analysis the contributions of variables on perceptions about teaching

	Model 1			Model 2		
Model 1	β	t	sr^2	β	t	sr^2
Supports from classmates	.21	5.60*	.04*	.19	4.80*	.03*
Supports from instructors	.24	6.47*	.05*	.22	5.96*	.04*
Supports from family	.22	6.29*	.05*	.21	5.88*	.04*
Model 2						
Sense of belonging				.08	3.01**	.02*
Feel of rejection				-.06	-2.45**	.01**
R^2	.27			.30		
R^2 Changes				.03		
F (df)	80.50(3)*			60.61(5)*		

Note: *p < .01, **p < .05

The second model including sense of belonging significantly predicted motivation for teaching (F (5, 664) = 84.19, p <.001). When variables related to sense of belonging added in the first model, explained variance of motivation for teaching increased from.31 to .39. The standardized regressions coefficients of sense of belonging and feeling of rejection with motivation for teaching were statistically significant (β= .07, p < .05, and β= - .28, p < .001, respectively). As expected, the sign of standardized regressions coefficients between feeling of rejection and motivation for teaching was negative. In the second model,

the unique contributions of variables indicated that the largest contributions on the motivation for teaching were from feel of rejection (sr^2=.07, p < .001) and support from instructors (sr^2=.07, p < .001).

As seen Table 6, the first model including only support from classmate, instructors and family explained a significant amount, 27%, of the variance in perceptions about teaching (F (3, 666) = 80.50, p <.001). It was found that the standardized regressions coefficients of support from classmate, instructors and family with perceptions about teaching were statistically significant (β= .21, p < .001, β= .24, p < .001, and β= .22, p < .001, respectively). The unique contributions of support types showed that all support types significantly contributed to perceptions about teaching whereas the largest contributions on perceptions about teaching were from support from instructors (sr^2=.05, p < .01) and support from family (sr^2=.05, p < .05), and followed by support from classmates (sr^2=.04 p <.01). The second model including sense of belonging significantly predicted perceptions about teaching (F (5, 664) = 60.61, p <.001). These findings indicated that when variables related to sense of belonging added in the first model, explained variance of perceptions about teaching increased from.27 to .30. The standardized regression coefficients of sense of belonging and feeling of rejection with perceptions about teaching were statistically significant (β= .08, p < .05, and β= - .06, p < .05, respectively). Again, feeling of rejection was negatively related to perceptions about teaching. The unique contributions of variables showed that the largest contributions on perceptions about teaching were from support from instructors (sr^2=.04, p < .01) and support from family (sr^2=.04, p < .01). The contributions of sense of belonging and feel of rejection (sr^2=.07, p < .001) were statistically significant (sr^2=.02, p < .001 and sr^2=.01, p < .05, respectively).

To sum up, the results of hierarchical multiple regression analysis revealed that support and sense of class belonging predicted pre-service teachers' career motivation. Addition to this, explained proportions of motivation for teaching and perceptions about teaching significantly increased when sense of class belonging was added in the model. All standardized regression coefficients were statistically significant and positive, except that coefficients of feeling of rejection were negative. Overall, these results indicated that support from classmates, instructors and family, and sense of class belonging and rejection were related to preservice teachers' career motivation.

DISCUSSION and IMPLICATION

What motives people to choose teaching as a career is a multidimensional and complex construct. Teachers' career motivations start developing through their experience at teacher education programs and continue being shaped over their experience at schools they would work. Studies have highlighted the importance of teacher education programs in teachers' career motivation as they have started feeling themselves as teachers and see what teachers do, what they are expected and so forth. Previous studies on pre-service teacher' career motivation have mostly focused on what types of motivation (e.g., instincts or extrinsic motivation) pre-service teachers have (e.g., Kilinc et al., 2012; Sinclair, 2008). These studies reported that pre-service teachers mostly seemed to have intrinsic motivation, which indicated that internal satisfaction and interest were the main reason to choose teaching as a career.

