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Preschoolers' academic readiness: What role does the teacher–child relationship play?

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Abstract

We examined the role of the teacher–child relationship quality (close, dependent, and conflictive) on preschoolers' ($N = 95$) academic readiness for kindergarten, and we tested children's prosocial and aggressive behavior and peer group exclusion as mediators of this relation. A unique feature of this study is the ethnically and socio-economically diverse preschool-aged sample. The association between close teacher–child relationships and academic readiness was partially mediated by prosocial behavior and peer group exclusion. There was also evidence of a transactional association between close teacher–child relationships and children's behavior. Additionally, children's behavior and peer group exclusion mediated the relation between negative teacher–child relationships (dependent and conflictive) and academic readiness. The findings suggest that teacher training, education, and support for establishing close teacher–child relationships may maximize preschoolers' academic readiness by promoting social adaptation.

Keywords

Teacher–child relationship; Preschool; Academic readiness

Identifying the contributors to young children's readiness for school is crucial to promoting positive academic experiences. The importance of this is highlighted by the fact that children who are not ready to do well in school are more likely to evidence later school adjustment problems, including school dropout and delinquency (Alexander, Entwisle, & Kabbani, 2001; Ensminger & Slusarcick, 1992). Although a large proportion of children transition from preschool into kindergarten successfully, a significant number are not ready to meet the demands of formal schooling. For instance, using a national sample of kindergarten teachers, Rimm-Kaufman, Pianta, and Cox (2000) found that over one-third of the teachers indicated that approximately half the students who entered kindergarten not only experienced difficulty following directions and working independently, but also exhibited diminished academic skills.

To understand the factors that influence early school readiness, it is important to consider children's relationships with their teachers. Research has shown that teachers have a significant influence on young children's school readiness and adjustment, such that children who experience warmer or closer teacher–child relationships tend to have fewer behavior problems, like school more, and perform better academically than do children who experience more conflicted or dependent teacher–child relationships (e.g., Birch & Ladd,

1997; Hamre & Pianta, 2001; Hughes, Cavell, & Jackson, 1999; Pianta, Steinberg, & Rollins, 1995). However, little attention has been given to the *processes* by which the qualities of the teacher–child relationships (i.e., close, dependent, or conflictive) relate to young children’s school adjustment. A focus on process is critical to developing useful working models that can guide both future research and practice (see Coie et al., 1993). Thus, examining the processes that explain how the quality of the teacher–child relationship engenders school readiness is a crucial next step.

The purpose of the present study was to test a model of the factors that may mediate the effects of the teacher–child relationship on preschoolers’ academic readiness for kindergarten. Academic readiness for kindergarten – namely children’s ability to perform basic academic tasks, such as counting, recognizing letters, and communicating effectively – is an important precursor of school adjustment in the primary years. Our model is influenced by Ladd’s (2003) contention that child-by-environment models provide a more complete representation of the factors that shape children’s school readiness than models that test *either* child *or* environmental influences alone. In child-by-environment models, it is assumed that children’s readiness is influenced not only by factors within the children themselves (e.g., their behavior) but also by the factors within their social-relational environment (e.g., their relationships with teachers and peers).

In testing our primary aim, we relied on a sample of preschool children. Most extant studies of children’s early school readiness and adjustment have relied primarily on samples of kindergarten or first grade children (e.g., Ladd, 1990). Thus, most studies have focused on children *after* they have already made the transition into formal schooling (for an exception, see Howes, Phillipsen, & Peisner-Feinberg, 2000). However, for many children, preschool is the first time that they are exposed to learning environments in which large numbers of same-aged peers gather together to acquire new skills. It is also likely to be the first time they encounter adults other than parents who specifically take on the role of facilitating and guiding children’s learning. As such, children’s preschool experiences provide a foundation for their later academic experiences, making it essential to explore the contributors to preschoolers’ academic readiness for kindergarten. Thus, we tested our hypotheses with a sample of preschool-aged children.

