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Examining the roles of child temperament and teacher-child relationships as predictors of Turkish children's social competence and antisocial behavior

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Abstract

The present study examined the concurrent contribution of Turkish children's temperament and teacher-child relationship quality to their social competence and antisocial behavior, with a specific focus on the moderating role of teacher-child relationships (closeness and conflict) on children's temperament (inhibitory control and shyness) when predicting social competence and antisocial behavior. Participants were 94 children (56 boys) with mean age of 7.05 years ($SD = .88$) enrolled in 24 classrooms from five elementary schools in a suburban school district in Turkey. Mothers reported on children's temperament and teachers reported on their relationships with children as well as children's social competence and antisocial behavior. SAS PROC MIXED was used to test hierarchical regression models of children nested within classrooms. Results showed that high conflict teacher-child relationships moderated the association between low shyness and antisocial behavior. Less shy children displayed more antisocial behavior at higher levels of teacher-child conflict. In addition, at high levels of child shyness, social competence ratings improved as teacher-child closeness increased. Inhibitory control was positively correlated with social competence and negatively correlated with antisocial behavior. The qualities of teacher-child relationships can effectively support children's social competence and antisocial behavior depending upon their temperamental characteristics. Limitations and future directions of the current study are discussed.

Keywords Child temperament · Turkish children · Social competence · Antisocial behavior · Teacher-child relationship

Introduction

Children's early social behavior has significant implications for their later socio-emotional and academic success (Rose-Krasnor and Denham 2009; Rubin et al. 2015). For example, in early childhood, children with high levels of social competence tend to have positive concurrent and future attitudes toward school, high academic achievement, and positive interactions with peers and teachers (Denham 2006; Ladd and Birch 1999; Ladd et al. 1996). *Social competence* is defined as

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the ability to integrate feelings, thinking, and behaviors to achieve personal goals within a given context and culture including "sustaining positive engagement with peers" and "effectiveness in interaction" with peers (Rose-Krasnor and Denham 2009, p.163). Children's interpretations of and responses to communication from peers and adults within social transactions are considered as part of the social competence (Dodge et al. 2003). Being socially competent enhances children's positive relationships at home and at school (e.g., relationships with peers and teachers), and contributes to school adjustment and the quality of children's future social relationships (Rose-Krasnor and Denham 2009; Rubin et al. 2015). There is also evidence that social competence is positively associated with academic achievement and school attitudes (Blandon et al. 2010; Denham 2006; Ladd and Birch 1999). For example, children who are able to understand affective messages and respond accordingly are more popular and accepted by their peers (Ladd and Birch 1999; Ladd et al. 1997; McCabe and Altamura 2011). Conversely, *antisocial behavior* is defined as disruptive behavior that harms others such as aggressive, externalizing, impulsive, disobedient, and conduct problem behaviors (Averdijk et al. 2012; Loeber and Farrington 1998). High levels of antisocial behaviors in early childhood predict problematic behaviors at home, at school, and in the community (Côté et al. 2007). In details, antisocial behaviors include both internalizing and externalizing behavior problems (Merrell 1993). These types of behaviors have negative consequences for relationships with peers, parents, and teachers (Doumen et al. 2008; Rubin et al. 2009), and this difficulty forming positive peer relationships can lead to further externalizing behavior (Masten 2006; van Lier and Koot 2010). In longitudinal studies, Dodge et al. (2003) found that peer rejection in grades 1 to 3 predicted growth in aggression in grades 5 to 7. Moreover, physical and verbal aggression are strongly and positively associated with peer rejection and negatively associated with closeness in friendships (Cillessen and Mayeux 2004; Tomoda and Schneider 1997).

Children's early relationships with teachers appear to play a critical role in the development of social competence. For example, positive teacher-child relationships can be protective for young children who may be at risk for problematic social interactions (Acar et al. 2018a, b; Merritt et al. 2012; Silver et al. 2005). Individual differences in child temperament also predict social behaviors (Dennis et al. 2007; Fabes et al. 1999). For example, children who are less able to inhibit inappropriate actions (i.e., children with lower inhibitory control) and less comfortable in social situations (i.e., those higher in shyness) tend to display more problematic social behaviors (Dennis et al. 2007; Rudasill and Konold 2008).

Bronfenbrenner's (Bronfenbrenner and Morris's 1998) Bioecological Model of human development posits that developmental outcomes are influenced by proximal processes within the microsystem which is comprised of the immediate

settings experienced directly by the child. The current study focuses on the proximal processes of bidirectional interactions between teachers and children, which are shaped by both child characteristics (e.g., temperament) and environmental factors (e.g., teacher behavior). The quality of proximal processes is important for children's positive and negative social outcomes (Arbeau et al. 2010; Rudasill et al. 2013). It may be more challenging for children with certain temperamental characteristics (e.g., low regulation and high reactivity) to develop social competence and suppress antisocial behavior in classrooms. For example, reactive temperamental characteristics indicative of negative emotionality (e.g., anger/frustration, fear, sadness) have been associated with antisocial and externalizing behavior in early childhood (Moran et al. 2013). When teachers form positive relationships (e.g., high closeness and low conflict) with temperamentally-at-risk children by providing nurturing and supportive environments, children develop better social outcomes (Griggs et al. 2009; Rudasill et al. 2013). From this theoretical perspective, focusing on interactions between child temperament and teacher-child relationships presented above, the current study focuses on the microsystem of the early childhood classroom and the proximal processes of children's interactions with teachers. Teacher-child relationships are important conduits of children's social development (Merritt et al. 2012), so we conceptualized teacher-child relationships within classroom environments as moderators of the associations between children's temperamental traits and social outcomes (Denham 2006; Fabes et al. 1999; Rudasill and Konold 2008; Silver et al. 2005; Valiente et al. 2003).

Predictors of Social Competence and Antisocial Behavior

Evidence suggests that the development of both social competence and antisocial behavior is influenced by the complex interplay among a wide range of proximal and distal factors. These include child characteristics (e.g., temperament), aspects of school environments (e.g., the quality of student-teacher relationships), and broader cultural norms (Collins et al. 2000; Denham 2006; Rudasill and Konold 2008).