Previous studies addressing preservice teachers' career motivation in the Turkish context reported pre-service teachers' career motivation score was to be between moderate and high scores (1-7 Likert type, 1= low, 4= moderate, 7= high). For example, Kilinc et al. (2012) reported that for Turkish pre-service teachers the weighted mean scores of FIT-Choice scales were between moderate and high (for motivation for teaching M=4.92, SD=1.51 and for perceptions about teaching M=4.53, SD=1.41). Results of this study indicated that our pre-service teacher sample tend to have similar mean scores, between moderate and high career motivations (M= 5.34, SD= 1.57 and M= 5.18, SD= 1.17, respectively). Although we did not test its statistical significance, pre-service students' means scores for

motivation for teaching was slightly higher than their mean score for perception about teaching. The reason behind this may be the fact that in the Turkish culture being a teacher at a state school provides job security, which may lead Turkish pre-service teachers to report a higher mean score for motivation for teaching than perceptions about teaching. Kilinc et al. (2012) argued that individuals who came from lower socio-economic status would view teaching as a job secure career because in the Turkish context working as a teacher at state schools provides a high job security.

Motivation theories highlight what we are, what we want to do and why we want to do depend on the social environment including whom we are acting with, by whom we are supported and by whom we are leaded. This study furthers our understanding of pre-service teachers' career motivation by examining its relation with the social-contextual variables. In this study, the contribution of social-contextual variables including belonging and support to the pre-service teachers' career motivation were examined in the Turkish context. The results of this study suggest that social-contextual variables including support from classmates, instructors and family, and sense of belonging predicted pre-service teacher' motivation for teaching and their perceptions about teaching.

One important result of this study is that the pre-service teachers' sense of class belonging and feeling of rejection made strong contributions to the pre-service teachers' motivation for teaching. While sense of belonging had a positive relation with motivation, feeling of rejection was negative relation with motivation for teaching. Both variables made statistically significant contribution to the prediction of motivation for teaching. The previous research addressing sense of belonging and teacher motivation reported that there were positive correlations between sense of belonging and motivation (e.g., Furrer & Skinner, 2003; Goodenow & Grady, 1993; Skaalvik & Skaalvik, 2011; Weiss, 1999). Consistent with these studies, the present study revealed that there were strong relations between sense of belonging and the pre-service teachers' motivation for teaching. Baumeister and Leary (1995) underscore that the need to belong is an essential to human motivation. Skaalvik and Skaalvik (2011) argued that the teachers' feelings of belonging are positively related to satisfaction and positive affect. In addition to this, Strayhorn (2012) and Zumbrunn et al. (2014) suggest that sense of belonging is the context-dependent and particular types of belonging (e.g., classroom, school) has important effects on educational outcomes including adjustment, achievement and motivation. Considering the literature given, it would be reasonable to say that the relations of sense of belonging with teacher motivation should be tested in different contexts to better understand the nature of the context on teacher motivation.

Another important result of this study was that there were strong and positive relations between the pre-service teachers' perceived support from classmates, instructors, and family and their motivation for teaching as a career. These findings of the current study also were consistent with the previous research results (e.g., Skaalvik & Skaalvik, 2011; Zumbrunn et al., 2014). The previous research reported that perceived support positively predicted motivation. Consistent with the studies carried out by Weiss (1999, 2002) supportive environments were associated with teachers' career motivation. Additionally, studies addressing teachers' beliefs and behaviors concluded that learners with greater perceptions of support from various sources including peers and instructors generally tend to have more enjoyment and higher levels of academic achievement (Anderman 2002; Buhs 2005; Umbach & Wawrzynski 2005). For instance, Eret-Orhan, Ok and Capa-Aydin (2017) reported that faculty environment and teaching staff significantly contributed to Turkish preservice teachers of the adequacy of their education (sr^2=.04, p< .05 and sr^2=.01, p< .14, respectively). Consequently, consistent with the previous studies, findings of this study suggest that a supportive and friendly learning environment at teacher education schools is important to foster their perception and motivation for teaching profession.

The predictor variables explained higher variation of motivation for teaching than did variation of perceptions about teaching (R^2=. 39 vs R^2= .30). It may be related to the fact that perceptions about teaching includes salary and social status that may not be related to pre-service teachers' in-class experience. When looked at standardized regression coefficients of support from family in Table 5 and 6, its coefficient with perception about teaching was higher than did with motivation for teaching (β= .22 vs, β= .11). It can be concluded that because support from family may be related to the salary and

social status of teaching profession, support from family significantly contributed to the preservice teachers' perceptions about teaching.