1. The teacher–child relationship and children’s school readiness

Previous research has found that the teacher–child relationship quality is an important correlate of children’s school readiness. Specifically, the teacher–child relationship quality influences kindergarteners’ school adjustment, with close teacher–child relationships predicting heightened school readiness, and dependent or conflictive relationships predicting lowered levels of school readiness and increased rates of school adjustment problems. For example, Birch and Ladd (1997) found that teacher–child closeness was positively associated with kindergarteners’ school liking, self-directedness, and academic performance. Additionally, Pianta et al. (1995) found that close teacher–child relationships in kindergarten were predictive of fewer behavior problems (e.g., conduct problems, learning problems, and anxiety) and greater competence behaviors (e.g., assertive social skills and peer sociability) at the end of first grade. They also found that kindergarten teacher–child relationships that were relatively close and conflict-free served as protective factors for children who were at risk for special education referral, thereby reducing the risk of later grade retention and referral for services.

In contrast, negative relations with school outcomes have been found for teacher–child dependence and conflict. For instance, Birch and Ladd (1997) reported that teacher–child dependence in kindergarten was associated with greater concurrent school adjustment

difficulties, including more negative school attitudes, less positive engagement in school, and poorer academic achievement. They also found that conflictive teacher–child relationships were positively associated with kindergarteners' school avoidance and negatively associated with school liking, self-directedness, and cooperation in the classroom. Furthermore, Ladd and Burgess (2001) found that children who were chronically at risk for both aggression and teacher–child conflict had the largest increases in school misconduct from kindergarten to first grade. Taken together, these studies indicate that the teacher–child relationship in kindergarten is an important correlate of children's early school adjustment. Again, however, it is unclear if these relations are found in preschool, although we expected to find similar patterns with preschoolers. Specifically, we expected that teacher–child closeness would correlate positively with young children's academic readiness and that preschoolers' teacher–child dependence and conflict would be negatively correlated with academic readiness.

2. Children's behavior and peer group exclusion as mediational mechanisms

Prior studies of the relations between aspects of the teacher–child relationship and school-related functioning have focused primarily on single predictor models. For instance, Hamre and Pianta (2001) found that a composite of conflict and dependency in the teacher–child relationship during kindergarten predicted children's long-term behavioral (e.g., class disruption and defiance of school authority) and academic outcomes through eighth grade. Although such single predictor models provide useful information, as noted previously, they fail to account for the processes that lead to positive school adjustment, particularly in the early years of formal schooling. This has led to a call for more extensive study of the mediational processes that relate to children's academic readiness, adjustment, and functioning (e.g., Ladd, 2003).

In the present study, we tested a mediational model in which children's prosocial and aggressive behavior and peer group exclusion accounted for the link between teacher–child relationship quality and young children's academic readiness (see Fig. 1). This type of design allowed us to assess the direct and indirect contributions of the teacher–child relationship quality, children's behavior, and peer group social status on academic readiness.

Empirical support for the hypothesized mediational model can be found in several studies that have linked teacher–child relationship quality with behavioral and social status variables, and that have linked behavioral and social variables with academic-related functioning. For example, the findings of Copeland-Mitchell, Denham, and DeMulder (1997) and Howes, Hamilton, and Matheson (1994) suggest that young children with secure or close teacher–child relationships are more prosocial towards peers than other children. Hughes et al. (1999) also found that positive teacher–child relationships were associated with diminished levels of children's aggression, as rated by both teachers and peers. When the teacher–child relationship was dependent, however, young children tended to be less prosocial and more aggressive with peers (Howes, Hamilton et al., 1994; Howes, Matheson, & Hamilton, 1994). Additionally, conflictive teacher–child relationships in kindergarten have been associated with decreased prosocial behavior and increased aggressive behavior in first grade (Birch & Ladd, 1998). Based on these findings, we expected prosocial behavior to relate positively with teacher–child closeness and negatively with teacher–child dependence and conflict. Conversely, we expected aggressive behavior to relate negatively with teacher–child closeness and positively with teacher–child dependence and conflict. In addition, because previous research suggests that children with close teacher–child relationships are likely to be more socially competent than children with conflictive teacher–child relationships (Howes, Hamilton et al., 1994; Pianta & Stuhlman, 2004), we expected

peer group exclusion to be negatively related to teacher–child closeness and positively to teacher–child dependence and conflict.