Temperament Temperament is defined as relatively stable, constitutional individual differences in reactivity and self-regulation (Rothbart 2011; Rothbart and Bates 2006) that influence personality, emotionality, and social behavior (see Berdan et al. 2008; Rothbart 2007; Sanson et al. 2002; Sterry et al. 2010, for reviews). Temperament has biological foundations and interacts with an individual's environment in complex ways (Shiner et al. 2012). The reactive component of temperament refers to the intensity of arousal or responsivity of the individual to the environment (Rothbart et al. 2000). For example, *shy* children may experience motivational conflict in

which they desire to play with peers, but are reticent due to social fears and/or evaluative concerns (Asendorpf 1993; Coplan et al. 2004). Regulation refers to processes that regulate reactivity, including inhibitory control, attention, and avoidance (Rothbart 2011). For example, children with strong regulatory temperament characteristics (e.g., *inhibitory control*) tend be high in social competence and relatively low in externalizing behaviors (Valiente et al. 2003).

The current study considers two components of temperament that are particularly salient to children's current and future social outcomes: inhibitory control (a regulatory component) and shyness (a reactive component). Inhibitory control helps children manage and sustain positive social relationships with peers and teachers (Valiente et al. 2003). On the other hand, shyness may undermine children's social relationships and suppress children's interactions with peers (Acar et al. 2015; Rubin et al. 2009).

Because shy children are fearful of engaging in social interactions, they are more likely to demonstrate higher levels of internalizing and lower levels of externalizing behavior problems (Acar et al. 2015; Schwartz et al. 1996). For example, Schwartz et al. (1996) found that shy or inhibited toddlers had lower scores on assessments of externalizing and delinquent behaviors at age 13 compared to children who were not shy or inhibited as toddlers. On the other hand, children who are very low in shyness (i.e., are bold) are more likely to be disruptive during class (e.g., Rimm-Kaufman and Kagan 2005) and may have difficulty interacting successfully with peers, especially when combined with low levels of regulation. For example, low levels of shyness and high levels of impulsivity at age five predicted girls' increases in externalizing behavior from ages 5 to 17 (Leve et al. 2005). Indeed, regulatory temperamental traits can serve as protective factors against development of antisocial behavior. Research shows that higher inhibitory control is related to lower levels of conduct problems among preschool children (Gusdorf et al. 2011).

Teacher-Child Relationships Positive teacher support in early childhood helps children develop social skills (Merritt et al. 2012; Rudasill et al. 2013). For example, teachers who are sensitive and responsive help children build social competence by modeling prosocial interactions and creating a classroom environment where kindness and empathy are nurtured (Farmer et al. 2011). Additionally, teachers' provision of emotional support and effective classroom management fosters pre-kindergarten and first grade children's prosocial behavior and peer inclusion (Merritt et al. 2012). Conversely, negative relationships with teachers in early childhood predict higher levels of externalizing behavior concurrently and prospectively (Silver et al. 2005, 2010). For example, Merritt et al. (2012) found that teachers' emotional support helped students regulate their behaviors and exhibit prosocial behaviors in first grade. Similarly, Rose-Krasnor (1997) reported that preschool

children are better able to behave prosocially and self-regulate if they have teachers who are emotionally supportive.

There is some evidence suggesting that teacher-child relationships can potentially moderate associations between children's temperament and social behavior (Arbeau et al. 2010; Peisner-Feinberg et al. 2001). In general, positive teacher-child interactions (e.g., closeness and emotional support) moderate the associations between temperament and social behavior (e.g., positive peer interactions, low level of externalizing behavior). As children with more difficult temperament traits (i.e., those indicative of high reactivity and low regulation) establish close relationships with teachers, they tend to demonstrate fewer externalizing behaviors and more positive social behaviors (Arbeau et al. 2010; Silver et al. 2005). Taken together, these findings suggest that high quality teacher-child relationships may ameliorate risks of negative or antisocial behaviors for children with more difficult temperamental characteristics.

On the other hand, children's poor relationships with teachers may influence children's problem behaviors with peers. That is, low levels of closeness and high levels of conflict between teachers and children may amplify associations between shyness and social competence or aggressive behavior with peers. For example, Sette et al. (2014) found that shyness was negatively correlated with teacher-rated social competence and positively associated with peer rejection for children in Italian preschool classrooms that were low in teacher closeness. Considering the importance of teacher-child relationships for children's development, in the current study, we investigated early elementary children's relationships with teachers as moderators of the associations between temperament and their social competence and antisocial behavior.

Cultural Context, Temperament, and Social Relationships

Children's social behavior is best understood within the relevant cultural context within which it occurs. Culture may influence the socialization of children because parents and others model and encourage cultural norms and values (Kagitcibasi 2007; Ladd 2005). Generally, Turkish children grow up in an interdependence-oriented family context as part of the cultural context (Baydar et al. 2012; Kagitcibasi 2007). However, Turkish children's socialization in family contexts varies as a function of parents' socioeconomic status, mothers' education, and cultural values emphasizing interdependent child development (Kagitcibasi 2007; Kağıtçıbaşı et al. 2010). In lower socioeconomic status (SES) families, there is greater emphasis on *inter*dependence, whereas in higher SES families, there is greater emphasis on *in*dependence (Kagitcibasi and Ataca 2005). Early elementary school is a transition process from the family to school context for the

majority of Turkish children. This transition may be particularly difficult for low SES students who often lack experience in preschool education (Kagitcibasi 2007); thus, early elementary school environments are particularly crucial for social, cognitive, and academic development (Merritt et al. 2012; Peisner-Feinberg et al. 2001; Pianta 1999).

Children's temperamental expressions may be fostered or impeded by the socialization processes that occur within a cultural context (Chen et al. 2012). In general, children from collectivistic cultures (e.g., Korean and Chinese) display more fearful and anxious temperamental reactions than children from individualistic cultures (e.g., Italian and Australian) (Rubin et al. 2006). From this perspective, we may expect that children from Turkey, an interdependence-oriented family cultural context, characterized by physical and social closeness, to display high levels of reactivity to stressful situations, which is more similar to behavior of children from collectivist cultures (Bayram Özdemir et al. 2015; Yagmurlu and Sanson 2009). For example, Bayram Özdemir et al. (2015) found that Turkish elementary school children's social withdrawal (shyness, unsociability, and regulated withdrawal) was associated with adjustment difficulties such as loneliness, depression, and asocial behaviors. The authors posited that shyness may have a stronger association with internalizing problems than other forms of social withdrawal such as unsociability due to the interdependent nature of Turkish culture. In another study, Yagmurlu and Sanson (2009) found that high levels of approach in Turkish preschool children (a reactive component of temperament indicative of excitement about upcoming events) was positively associated with emotion regulation when the children had responsive mothers. The association between children's temperament and social outcomes differs depending on cultural context; because research on Turkish children is relatively sparse, one purpose of the current study is to explore the association between children's temperament and social outcomes within the Turkish cultural context. Considering interconnectedness between temperament and relationships with the social environment laid out above, the purpose of this study was to examine the potentially complex inter-associations between children's temperament (i.e., inhibitory control, shyness), teacher-child relationship quality (i.e., closeness, conflict, dependency), and social competence and antisocial behavior in a sample of Turkish children in early elementary grades. Such associations have not yet been examined in Turkish children.