One implication from findings of this study suggest is to pay attention to the relations between support from instructors and pre-service teachers' career motivation. Given the standardized regression coefficients, support from instructors was the best predictor of motivation for teaching. Previous studies addressing pre-service teacher education reported that pre-service teachers seemed to take their instructors at teacher education programs as a role model on the implementation of educational practices or to be what kinds of a teacher (Goktas, Yildirim, & Yildirim, 2009). The results of this study suggest that instructors at teacher education programs are important for pre-service teachers' motivations for teaching career. The higher pre-service teachers perceived support from instructors the more they motivated to become a teacher. Yet, the pre-service teachers in the sample of this study reported the lowest mean score for support from instructors. This result indicated that support from instructors was not at the satisfactory level and that can lead pre-service teachers' career motivation to be between moderate and high. Research addressing teacher education programs in Turkey indicated that teacher education programs suffer from large class sizes (Sendag & Gedik, 2015). According to the 2013 report of the Council of Higher Education, for example, the ratio of the number of students to the number of instruction at social studies programs including teacher education programs was 48 (Cetinsaya, 2014). The large class size would negatively influence pre-service teachers' motivation (Sendag & Gedik, 2015). More importantly, a large class size would restrain instructors to get close relationships with their students and lead pre-service teachers to have a lower support from their instructors. The results of this study suggest that teacher education programs should find a way to help pre-service teachers to get more support from their instructors. Considering the results of the previous studies, reducing class size can be a way to increase support from instructors.

Another implication that results of this study suggest is to increase pre-service teachers' sense of class belonging. Findings of this study indicate that a higher sense of belonging would positively contribute to pre-service teachers' career motivation. Yet, the mean score of pre-service teachers' sense of class belonging was slightly higher than moderate, not at a satisfactory level. The reason behind this may be the large class size. Previous studies reported that instructors were restrained to implement more constructivist teaching approaches and techniques in crowded classrooms, and choose more direct-lecturing oriented teaching techniques (Aykac & Ulubey, 2012; Goktas et al., 2009). More direct lecturing oriented techniques; however, were more likely to create more isolated and less friendly classroom environment (Yigit, Alpaslan, Cinemre, & Balcin, 2017). This might reduce pre-service teachers' sense of class belonging. The findings of this study suggest that instructors should give more space to more constructivist teaching approaches to encourage cooperative learning. As a conclusion, this study demonstrates the relations between the pre-service teachers' perceived supports and their teacher career motivation and between the pre-service teachers' sense of belonging and their teacher career motivation as well. Although certain conclusions about causality cannot be drawn from this study, there are high and strong relations between the variables in this study.

This study has certain limitations. First, in this study the data were collected from a single institution in Turkey. Yet, in Turkey because pre-service teachers were enrolled in teacher education programs based on the central enrolment examination, pre-service teacher sample in the study represented at moderate achievers and came from various regions of Turkey. There is a need for further studies examining the relations between variables with data that would be collected different institutions in Turkey. Second, the study examined separately the contributions of sense of class belonging and supports to pre-service teachers' career motivation. An interaction effect between sense of class belonging and support might exist. It is plausible to assume that the strength of relations between variables can be different when a total of contributions of sense of class belonging and supports to pre-service teachers' career motivation is examined. Further studies can examine the relations among variables by using higher statistical techniques including structural equation modelling.