Moreover, children's social behaviors have been linked to social status and school adjustment. Ladd and colleagues (Ladd, Birch, & Buhs, 1999; Ladd & Burgess, 2001) found that prosocial children (e.g., children who play cooperatively) were more likely to be accepted by peers, whereas aggressive children tended to be excluded by peers. They have also reported that kindergarteners' aggressive and antisocial behaviors were associated with lower academic achievement, whereas prosocial behaviors were associated with greater academic achievement. This latter relationship, however, was mediated by social status (i.e., peer rejection/acceptance) and classroom participation, respectively. Relatedly, Ladd and colleagues (Ladd, 1990; Ladd, Kochenderfer, & Coleman, 1997) have also reported that children who were rejected by peers in kindergarten tended to avoid school more, like school less, be less involved in the classroom, and perform less well academically than non-rejected children. Based on these findings, we not only expected children's prosocial and aggressive behaviors to correlate with academic readiness but also that this relation would be mediated by peer group exclusion.

In the present study, we expected that close teacher–child relationships would be associated with greater prosocial behavior and less aggressive behavior and that dependent and conflictive teacher–child relationships would be associated with less prosocial behavior and greater aggressive behavior. In turn, prosocial behavior was expected to be negatively related to peer group exclusion and aggressive behavior was expected to be positively associated with peer group exclusion. In line with our goal to examine *processes*, we expected that prosocial and aggressive behaviors would mediate the relation between the teacher–child relationship quality and peer group exclusion. Finally, as indicated in Fig. 1, peer group exclusion was hypothesized to be related to diminished academic readiness for kindergarten, and we expected that it would mediate the relation between children's behavior and academic readiness.

3. Alternative model

In addition to testing a model in which children's behavior and social status were hypothesized to mediate the relation between the teacher–child relationship and academic readiness, we also considered the alternative possibility that the teacher–child relationship mediates the linkage between children's behavior and academic readiness (see Fig. 2). That is, the alternative model considered the possibility that children's own behavior serves as the foundation for academic readiness.

Empirical support for the alternative model stems from the classic work of Bell (1968), who highlighted the importance of considering child effects, as well as more recent studies that have longitudinally linked children's behavior with the teacher–child relationship quality. For example, Howes et al. (2000) found a negative relation between problematic child behavior in preschool (i.e., distractibility, hostility, and a lack of consideration) and teacher–child closeness in kindergarten, as well as a positive relation between problematic behavior in preschool and both teacher–child conflict and dependency in kindergarten. Additionally, they found an inverse relation between positive child behavior and both teacher–child conflict and dependency. Relatedly, Ladd et al. (1999) found that kindergarteners' prosocial behavior (social conversation, cooperative play, and friendly physical interaction) predicted improved teacher–child relationship quality and that kindergarteners' antisocial behavior (aggression, object possessiveness, and arguing) predicted later diminished levels of teacher–child relationship quality. The findings of these studies provide support for testing

the alternative hypothesis that the teacher–child relationship mediates the relation between child behavior and academic readiness.

Should both the primary and the alternative hypotheses be supported, it would provide some evidence for the transactionality of these effects and support previous research findings. Transactional designs are central to assessing developmental processes because they allow researchers to examine the interplay that both children and their environment have on developmental outcomes. Additionally, such models suggest that developmental outcomes are not solely a function of either the children themselves or their environment, but rather a combination of both (Sameroff & Chandler, 1975; Sameroff & Mackenzie, 2003).

4. Method

4.1. Participants

Participants were 95 children with complete data (10 had incomplete data) and their teachers drawn from six classrooms in three preschools (including university-sponsored, community-based, and Head Start schools) using a convenience sampling procedure. All schools were located in a major metropolitan area in the southwest. Data were collected across two waves over 2 years. For those children ($n = 27$) who attended a participating class across both years, only the first year of data was used. Three of the teachers were females and one was male, with two female teachers participating in both waves of data collection.

Written parental consent was obtained for all participating children. An overall 98% consent rate was obtained. Children's ages ranged from 35 to 61 months, with age calculated at the beginning of the school year. The M age was 48 months, and the SD was 6 months. However, only one child was less than 36 months and two were 60 months or older. Thus, the vast majority were 3 ($n = 46$, boys = 23) or 4 ($n = 46$, boys = 25) years of age. Approximately half of the participants (48%) were girls. Furthermore, about half of the participants were from non-Hispanic White backgrounds (54%). The remainder were Hispanic (predominantly Mexican American, 23%), Native American (6%), Asian American (6%), African-American (5%), or other/mixed ethnicity (5%). The majority of the children were from two-parent households (65%), and a wide range of socioeconomic backgrounds was represented; 22% were below or near the poverty line (\$0–\$20,000 per year). Additionally, 15% of the families earned \$20,000–\$40,000 per year, 15% earned \$40,000–\$60,000 per year, 9% earned \$60,000–\$80,000, and the remaining 39% earned above \$80,000 per year.