The Current Study

Although research conducted with samples of children from Western cultures indicates that both children's temperament and classroom environments are associated with their social competence and antisocial behavior, it is unknown how these variables work together for children from a non-Western culture such as Turkey. Thus, the purpose of this study is to examine the interplay of temperament and teacher-child relationships as they relate to social competence and antisocial behavior in school settings in a sample of Turkish elementary school children. In particular, the present study focused on the *moderating* role of teacher-child relationships on the associations between temperament and children's social competence and antisocial behavior.

We addressed the following research questions and hypotheses. First, to what extent is children's temperament (inhibitory control and shyness) related to social competence and antisocial behavior? Consistent with Rudasill and Konold (2008), we hypothesized that inhibitory control would be positively related to social competence and negatively related to antisocial behavior (Hypothesis 1A), and that shyness would be inversely related to social competence and antisocial behavior (Hypothesis 1B).

Second, to what extent are teacher-child relationship quality (closeness, conflict, and dependency) associated with children's social competence and antisocial behavior? We hypothesized that positive teacher-child relationships, characterized by high closeness and low conflict and dependency, would be positively associated with social competence and negatively related to antisocial behavior (Hypothesis 2A); and that negative teacher-child relationships, characterized by high conflict and dependency, would be negatively associated with social competence and positively related to antisocial behavior (Hypothesis 2B).

Third, to what extent do teacher-child relationships moderate associations between temperament and children's social competence and antisocial behavior? We hypothesized that positive teacher-child relationships would moderate links between children's temperament and social competence (Hypothesis 3A). Children who are low on inhibitory control will demonstrate higher social competence and lower antisocial behavior when they have close relationships with their teachers. Children low on shyness will demonstrate higher social competence and lower antisocial behavior when they have close relationships with their teachers. Conversely, children with high levels of shyness will demonstrate more social competence when they have close relationships with their teachers. On the other hand, teacher-child conflict will have an exacerbating effect. Children who are low on inhibitory control and shyness will have worse social competence and antisocial behavior when they have conflict with teachers. Children who are high in shyness will be less socially competent when conflict with teachers is high (Hypothesis 3B). See Fig. 1 for the proposed model.

Finally, research indicates that there are gender differences in children's social competence and externalizing behavior (LaFreniere et al. 2002). Gender trends in social competence of young children favor girls and externalizing behaviors favor boys (Walker 2005; LaFreniere et al. 2002). Among

Fig. 1 The Proposed Model of
Child Temperament and Teacher-
Child Relationship Quality
Predicting Child Social
Competence and Antisocial
Behavior. Child Age and Gender
were Covariates
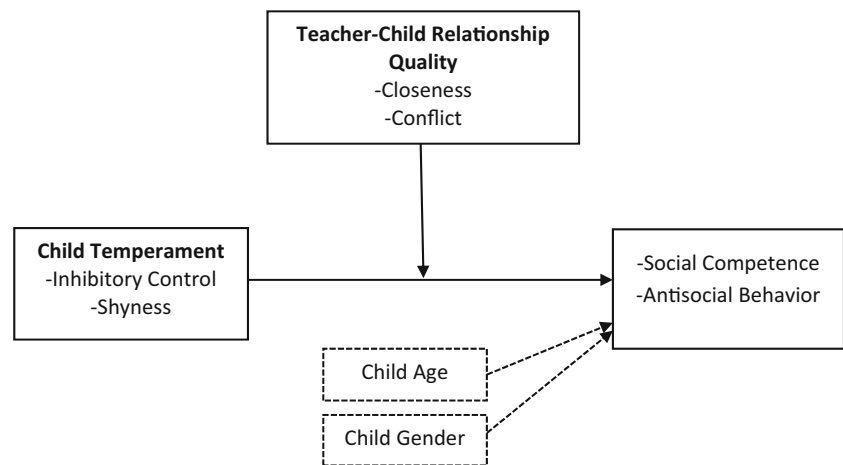
Turkish children, girls tended to be rated as higher on social competence than boys by teachers and parents (Etel and Yagmurlu 2014; Metin-Orta et al. 2013). Gender differences on antisocial behavior among Turkish children have not been consistent across studies. For example, Gulay (2011) found no significant association between gender and antisocial behavior in Turkish preschool children. However, Ozbey and Alisinaoglu (2004) found that boys scored higher on teacher-rated antisocial behavior than girls during preschool years. Considering these findings in studies with Turkish children, we controlled for gender on child outcomes in the current study.

Method

Participants

Participants were 94 children (56 boys) enrolled in 24 classrooms from five elementary schools in a suburban district of Istanbul, Turkey. Each classroom had approximately 25 to 30 children. A total of 64 children were from first grade (age of 5.5 to 7), 28 children were from second grade (age of 8), and 2 children were from third grade (age of 9). We selected children from each classroom depending on parents' consent; therefore, there were different number of children recruited across classrooms. Children's ages ranged from five and a half to nine years ($M = 7.05$ years, $SD = .85$ years). Although we did not collect information about teachers' contact experience with a target child, in general, a teacher continues with the same children from first until fourth grade. In addition, the district from which the current data were collected is a bounden duty district where teachers must serve for at least four years before they can move to another district or city. Therefore, we can speculate that teacher turnover rate should be lower in this district. This is a low-income sample according to the Turkish Statistical Institute (2015), with 38.6% of

parents reporting 1000/month (approximately $375/month), 50% reporting between 1000–1500/month, and 11.7% reporting 2500/month and higher. Approximately two-thirds (62%) of parents completed elementary school, 26.6% of parents completed middle/high school, 3.2% of parents completed college, and 1.1% had earned their Master's degree.

Data Collection Procedures

First, we obtained permission from Provincial Directorate of National Education for data collection in Turkish public schools. Second, teachers of the target age group of children were contacted through school principals in the district to obtain consent for the study. Then, parents were contacted through teachers, and each parent was asked to sign a consent form for his or her child. Consented parents were given the Children's Behavior Questionnaire for child temperament and parents returned these forms to teachers or school principals who returned them to the researchers. Teachers completed the School Social Behavior Scale with information about children's social competence and antisocial behavior; in addition, teachers completed the Student-Teacher Relationships Scale as a measure of their relationships with children.