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TÜRKÇE GENİŞLETİLMİŞ ÖZET

Öğretmenlerin mesleğe yönelik inanç ve tutumları, gelecekteki mesleki başarılarını şekillendirdiği için son yıllarda öğretmen adaylarının öğretmenlik mesleğine yönelik motivasyonu araştırmacıların dikkatini çekmektedir. Bu nedenle, öğretmen adaylarının mesleğe yönelik motivasyonu ile ilişkili olan değişkenlerin incelenmesi oldukça önemlidir. Bu çalışmada, öğretmen eğitimi ile ilgili alanyazında, öğretmenlerin mesleğe yönelik motivasyonunu araştırmak için yaygın olarak kullanılan ve Watt ve Richardson (2007) tarafından geliştirilen Öğretmenin Seçimine Etki Eden Faktörler (Factors Influencing Teaching Choice [FIT-Choice]) kuramsal modeli kullanılmıştır. Eccles ve meslektaşlarının beklenti-değer kuramına dayanan FIT-Choice, bireylerin meslek olarak seçtikleri ve öğretmenlik meslekleriyle ilgili algılarını belirlemeye ve motivasyonlarını keşfetmeye yönelik çok boyutlu ve kişilik odaklı bir yaklaşımdır. Alanyazındaki çalışmalar, cinsiyet, benlik, görev ve değer algıları gibi değişkenlerin meslek olarak öğretmenliği seçme kararlarını etkilediğini göstermektedir. Buna ek olarak, sosyal bilişsel kuramı temel alan motivasyon ve meslek ile ilgili yakın zamanda ortaya atılan kuramlar ve öğretmen motivasyonuna yönelik araştırmalar, sosyal bağlamsal faktörlerin bireylerin öğretmenlik mesleğe yönelik motivasyonunu etkileyebileceğini ve öğretmenlik mesleğini yürütmede onlara destek sağlayacağını vurgulamıştır. Bu nedenle öğretmen eğitimi sürecince kurulan sosyal ilişkilerin kalitesi, diğer akranlar ve öğretim elemanları ile iletişim ve etkileşim, öğretmen adaylarının mesleğe yönelik motivasyonu ile ilişkili olabilir. Çünkü öğretmenlerin öğretmenlik mesleğine yönelik motivasyon ve tutumları, hizmet öncesi eğitimleri sırasında edindikleri deneyimlerle şekillenmektedir.

Alanyazında yapılan çalışmalar destek ve sınıf aidiyetinin öğretmenlerin iş tatmini ve öz-yeterlik gibi duyusal öğeleri anlamlı bir şekilde yordadığını göstermiştir. Bu çalışmada, yazarlar, iki değişkenin öğretmen adaylarının öğretmenlik mesleğe yönelik motivasyonuna ilişkisini ve yordama gücünü incelemeyi amaçlamışlardır. Destek, bireylerin diğerlerinden sorunlara karşı aldıkları yardım, ilgi ve sevgi algısını ifade ederken, aidiyet, başkaları tarafından saygı görmesi, kabul edilmesi ve desteklenmesi duygusunu ifade eder. Alanyazında bu iki sosyal bağlamsal değişkenlerin öğretmen adaylarının öğretmenlik mesleğe yönelik motivasyonlarına olan katkılarını inceleyen herhangi bir çalışma bulunmamaktadır. Bu çalışmadan elde edilen bulgular, öğretmen eğitim programlarının etkinliğinin arttırılması ve yükseköğretim politikalarının geliştirilmesi için önemli katkılar sunabilir.

Bu çalışmaya, Ege Bölgesindeki bir devlet üniversitesinde öğrenim gören 670 öğretmen adayı (449 kadın ve 221 erkek) katılmıştır. Katılımcılar, fen bilgisi (209 katılımcı), matematik (137 katılımcı), sosyal bilgiler (156 katılımcı) ve Türkçe öğretmenliği (168 katılımcı) branşlarında eğitim görmektedir. Veriler Nisan 2017'de toplanmıştır. Bu çalışmada üç farklı ölçme aracı kullanılmıştır. FIT-Choice Ölçeği, öğretmen adaylarının mesleğe yönelik motivasyonunu FIT-Choice çerçevesine dayanarak değerlendirmek için Watt ve Richardson (2007) tarafından geliştirilmiştir. Ölçek, motivasyon faktörleri ve öğretim ile ilgili algılar olmak üzere iki gruba ayrılmakta ve 18 alt boyuttan oluşmaktadır. Öğretmen adaylarının sınıf aidiyet duygusunu değerlendirmek için Okula Aidiyet Duygusu Ölçeği kullanılmıştır. Ölçek, Goodenow (1993) tarafından geliştirilmiş ve Sarı (2012) tarafından Türk kültürüne uyarlanmıştır. Alanyazında yapılan çalışmalar üç farklı destek türü üzerine odaklanmıştır. Bunlar sınıf arkadaşlarından, öğretim üyelerinden ve aileden alınan destektir. Skaalvik ve Skaalvik (2011) tarafından geliştirilen üç madde, her bir destek türünü ölçmek için uyarlanmıştır. Veri toplama araçlarının geçerliliği ve güvenilirliğini test etmek için doğrulayıcı faktör analizi ve güvenilirlik analizi yapılmıştır. Sonuçlar veri toplama araçlarının güvenilir ve geçerli olduğunu göstermiştir. Toplanan verileri analiz etmek için istatiksel yöntemler kullanılmıştır. Betimleyici istatistiklerin yanı sıra SPSS 22 yazılımında hiyerarşik çoklu regresyon analizi, sosyal bağlamsal değişkenlerin motivasyon değişkenlerini ne derece yordadıklarını belirlemek için kullanılmıştır.