4.2. Procedures and measures

Data were gathered in the spring semester of preschool. Lead classroom teachers completed questionnaires on the quality of the teacher–child relationship, children's behavior, and academic readiness for kindergarten. These were embedded within a larger questionnaire packed that included several additional measures of children's functioning that are not relevant to the present study. The teachers completed one questionnaire for each child in their classroom, and each questionnaire took approximately 45 min to complete.

4.2.1. Teacher–child relationship—The Student–Teacher Relationship Scale (STRS; Pianta, 2001) was used to assess teachers' perceptions of the quality of their relationships with each student. Using responses ranging from *definitely does not apply* (1) to *definitely applies* (5), teachers rated the 28 items in this scale in terms of how applicable each statement was to their relationship with a particular child. Three subscales comprised this measure: Conflict, Dependence, and Closeness. The Conflict subscale consisted of 12 items that measured tension in the teacher–child relationship (e.g., 'this child and I always seem to

be struggling with each other'; $\alpha = .93$). The Dependence subscale included 5 items that measured children's over-dependence on their teachers (e.g., 'this child reacts strongly to separation from me'; $\alpha = .69$). Finally, the Closeness subscale contained 11 items that measured warmth and cohesion in the teacher-child relationship (e.g., 'I share an affectionate and warm relationship with this child'; $\alpha = .81$). The scores from each subscale were averaged to create teacher-child conflict, dependence, and closeness scores for each child.

4.2.2. Prosocial behavior—The 7-item Prosocial subscale from the Child Behavior Scale (CBS; Ladd & Profilet, 1996) was completed by teachers and used to measure children's prosocial orientation (e.g., 'this child is kind towards peers'). Teachers responded on a 3-point Likert-type scale, with responses ranging from *doesn't apply* (1) to *certainly applies* (3). The scores were averaged to produce a prosocial behavior score for each child ($\alpha = .92$).

4.2.3. Aggressive behavior—To assess children's aggressive behavior, teachers completed the Child Behavior Checklist-Teacher Report Form (CBCL-TRF; Achenbach, 1991). This 25-item subscale has been used in numerous studies as a reliable and valid index of children's aggressive behavior (e.g., Emerson, Crowley, & Merrell, 1994; Hanish & Guerra, 2000; Hughes et al., 1999). The item responses range from *not true* (0) to *very true* (2). Sample items include 'this child gets in many fights' and 'this child argues a lot' ($\alpha = .92$).

4.2.4. Peer group exclusion—The Peer Exclusion subscale of the CBS (Ladd & Profilet, 1996) was completed by teachers and used to assess children's peer group exclusion. This 7-item subscale is designed to measure children's peer rejection (e.g., 'peers refuse to let this child play with them'). As described above, teachers responded on a 3-point Likert-type scale, with responses ranging from "doesn't apply" (1) to "certainly applies" (3). The scores were averaged and a peer group exclusion score was obtained for each child ($\alpha = .90$).

4.2.5. Academic readiness—Children's academic readiness for kindergarten was assessed using a 19-item measure of academic readiness completed by teachers that tapped children's logical thinking, mathematical, reading, and writing capabilities (Fabes, Martin, Hanish, Anders, & Madden-Derdich, 2003). The response choices were *not yet* (1), *early stage* (2), *intermediate stage* (3), and *proficient* (4). Sample items include 'recognizes most upper and lower case letters and knows most of their sounds' and 'uses language to gather information and solve problems (e.g., asks questions).' Scores were averaged to create an academic readiness score for each child ($\alpha = .94$).

5. Results

5.1. Analytic strategy

The purpose of this study was to test the hypothesis that the quality of the preschool teacher-child relationship would be related to children's academic readiness, with the relation mediated by aggressive and prosocial behaviors and peer exclusion. We begin by presenting descriptive analyses, followed by the formal tests of our hypothesized model. We also tested an alternative model to examine to possibility that teacher-child relationship qualities and peer exclusion mediate the relation between aggressive and prosocial behaviors and academic readiness. Finally, because children were sampled from six different classrooms, we examined classroom level effects by testing a pair of mixed models to determine the consistency of the pattern of findings across the different classrooms.