Measures

Demographic Information Parents completed a questionnaire with demographic information such as child's gender and age, as well as respondent's age, level of education, and family income (Table 1).

Child Social Competence and Antisocial Behavior The *School Social Behavior Scale* (SSBS; Merrell 1993) was adapted into Turkish by Yukay-Yüksel (2009) and was used by teachers to assess participating children's social competence and antisocial behavior. The SSBS consists of two subscales: Social

Table 1 Participant's demographic information

Child characteristics	n (%)	Missing	M	SD	Range
Gender					
Boy	56(59.6)				
Girl	38(40.4)				
Age (years)	94		7.05	.85	5–9
Family characteristics					
Parent age	94		33.47	4.88	25–49
Parent education					
Elementary	62(66)				
Secondary/High School	25(26.6)				
College	3(3.2)				
Master's Degree	1(1.1)				
Parent gender					
Male	26(27.7)				
Female	68(72.3)				
Parent income (= Turkish Lira)					
1000	36(38.3)				
1000–1500	47(50)				
2500 and higher	11(11.7)				

Competence and Antisocial Behavior. The Social Competence subscale is composed of 32 items (e.g., "Is skillful at initiating or joining conversations with peers") and asks teachers to rate the social behaviors of children on a 5-point scale (1 = "Never" and 5 = "Frequently"). The Antisocial Behavior Subscale is also composed of 32 items (e.g., "Argues and quarrels with peers") and uses the same 5-point scale. The SSBS was validated for use with Turkish children (Yukay-Yüksel 2009, 2013). Yukay-Yüksel (2009) reported item-total correlations varying from .51 to .91 across items in the SSBS. Each item in the subscales of Social Competence and Antisocial Behavior was loaded on subscales ($\lambda > .30$) in confirmatory factor analyses (Yukay-Yüksel 2009), confirming the same factor structure as in the American sample. In the present study, the internal consistency of the social competence ($\alpha = .97$) and antisocial behavior subscales ($\alpha = .97$) were high.

Child Temperament Children's temperament was measured via parent report on the *Children's Behavior Questionnaire – short form* (CBQ; Rothbart et al. 1994). The Turkish adaptation of the CBQ was validated by Akin Sari et al. (2012). The short form CBQ is composed of 94 items and contains 15 subscales designed to measure the temperament of children. In the current study, parents completed a CBQ on a 7-point scale (where 1 = "Extremely untrue of your child" and 7 = "Extremely true of your child"; Rothbart et al. 1994).

The Shyness (6 items) and Inhibitory Control (6 items) subscale scores were analyzed in the current study. Shyness was measured with items such as "Sometimes seems nervous when talking to adults s/he has just met" and "Acts shy around new people." Inhibitory control was measured with items such as "Can easily stop an activity when s/he is told 'no.'" A child with a high score in each subscale was considered as "high" in that temperamental characteristic. The CBQ-SF has been validated and used with Turkish children (Akin Sari et al. 2012; Batum and Yagmurlu 2007; Gündüz et al. 2015). Test-retest results showed $r = .89$ for inhibitory control and $r = .94$ for shyness (Akin Sari et al. 2012). Internal consistency in the original Turkish adaption was $\alpha = .67$ for inhibitory control and .86 for shyness (Akin Sari et al. 2012). For this sample, the internal consistency for shyness was $\alpha = .68$ and inhibitory control was $\alpha = .60$.

Teacher-Child Relationship The *Student-Teacher Relationship Scale* (STRS; Pianta 2001) is a measure of teachers' perceptions about their relationships with students and was adapted into Turkish by Beyazkurk and Kesner (2005). The STRS contains 28 items and is composed of three subscales: Conflict (12 items; e.g., "This child and I always seem to be struggling with each other"), Closeness (11 items; e.g., "I share an affectionate, warm relationship with this child"), and Dependency (5 items; e.g., "This child is overly dependent on me"). Teachers rate each item on a 5-point scale (1 = "Definitely does not apply" and 5 = "Definitely applies"). The STRS has been validated with Turkish elementary school children (Acar et al. 2018a, b; Beyazkurk and Kesner 2005; Koca 2010). Koca (2010) reported an acceptable three-factor structure (i.e., closeness, conflict, and dependency). In addition, teacher-child closeness positively ($r = .46$) correlated with social skills and negatively correlated with problem behaviors ($r = -.52$). Teacher-child conflict negatively correlated with social skills ($r = -.26$) and positively correlated with problem behaviors ($r = .58$), demonstrating criterion validity (Koca 2010). Internal consistency in the original Turkish adaption was $\alpha = .80$ for conflict and $\alpha = .73$ for closeness. In the current sample, the internal consistency of the subscales was acceptable (conflict $\alpha = .83$, closeness $\alpha = .79$, and dependency $\alpha = .73$).

Results

Data Analyses

The outcome variables – teacher ratings of social competence and antisocial behavior – did not conform to assumptions of normality. Antisocial behavior was positively skewed (Skewness = 2.46 and Kurtosis = 6.27). Since the current sample is non-clinical, it is not unexpected that teachers reported low levels of antisocial behavior is normally distributed ($M = 1.36$ $SD = 0.58$ on a 5-point Likert Scale). In fact, Metin-Orta et al. (2013) found similar levels of teacher-reported

externalizing behavior on a non-clinical sample of Turkish preschool children ($M = 1.59$ $SD = 0.56$ on a 6-point Likert Scale). In contrast, social competence was negatively skewed (skewness of −1.47 and kurtosis of 3.52). We applied Box-Cox transformation method (Box and Cox 1964) to improve the normality of the distributions and equalize variances for both outcomes. The Box-Cox transformation procedure is a family of power transformations (distinct from classic square root, log, and inverse transformations) that improves the efficacy of normalizing and variance equalizing for both positively- and negatively-skewed variables (Osborne 2010). Procedures from Osborne (2010) were applied to antisocial behavior and social competence variables. The optimal distribution of antisocial behavior produced a skewness of 0.91 and kurtosis of −0.39 - values that fall within acceptable ranges of normality for skewness and kurtosis (Tabachnick and Fidell 2007). This transformed antisocial behavior variable was used in the following multivariate analyses. The transformation did not provide an optimal level of skewness (−1.47) for social competence. However, since the original variable was not in extreme violation of the normal range of skewness (between −2 and + 2; Curran et al. 1996), we used social competence without any transformation for further analyses. Residuals for both outcomes were evaluated using a Q-Q plot (see Fig. 2).