Öğretmen adaylarının mesleğe yönelik ortalama motivasyon puanları orta ve yüksek arasındadır(orta-yüksek, 4-orta, 7-yüksek). Öğretmenlik mesleğine yönelik ortalama motivasyon puanı (M = 5.34, SS = 1.57), öğretim ile ilgili algı ortalama puanından biraz daha yüksek bulunmuştur (M = 5.18, SS = 1.17).

Destek türleri arasında en yüksek ortalama değerin aile desteğine yönelik olduğu belirlenmiştir (M = 3.84, SS = 1.23). En düşük ortalama puan ise öğretim elemanlarının desteğindedir (M = 3.22, SS = 1.31).

Regresyon analizi sonuçları, destek ve aidiyet duygusunun öğretmenliğe yönelik motivasyon ve öğretim ile ilgili algı değişkenlerine istatistiksel olarak anlamlı katkılarının olduğunu göstermiştir. Sınıf arkadaşlarından, öğretim elemanlarından ve aileden alınan destek ile sınıfa ait olma duygusunu içeren model öğretmenlik motivasyonun %39'luk varyansını anlamlı bir şekilde açıklamıştır (F (5, 664) = 84.76, p <.001). Ayrıca, sınıf arkadaşlarından, öğretim elemanlarından ve aileden alınan destek ile sınıfa ait olma duygusunu içeren model, öğretmen adaylarının öğretim ile ilgili algılarının %30'luk varyansını anlamlı bir şekilde açıklamıştır (F (5, 664) = 60.61, p <.001). Özetle, hiyerarşik çoklu regresyon analizinin sonuçları, destek ve sınıfa aitlik düzeyinin öğretmen adaylarının mesleğe yönelik motivasyonunu yordadığını göstermiştir. Tüm standart regresyon katsayıları, istatistiksel olarak anlamlı ve pozitif iken, reddedilme duygusu katsayıları negatif olarak bulunmuştur. Diğer bir ifadeyle, sınıf arkadaşlarından, öğretim elemanlarından ve aileden gelen desteğin sınıf aidiyeti ve reddedilme duygusunun öğretmen adaylarının mesleğe yönelik motivasyonu ile ilgili olduğunu göstermiştir.

Bu çalışmanın sonuçları, öğretim elemanlarının öğretmen adaylarına sundukları desteğin öğretmenlik mesleğe yönelik motivasyonları açısından önemli olduğunu göstermektedir. Ancak, öğretmen adayları destek türleri içerisinde en düşük ortalama puanının öğretim elemanlarından alınan destek olduğunu belirtmiştir. Bu sonuç, öğretim elemanlarından alınan desteğinin yeterli düzeyde olmaması nedeniyle öğretmen adaylarının mesleğe yönelik motivasyonlarının orta düzeyde olduğu söylenebilir. Öğretmen adayları ile öğretim elemanları arasındaki ilişki zenginleştirilmeli ve bunun için eğitim fakültelerindeki sınıf mevcudu ve öğretim üzerindeki ders yükü azaltılması önerilebilir.

Öğretmen adaylarının sınıf aidiyet duygularının, orta dereceden biraz daha yüksek bulunmuştur. Bunun sebebi sınıflardaki öğrenci sayısının fazlalığı olabilir. Alanyazındaki çalışmalar, öğretim elemanlarının kalabalık sınıflarda yapılandırmacı öğretim yaklaşımın gereği olan yöntem ve teknikleri uygulamaktan kaçındıkları ve öğretmen merkezli yöntem ve tekniklerini seçtiklerini göstermektedir (Aykac & Ulubey, 2012; Goktas, Yildirim, & Yildirim, 2009). Öğretmen merkezli yöntem ve tekniklerin kullanılması sınıf içinde daha az iletişim kurmasına neden olabilir (Yiğit, Alpaslan, Cinemre, & Balcin, 2017). Bu durum, öğretmen adaylarının sınıf aidiyet duygusunu azaltabilir. Öğretmen adaylarının sınıfa aitlik duygularının geliştirilmesi için iş birliğine dayalı ve öğrenciyi merkeze alan yöntem ve tekniklerin kullanılması önerilir.