5.2. Descriptive analyses

We examined the distributions of variables, and we found that teacher–child closeness, teacher–child dependency, teacher–child conflict, children’s aggressive behavior, and peer group exclusion were significantly skewed, using the test recommended by Tabachnick and Fidell (2001) ($z = -4.74, 6.76, 5.19, 6.48, \text{ and } 5.09; p < .001$, respectively). As such, they were logarithmically transformed. Cook’s (1977) distance scores indicated no multivariate outliers.

Means and standard deviations for each study variable are shown in Table 1. These descriptive data indicate that, on average, children in this sample tended to have relatively positive relationships with teachers (e.g., M score on untransformed teacher–child closeness variable of 3.83 vs. M scores of 1.67 and 1.63 on teacher–child conflict and dependency measures, respectively) and that they were rated by teachers as moderately ready for kindergarten ($M = 2.83$, with a score of 2.00 indicating early stages of academic proficiency and 3.00 indicating intermediate stages of academic proficiency). The data also show that most children behaved prosocially ($M = 2.22$), that aggression levels and rates of peer exclusion were relatively low (M score on untransformed aggressive behavior variable of 6.01, with a cumulative range from 0 to 36 and M score on untransformed exclusion variable of 1.36). Moreover, scores on each measure were similar to those previously reported in the literature, supporting the similarity between this sample and other estimates of preschoolers’ social and academic functioning (e.g., Achenbach & Rescorla, 2000; Birch & Ladd, 1997; Ladd & Profilet, 1996).

5.3. Correlations among variables

Table 1 also contains the bivariate correlations for all the variables. Teacher–child closeness was positively correlated with children’s academic readiness and prosocial behavior. Teacher–child dependency and conflict were positively correlated with children’s aggressive behavior and peer group exclusion, and inversely correlated with children’s prosocial behavior and academic readiness. Additionally, prosocial behavior was positively correlated with academic readiness and negatively correlated with peer group exclusion. Not surprisingly, children’s aggressive behavior correlated positively with peer group exclusion and negatively with academic readiness.

In general, low-to-moderate correlations were found among the variables. However, we tested for multicollinearity by computing the variance inflation factor (VIF), which provides an index of the amount of variance that each regression coefficient is increased relative to all predictors being uncorrelated. The largest VIF we obtained was 4 (for children’s aggression), the square root of which indicates a possible twofold increase in the standard error of the predictor relative to all the predictors being uncorrelated. The VIF level is below the stringent threshold of 6 or 7 identified by Cohen, Cohen, West, and Aiken (2003). We also obtained the tolerance, which is the reciprocal estimate of the VIF and determines how much variance in each predictor is independent of the other independent variables in the model. Values of .10 or less suggest serious problems (Cohen et al., 2003). The smallest value we obtained was .25 for children’s aggression. Thus, each predictor in our model contributed unique variance to the criteria.

5.4. Analysis of covariates

Given that most children in the sample ranged in age from 3 to 4 years and that academic readiness should theoretically be greater for older children, we tested for age differences in each of the study variables. Children’s age was significantly correlated with academic readiness ($r(93) = .56, p < .001$) and prosocial behavior ($r(93) = .22, p < .05$). We also tested the possibility that different patterns of findings would be obtained for younger and older

preschoolers (using tests for moderation and graphical procedures outlined by Aiken & West, 1991). We found that children's age had a small but significant moderating effect in the relation between teacher–child dependency and academic readiness; the interaction term $\beta = -.21$, $t(91) = -2.47$, $p < .05$. As shown in Fig. 3, the negative relation between teacher–child dependency and academic readiness was stronger for older children (as indicated by the negative slope), whereas for younger children the relation remained relatively constant. Thus, children's age altered the strength of the association between teacher–child dependence and academic readiness. No other significant moderating effects were obtained for children's age on teacher–child closeness and conflict, children's behavior (prosocial and aggressive), or peer group exclusion, β ranged from $-.07$ to $.18$, $t(91)$ ranged from -1.71 to 1.32 , $p > .05$.