Descriptive Statistics

Descriptive statistics and interrelations among all study variables are presented in Table 2. As hypothesized, inhibitory control was significantly and negatively correlated with teacher-child conflict and dependency as well as child antisocial behaviors, and significantly and positively related to child social competence. Child shyness was significantly and negatively correlated with teacher-child closeness and positively correlated with teacher-child conflict. Teacher-child closeness and conflict were also significantly associated with child social competence and antisocial behaviors in the expected directions. Child age was not significantly correlated with any variables; therefore, it was not included in further analyses.

Model Specification

To examine our first and second research questions, a series of hierarchical linear regression models were estimated in SAS PROC MIXED to observe the strength of the associations between child temperament and the quality of the child-teacher relationship while controlling for child gender. Nesting of children within classrooms was accounted for as a random effect at the classroom-level within the statistical model. The dependent variables were specified as social competence (ICC = .09) and antisocial behavior (ICC = .11). We utilized random intercept models to account for non-independence of observations of children within classrooms (Hayes 2006). Teacher-child closeness, conflict, and dependency were centered at the sample mean (i.e., grand-mean centered) while child temperament scores were transformed to z-scores.

Fig. 2 Normal Q-Q Plots for Teacher-Rated Social Competence and Antisocial Behavior
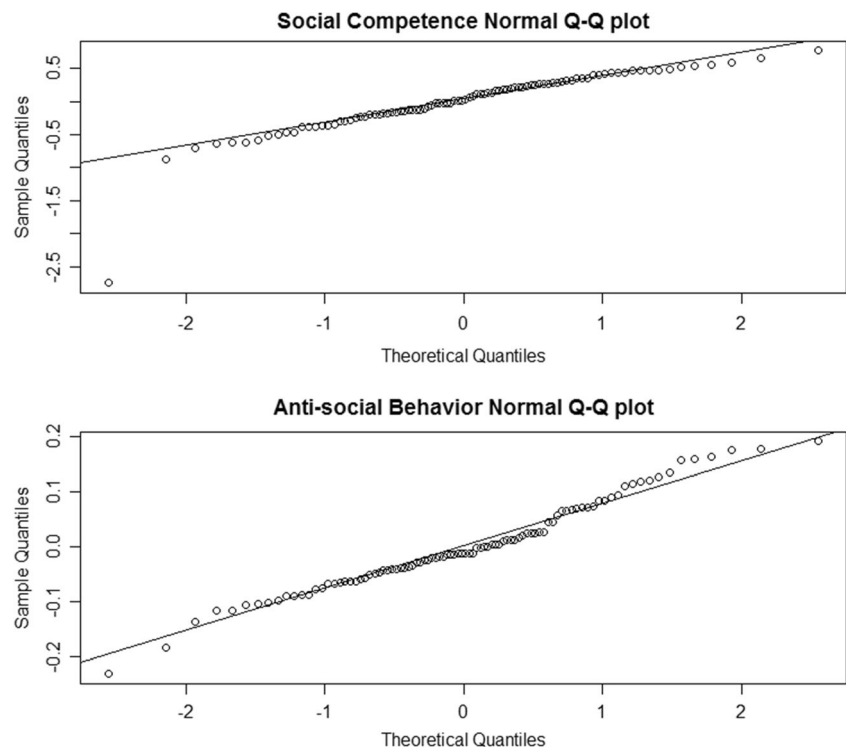
Table 2 Means, standard deviations and intercorrelations for all variables

Variables	M	SD	Range	α	1	2	3	4	5	6	7	8	9
1. CBQ-Inhibitory Control	5.03	1.11	2–7	.60	–								
2. CBQ-Shyness	3.68	1.21	1–6.17	.68	.09	–							
3. STRS-Closeness	43.97	6.06	27–54	.79	.02	−.27**	–						
4. STRS-Conflict	23.04	8.24	12–43	.83	−.32**	.18*	−.16	–					
5. STRS-Dependency	14.92	4.29	5–24	.73	−.18*	.06	.19*	.53**	–				
6. SSBS-Social Competence	4.24	.65	1.34–5	.97	.21*	−.11	.53**	−.24*	.14	–			
7. SSBS-Antisocial Behavior	1.36	.58	1–4.06	.97	−.23*	−.11	−.21*	.52**	.13	−.36**	–		
8. Child Gender					.21*	.16	.11	−.09	.05	.08	−.15	–	
9. Child Age					−.07	−.05	.01	.10	.01	−.04	−.05	.05	–

*p < .05, one-tailed. **p < .01, one tailed

CBQ, Child Behavior Questionnaire; *STRS*, Student-Teacher Relationship Scale; *SSBS*, School Social Behavior Scale; Child Gender; Male = 1 Female = 2

To examine our first and second research questions, the main effects of child temperament and the teacher-child relationship variables were regressed on social competence and antisocial behavior in two separate models. To examine our third research question, the baseline model was specified as the main effects of child gender, child temperament, and the teacher-child relationship variables. Then, all possible interaction terms were added sequentially and statistically tested based on their contribution to model fit compared to the previous, less complex model. Variables were tested one at a time and only statistically significant interaction effects were retained. Improvement in model fit was determined using log likelihood ratio chi-square tests (χ^2), *AIC*, and *BIC*. Table 3 presents the final model parameters for the main effects models and the moderation models for each outcome.

Main Effects Analyses

Given that we were interested in observing the extent to which patterns of associations between temperament and teacher-child relationship quality found in U.S. samples could be replicated in a Turkish sample, a close examination of main effects was warranted. Thus, no interaction terms were included in the first model. In addition, closeness and conflict were associated with social competence. Specifically, for a one-unit increase in teacher-child closeness, social competence increased significantly by 0.71 (*p* < .0001). For a one-unit increase in teacher-child conflict, social competence decreased significantly by 0.30 (*p* = .003). It is noteworthy that teacher-child closeness and conflict had the largest t-statistics in the social competence model. Teacher-child conflict was positively associated with antisocial behavior, such that for a one-unit increase in conflict, antisocial behavior increased significantly by 0.15 (*p* < .0001). See Table 3 for main effect models.