We also considered socioeconomic background, gender, and ethnicity as possible covariates. Socioeconomic background was unrelated to the factors in our study, $r(93)$ ranged from $.20$ to $-.13$, $p > .05$. To examine the effects of children's gender and ethnicity, we computed a MANOVA in which gender and ethnicity (white, non-Hispanic vs. other ethnicities) served as the predictors of the teacher–child relationship qualities, children's behavior, peer group exclusion, and academic readiness. The multivariate effects (Hotelling's T_s) were nonsignificant. However, gender had significant univariate effects on teacher–child conflict ($F(1, 69) = 7.87$, $p < .05$), prosocial behavior ($F(1, 69) = 5.24$, $p < .05$), and aggressive behavior ($F(1, 69) = 5.93$, $p < .05$). The degrees of freedom are reduced for these analyses because of 23 cases of missing data on child ethnicity. Teachers reported having greater conflict with boys ($M = .23$, $SD = .20$) than with girls ($M = .12$, $SD = .15$), that boys ($M = .63$, $SD = .55$) behaved more aggressively than girls ($M = .32$, $SD = .51$), and that girls behaved more prosocially ($M = 2.37$, $SD = .49$) than boys ($M = 2.08$, $SD = .58$).

To account for the significant effects of age and gender, we controlled for their influence as exogenous variables in tests of both the primary and alternative hypotheses. We also ran the same models with gender and age effects excluded, and we examined the extent to which including the covariates incrementally improved the fit of the models. Doing so provides an indicator of the importance of the contribution of these variables to the hypothesized models.

5.5. Tests of the hypothesized and alternative models

Path analysis using *Mplus* (4.2; Muthén & Muthén, 2007) was used to test the hypothesized relations between teacher–child relationship qualities and academic readiness. Maximum likelihood estimation was used in calculating all paths. Finally, the bootstrap resampling method, which uses random variability obtained from multiple model iterations to compute the standard errors of the model parameter estimates was used to estimate the model (Muthén & Muthén, 2007).

To assess model fit, we considered multiple fit indices, including the χ^2 statistic, root mean square error of approximation (RMSEA), and the comparative fit index (CFI; Bentler, 1990). Chi-square values that are nonsignificant are indicative of a good model fit. RMSEA values less than $.05$ are indicative of a good fit and those between $.05$ and $.08$ are indicative of a moderate fit (Browne & Cudek, 1993). CFI values above $.90$ are considered to be evidence of a good fit (Bollen, 1989).

5.5.1. Hypothesized model—The hypothesized model examined the mediating roles of children's behavior (prosocial and aggressive) and peer group exclusion in the relationship between the quality of the teacher–child relationship (close, dependent, or conflictive) and children's academic readiness for kindergarten, as shown in Fig. 1. Specifically, we tested the direct paths from the teacher–child relationship variables to children's academic

readiness, from the teacher–child relationship variables to children’s behavior variables, from children’s behavior to academic readiness, from children’s behavior to peer group exclusion, and from children’s peer group exclusion to academic readiness.

To account for the influence of age in the path model, we tested two direct paths from children’s age to prosocial behavior and academic readiness. Additionally, to account for the influence of gender, we tested two direct paths from gender to aggressive and prosocial behavior, and we estimated the covariance between gender and teacher–child conflict. However, as shown in Table 2, including both age and gender produced a model that only moderately fit the data (as indicated by the RMSEA) and yielded nonsignificant paths from gender to aggressive and prosocial behavior. In contrast, estimating the same model without gender produced a closer fit without altering the value of the parameter or standard error estimates. This indicates that the contribution of gender to our model was nonessential, and thus we report the tests of the main hypothesis without gender in the model. After excluding gender, our results revealed that the pathways from teacher–child conflict and dependency to academic readiness, teacher–child closeness to aggression, and prosocial and aggressive behaviors to academic readiness were nonsignificant, as was the error covariance between teacher–child dependency and teacher–child closeness. As part of a specification search to identify a final model (see MacCallum, 1986), these paths were deleted and the error covariance was fixed at zero. The final model corresponded closely to the hypothesized model (as indicated by the nonsignificant χ^2) which, according to MacCallum (1986), optimizes the success of the specification search and thus yields results that are likely to be validated in future research.

5.5.2. Final model—As shown in Table 2, the final model fit the data well and yielded the standardized path coefficients shown in Fig. 4. Positive paths were found from children’s age to children’s prosocial behavior and academic readiness, as well as from teacher–child closeness to children’s academic readiness. Indirect paths were found from all three teacher–child relationship qualities (i.e., close, dependent, or conflictive) to children’s academic readiness. Specifically, both teacher–child conflict and dependency were associated with children’s academic readiness through children’s prosocial and aggressive behavior, and peer group exclusion. That is, dependent and conflictive teacher–child relationships were negatively associated with prosocial behavior and positively associated with aggressive behavior. Prosocial behavior was negatively related to peer group exclusion, and aggressive behavior was positively related to peer group exclusion. Exclusion, in turn, was related to lower levels of academic readiness. In addition, although teacher–child closeness was unrelated to children’s aggressive behavior, it was positively associated with prosocial behavior, suggesting that prosocial behavior might mediate the relation between teacher–child closeness and academic readiness.

Finally, because children were sampled from six different classrooms, we estimated a pair of mixed models to examine whether the patterns of association among the variables differed significantly by classroom. In the first model, we examined the effect of the classroom by treating it as a random effect; in the second we excluded the classroom effect. Then, we compared the two models. The former model produced a better fit ($AIC = 143.7$) than the latter ($AIC = 147.7$) and a likelihood ratio test revealed a significant difference between both models ($\chi^2(1) = 4.9, p < .05$), suggesting a significant effect for the classroom environment. However, the parameter estimates (and standard errors) of the fixed effects were only slightly different between both models, which indicates that while the classroom environment had a significant effect, it was not large enough to have any substantial influence on the pattern of association among the variables in our final model.

To formally test for mediation in the final model, we relied on the bias-corrected bootstrap resampling method, which corrects for the bias in the central tendency of the estimate and accommodates the non-normal distribution of the estimator of the indirect effects (MacKinnon, Lookwood, & Williams, 2004). This method has been shown to have nominal Type I error rates and greater statistical power than other tests of mediation, particularly single sampling methods (e.g., Sobel, 1982). The bootstrap method yields more accurate confidence intervals by using random variability to compute a new data matrix each time the model is estimated. The indirect effects are calculated each time by dividing the estimate of the indirect effect by its standard error, which produces an empirical distribution of the test statistic with lower and upper confidence intervals that take into account the non-normal distribution of the indirect effect.

Five indirect paths were tested for mediation using this procedure. First, we tested the indirect path from teacher–child conflict to academic readiness through prosocial behavior and peer group exclusion. Secondly, we tested the path from teacher–child conflict to academic readiness through aggressive behavior and peer group exclusion. We also examined these possible paths using teacher–child dependency in place of conflict. Finally, we tested the indirect path from teacher–child closeness to academic readiness through prosocial behavior and peer group exclusion. Evidence of significant mediation exists when lower and upper confidence intervals of each indirect effect do not include 0. The results revealed (see Table 3) that the confidence intervals for each of the mediated pathways tested did not include zero, indicating significant mediation for each of the pathways.

5.5.3. Alternative model—We also tested an alternative model and considered whether the teacher–child relationship qualities (close, dependent, and conflictive) and peer group exclusion at school mediated the association between children’s behavior (prosocial and aggressive) and academic readiness (see Fig. 2). Additionally, paths between age and academic readiness and gender and teacher–child conflict were included to control for these effects, as well as covariances between gender and prosocial and aggressive behavior. As before, including gender resulted in a model that fit the data moderately, as shown in Table 2. As with our primary model, removing the effect for gender produced a close fit without altering the value of the parameter estimates, which indicates that the contribution of gender was nonessential. Thus, we report the results of the alternative model without gender.

The results from the alternative model revealed that the paths from children’s prosocial behavior, aggressive behavior, teacher–child dependence, and teacher–child conflict to academic readiness were nonsignificant. In addition, the paths from teacher–child closeness, teacher–child dependence, teacher–child conflict, and prosocial behavior to peer group exclusion were nonsignificant. Finally, the path from prosocial behavior to teacher–child dependence was nonsignificant as well, as were the error covariances between teacher–child conflict and closeness, and between teacher–child conflict and dependency. As part of the specification search (see MacCallum, 1986), the nonsignificant paths were deleted and the nonsignificant error covariances were fixed at zero. As shown in Table 2, the final alternative model (see Fig. 5) provided a fair fit.

As with our primary model, we relied on the bias-corrected bootstrap resampling method to test for mediation. Three paths were tested, including (1) teacher–child closeness as the mediator of prosocial behavior and academic readiness, (2) teacher–child closeness as the mediator of aggressive behavior and academic readiness, and (3) peer group exclusion as the mediator of aggressive behavior and academic readiness. As shown in Table 3, the confidence intervals for each mediated effect did not include zero, indicating significant mediation. That is, teacher–child closeness significantly mediated the relations between prosocial behavior and academic readiness and aggressive behavior and academic readiness.