Moderation Analyses

In this set of analyses, interaction effects were added to the model, thus shifting the model parameters (see Table 3). The interaction of teacher-child closeness x shyness was significant (β = .22, *p* = 0.05); that is, teacher-child closeness significantly moderated the association between shyness and social competence. For children who were shyer than average, social competence was lower if the teacher-child relationship was rated as low in closeness, and social competence was higher if the teacher-child relationship was rated as high in closeness. Figure 3 depicts this interaction in a surface plot. Shyness is on the x-axis, where 0 is the sample mean with 2 standard deviations above/below the sample mean. Teacher-child closeness is on the y-axis, where 0 is the sample mean. The range of the x- and y-axis reflects the range of the z-scores for shyness and teacher-child closeness centered at the grand mean, respectively. The predicted levels of social competence are depicted in gradations of dark and light grey, such that dark grey represents lower predicted social competence scores and light grey represents higher predicted social competence scores. There were no other significant interaction effects.

To further explore the interaction, simple slopes analyses were performed (Aiken and West 1991). At high levels of teacher-child closeness (+1 SD), shyness was not significantly associated with children's social competence. This corresponds to the simple slopes estimate of .11 (*p* = 0.16) seen in Table 3. At low levels of teacher-child closeness (−1 SD), social competence ratings decreased (but not significantly) with higher levels of shyness. This corresponds to the simple slopes estimate of −.11 (*p* = 0.17). However, although our purpose was to examine the moderating effect of teacher closeness on the association between shyness and social competence, our simple slope analysis indicated that the interaction was mainly driven by shyness. That is, at high levels of child shyness (+1 SD), social competence ratings improved as

Table 3 Final model parameters for main effects model and moderation model for social competence and antisocial behavior

| | Social competence | | | | | | Antisocial behavior | | | | | |
| | Main effects only | | | Interaction | | | Main effects only | | | Interactions | | |
	Estimate	t-statistic	p-value	Estimate	t-statistic	p-value	Estimate	t-statistic	p-value	Estimate	t-statistic	p-value
Intercept	1.883 (0.482)	3.91	0.0002	2.129 (0.485)	4.39	<0001	0.191 (0.056)	3.400	0.001	0.202 (0.055)	3.69	0.004
Child gender (Female)	-0.071 (0.110)	-0.65	0.519	-0.053 (0.109)	-0.49	0.624	-0.009 (0.021)	-0.43	0.666	0.010 (0.021)	-0.490	0.627
Child temperament												
Inhibitory control	0.085 (0.058)	1.46	0.148	0.082 (0.057)	1.43	0.157	-0.015 (0.011)	-1.31	0.193	-0.017 (0.011)	-1.150	0.137
Shyness	0.004 (0.058)	0.06	0.951	-0.814 (0.421)	-1.93	0.056	-0.021 (0.011)	-1.790	0.077	-0.021 (0.011)	-1.86	0.066
Child-teacher relationship												
Dependency	0.115 (0.082)	1.40	0.1673	0.093 (0.081)	1.15	0.255	-0.012 (0.072)	-0.69	0.491	-0.015 (0.017)	-0.89	0.377
Closeness	0.705 (0.130)	5.43	<.0001	0.657 (0.129)	5.11	<.0001	-0.033 (0.027)	-1.220	0.227-	-0.034 (0.027)	-1.28	0.205
Conflict	-0.306 (0.101)	-3.04	0.003	-0.297 (0.100)	-3.01	0.003	0.015 (0.020)	7.38	<.0001	0.149 (0.020)	7.510	<.0001
Interactions												
Shyness*Closeness	–	–	–	0.219 (0.111)	1.96	0.052	–	–	–	–	–	–
Shyness*Conflict	–	–	–	–	–	–	–	–	–	-0.038 (0.016)	-2.320	0.022

teacher-child closeness increased. This corresponds to the simple slope estimate of .875 ($p < .001$), which is almost two times larger than the simple slope at low levels of child shyness.

The interaction of teacher-child conflict x shyness was a significant predictor of antisocial behavior ($\beta = -.04$, $p = .022$). That is, depending on teacher-child conflict, the associations between level of child shyness and teacher ratings of antisocial behavior were different. Figure 4 depicts this interaction with a surface plot. Shyness is depicted on the x-axis and child-teacher conflict is depicted on the y-axis. The predicted levels of antisocial behavior are shown in gradations of dark and light grey, such that dark grey represents lower levels of predicted antisocial behavior and light grey represents higher predicted antisocial behavior.

At higher levels of teacher-child conflict (+1 SD), antisocial behavior scores tend to decrease with higher levels of shyness. This corresponds to the simple slope estimate of -0.05 ($p = 0.004$). However, at lower levels of teacher-child conflict (-1 SD), shyness was not significantly associated with antisocial behavior ratings. This corresponds to the simple slope estimate of 0.005 ($p = 0.76$). In other words, children who were not shy (i.e., bold) and had high conflict with the teacher were more likely to demonstrate antisocial behavior. Children who were shyer than the sample mean and had more conflict with the teacher were *not* more likely to demonstrate antisocial behavior. At lower levels of shyness, conflict has significant association with teacher ratings of antisocial behavior. This corresponds to the simple slope estimate of .11 ($p < .001$). At lower levels of shyness, conflict still has a significant association with teacher ratings of antisocial behavior. This corresponds to the simple slope estimate of .19 ($p < .001$).

Discussion

In this study, we investigated whether patterns of associations between teacher-child relationships, temperament, antisocial behavior, and social competence found in the U.S. would also be found in Turkey. We examined teacher–child relationship quality among elementary-aged Turkish children as moderators of associations between children's temperament, social competence, and antisocial behavior. Two main findings emerged. First, for children who were shyer than average, social competence was lower if the teacher-child relationship was rated as low in closeness, and social competence was higher if the teacher-child relationship was rated as high in closeness. Second, less shy children displayed more antisocial behavior at higher levels of teacher-child conflict.

Teacher-child closeness emerged as protective for shyer children's social competence. Overall, the effects of teacher-child closeness on social competence were greater for children

Fig. 3 Predicted surface plot depicting the interaction between child shyness and child-teacher closeness for social competence. Dark grey represents lower predicted social competence scores and light grey represents higher predicted social competence scores
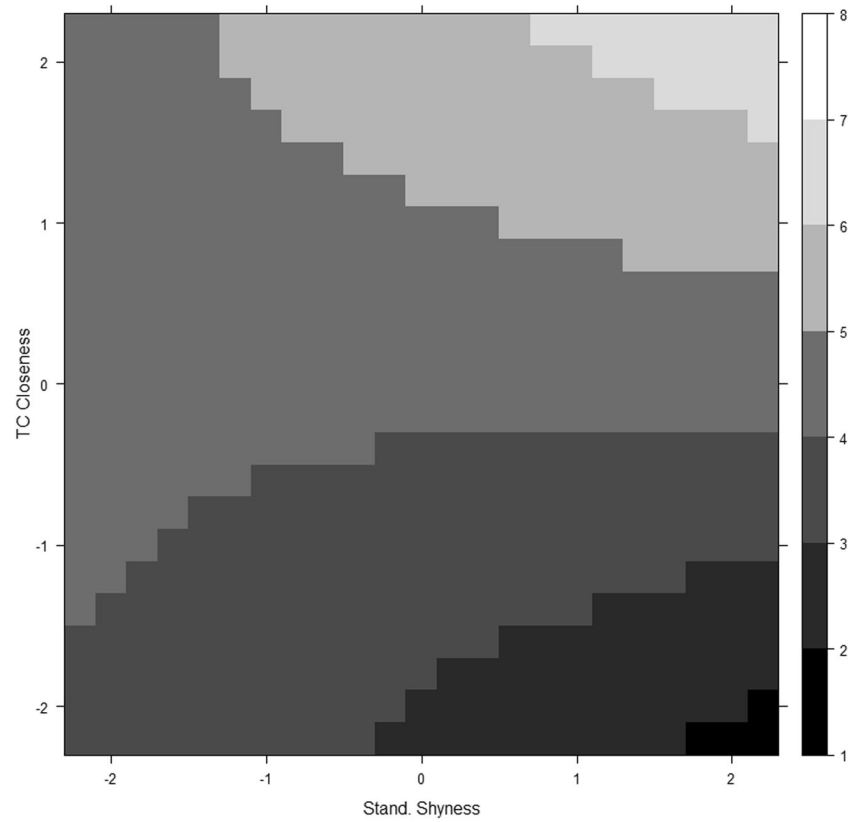
Fig. 4 Predicted surface plot depicting the interaction between child shyness and child-teacher conflict for antisocial behavior. Dark grey represents lower levels of predicted antisocial behavior and light grey represents higher predicted antisocial behavior
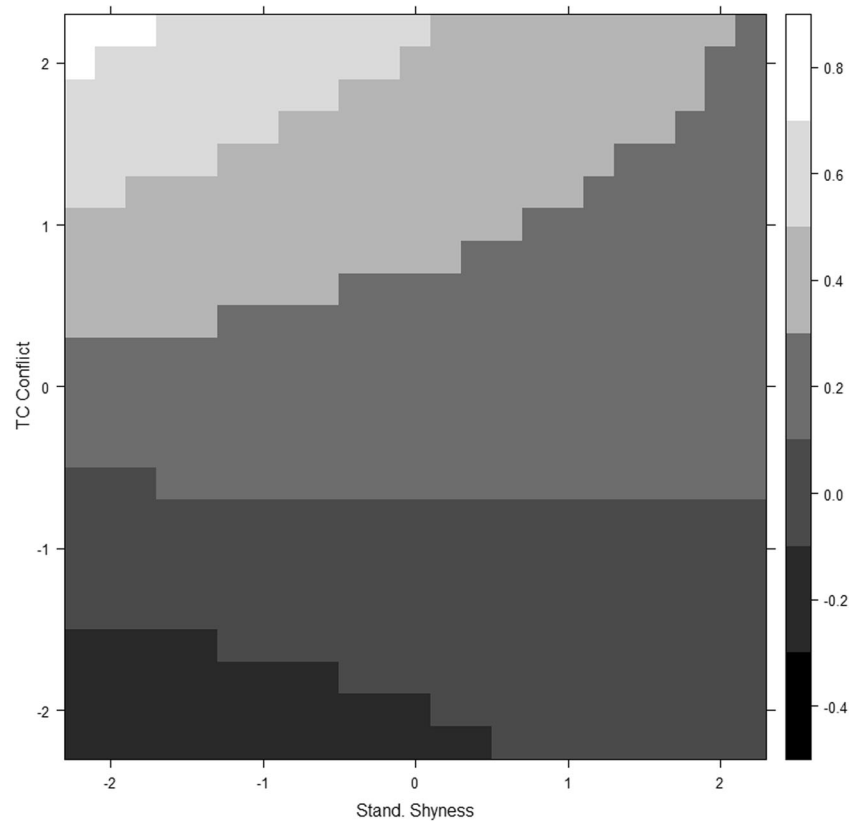
who were higher in shyness. Specifically, for children who were shyer than average, lower closeness with teachers was related to being rated low in social competence; but higher closeness with teachers was related to having high social competence. Findings from the current study are consistent with previous research conducted with a sample of children in an Italian preschool setting showing that shyness was negatively associated with teacher-reported social competence at low levels of teacher closeness (Sette et al. 2014).

Similarly, with a sample of early elementary students in Canada, Arbeau et al. (2010) found that shy children who had lower levels of teacher-child closeness had higher levels of self-reported social adjustment problems, such as school avoidance and social withdrawal. These findings are consonant with the notion that teacher-child closeness promotes children's socially competent behavior (Rudasill et al. 2013). The perspective that teachers create a social milieu in which children learn to successfully interact with others, maps onto the findings reported here – it is likely that children with closer teacher-child relationships are learning from these positive interactional experiences and generalizing them to other social relationships. However, it is also possible that children who have more teacher-child closeness have better social skills to begin with, thus facilitating the formulation of positive teacher-child relationships.

The second finding was that conflict with teachers exacerbated the association between (low) shyness and antisocial behavior. That is, although teacher-child conflict was associated with more antisocial behavior regardless of children's level of shyness, children who were low in shyness and had higher levels of teacher-child conflict had the highest reported antisocial behavior. Less shy (i.e., bold) children are more likely than their shyer peers to engage in antisocial behavior when they have conflict with teachers. This is congruent with previous work conducted with Chinese (Han et al. 2016) and Italian preschoolers (Sette et al. 2014) showing that children's shyness was positively associated with aggressive behavior and peer rejection and negatively associated with social competence when they had lower levels of teacher closeness, which may be indicating presence of struggle between teacher and children. In fact, Han et al. (2016) found that less shy children showed higher levels of aggressive behavior when they had low levels of close relationships with their teachers. Therefore, if less shy children cannot establish close relationships with their teachers, it may hinder their social skills and increase the likelihood that their behavior is viewed as antisocial.

On the other hand, inhibitory control was not a significant predictor in any of the models. It possible that, given the obedience-oriented interdependent culture (Kagitcibasi 2007), Turkish teachers have such high expectations for children's regulated behavior that children's inhibitory control may not have an effect on their social outcomes. Previous research has shown that Turkish children's regulated withdrawal was not significantly associated with prosocial behaviors and peer social preference (Bayram Özdemir et al. 2015).

Another important finding from the current study is that children's age was not significantly associated with their temperament (inhibitory control and shyness), social competence, or antisocial behavior in bivariate analyses. This finding is similar to previous research with Turkish children (e.g., Corapci et al. 2010; Korucu et al. 2016; Yagmurlu and Sanson 2009) that revealed mixed findings on associations between children's age and social outcomes and temperament. For example, Korucu et al. (2016) found no significant association between Turkish preschool children's age and mother-reported inhibitory control ($r = .09$) but they found significant association between age and teacher-rated social competence ($r = .19$). Conversely, Metin-Orta et al. (2013) did not find a significant association between Turkish preschool children's age and their teacher-rated social competence (same measure as it is in Korucu et al. 2016). In addition, Öztürk (2011) found no significant association between children's age and their play disruption behavior, which indicates aggressiveness and disruptive behaviors during peer interactions ($r = -.03$). Corapci et al. (2010) also did not find a significant association between children's age and their teacher-rated aggression. In the current study, most of the children were from first and second grade and this may impede variability in children's age to detect age differences on temperament and social behaviors.

Interestingly, the findings presented here with a Turkish sample showed similarity and consistency with findings with Western samples in terms of how children's temperamental characteristics (shyness as reactive temperament in particular) interacted with teacher-child relationships as predictors of social competence and antisocial behavior. From this point of view, we could speculate that no matter whether it is a Western classroom or a Turkish classroom, teachers play an important role in creating the social context for the development of children's social behavior and outcomes, and in a similar manner. Farmer et al. (2011) described the central role of the teacher in children's social development as the "invisible hand," whereby teachers' leadership in the classroom informs and shapes the social environment in which children learn to interact successfully with peers and adults. Specifically, teacher-child closeness has is a longitudinal predictor of children's positive social outcomes such as prosocial interactions with peers; on the other hand, teacher-child conflict is a longitudinal predictor of aggression (Rudasill et al. 2013). Considering the perspectives of the Bioecological Model (Bronfenbrenner and Morris 1998), the findings from the current study also posits the importance of bidirectional interactions between children's temperament and teacher-child relationships in predicting children's social competence and antisocial behavior.

Implications of the Current Study

Findings from the current study have implications for teachers in early elementary classrooms. Teacher-child closeness and conflict both have main effects on children's social development, but they also may have different effects on children's social outcomes depending upon children's temperamental characteristics. When teachers know about children's temperamental characteristics, they can accommodate their approaches to children in ways that best support children's needs in the classroom. Teachers' understanding of children's temperament may be especially beneficial for shy children, but also for children who are low in shyness (i.e., bold) and potentially boisterous or even disruptive in class (Rimm-Kaufman and Kagan 2005). By fostering close relationships, teachers may help children feel more comfortable in a potentially stressful social environment so that they can engage in positive social interactions. These positive interactions include socially competent behaviors such as sharing, negotiation, and cooperative planning. As shy children engage in positive interactions, they build and hone socially competent behaviors.

Considering the importance of the teacher's positive relationships with children who are low and high in shyness, teacher-training programs should include guidance related to developing close relationships with children, and understanding how to constructively interact in challenging situations in order to circumvent conflict with children. Programs designed to facilitate teachers' positive relationships with children, such as Banking Time (Driscoll and Pianta 2010), have been successful and demonstrate the value of such approaches for meeting the needs of individual children in the classroom.

In addition, teachers also should be able to identify different temperamental characteristics of children in their classrooms to provide social and instructional support. For example, teachers can prepare supportive social environments for withdrawn children to help them to engage in productive interaction with peers and teachers (Rimm-Kaufman et al. 2002). Although the current study is small-scale research with limited sample size to refer to a culturally-relevant intervention and adaptation of interventions to different countries and sociocultural contexts without cultural tailoring and careful study may have limited success, a temperament-based intervention called INSIGHTS into Children's Temperament (INSIGHTS; McClowry et al. 2005) that provides teachers with information about temperament and the optimal ways of supporting children with different types of temperament has been found to be particularly beneficial for shy children's critical thinking and math skills (O'Connor et al. 2014).

Teachers' support may be more beneficial for children with bold temperaments (e.g., less shy) to help them develop better social skills and have less conflictual relationships with peers (Rimm-Kaufman et al. 2002).

Children who are bold may have problems with adjustment to classroom processes. Therefore, a sensitive teacher's approach to these children may ameliorate the effects of temperament by providing a supportive environment that aligns with children's temperamental characteristics (Rimm-Kaufman et al. 2002; Rudasill et al. 2013).

Limitations and Future Directions

Despite the unique contributions of this study, limitations in the current study point to future research directions. First, the sample was not very diverse in terms of SES; the sample was primarily comprised of children from low SES families, which limits generalizability of results to all Turkish children and teachers. Future work should include more diverse samples in terms of SES. Second, our sample size was somewhat small, limiting our power to detect effects. Some of our marginally significant results (e.g., shyness predicting antisocial behavior), may have been statistically significant at the conventional level of $p < .05$ with a larger sample. Finally, it is not possible to determine the direction of effects from this cross-sectional study. Indeed, it could be that children's social behavior predicts the quality of their relationships with their teachers, rather than their teacher-child relationships predicting their social behavior. Future research may use both child and teacher-report of their relationships with one another and child social behavior to capture whether there is bidirectional or directional association between these constructs. Similarly, teachers reported on children's social competence and antisocial behavior as well as the teacher-child relationships; therefore, the shared variance between these constructs may have accounted for some of the effects of the associations that merged in this study (Acar et al. 2018a, b). Future studies should employ multi-informant of children's behaviors and relationships to reduce the shared variance in the results (Renk and Phares 2004).

Compliance with Ethical Standards

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Conflict of Interest The authors, Ibrahim H. Acar, Traci Kutaka, Kathleen Moritz Rudasill, Julia C. Torquati, Robert J. Coplan, and Suleyman Yildiz personally have not received any funding for this project. Therefore, the authors declare that he has no conflict of interest to disclose.

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