Peer group exclusion also significantly mediated the relation between aggression and readiness.

It is worth noting that the alternative model produced a significant standardized coefficient from aggressive behavior to teacher–child closeness ($\beta = .21, p < .05$) that was not only larger in magnitude than the bivariate correlation ($r(93) = -.14, p > .05$), but also in the opposite direction, which is indicative of a suppressor effect. A suppressor effect occurs in mediational analyses when a variable included in a model amplifies the magnitude of the regression coefficient between two or more variables (MacKinnon, Krull, & Lockwood, 2000). Having suppressor variables in a mediational model enhances the relationship between the mediator and outcome variables by partialing out irrelevant variability (Cohen et al., 2003). Partial correlations revealed that the direction of the relationship between aggressive behavior and teacher–child closeness became positive when either teacher–child conflict ($r(92) = .18, p < .10$) or children’s prosocial behavior ($r(92) = .21, p < .05$) were controlled. Comparing this to the negative bivariate correlation suggested that teacher–child conflict and prosocial behavior may have suppressed the relationship between aggressive behavior and teacher–child closeness in the alternative model. Thus, this effect should be interpreted with caution.

6. Discussion

The goal of this study was to examine the role of the teacher–child relationship quality (close, dependent, or conflictive) on teachers’ perceptions of preschoolers’ academic readiness for kindergarten. Specifically, we expected that children’s behavior and peer group exclusion, respectively, would mediate the association between the teacher–child relationship and preschooler’s academic readiness. However, because our data were correlational, we also considered the alternative possibility that preschoolers’ academic readiness was a function of children’s behavior, with the teacher–child relationship and children’s social status, respectively, mediating the relation between children’s behavior and academic readiness. Our findings provided substantial support for the primary model and limited support for the alternative model.

Importantly, the quality of the teacher–child relationship was significantly related to preschoolers’ academic readiness for kindergarten. Specifically, teacher–child closeness was correlated with greater academic readiness, whereas both teacher–child dependence and conflict were correlated with diminished academic readiness. This finding is consistent with previous research (e.g., Birch & Ladd, 1997) and supports the idea that the teacher–child relationship is an important correlate of early school-related outcomes (Howes et al., 2000; Peisner-Feinberg et al., 2001). These findings suggest that teacher training, education, and support for early childhood educators may maximize preschoolers’ academic readiness for school. This is supported by the fact that attending a higher quality preschool has been shown to increase children’s long-term academic skills (Peisner-Feinberg et al., 2001). However, as discussed later, it is also important to consider how children’s behaviors and attributes correlate with the teacher–child relationship quality, because it may not only be that teachers are attracted to children who are more positive and less negative, but that children are attracted to teachers who are more positive and less negative as well.

We also examined the extent to which teacher–child relationship qualities were directly and indirectly associated with school readiness. It is notable that we obtained few direct effects. Indeed, the only significant direct effect that we obtained was for teacher–child closeness; the relations between conflict and dependence and academic readiness were fully mediated by child behavior and peer group exclusion. These findings support a child-by-environment model (Ladd, 2003), with children’s own behaviors and peer experiences, as well as the

teacher–child relationship, contributing to early academic readiness. Findings regarding positive aspects of the teacher–child relationship (i.e., closeness) and negative aspects of the teacher–child relationship (i.e., conflict and dependence) are discussed separately as different patterns of effects emerged for each type of variable.

The findings from the primary model indicated that prosocial behavior and peer group exclusion, respectively, partially mediated the relation between teacher–child closeness and preschoolers’ academic readiness, as rated by teachers. That is, when the teacher–child relationship was close, children were reported as more likely to behave prosocially. Greater prosocial behavior was associated with less peer group exclusion and, ultimately, greater academic readiness for kindergarten. This finding supports the idea that when teachers have positive relationships with children, it encourages them to develop prosocial skills, which then draws other peers to them and improves their school readiness (Caprara, Barbarelli, Pastorelli, Bandura, & Zimbardo, 2000).

Furthermore, the results of the alternative model suggested that teacher–child closeness also mediated the relation between children’s prosocial behavior and academic readiness. Thus, when it comes to preschoolers’ academic readiness, the findings from both the primary and alternative models suggest that there may be a transactional relationship between teacher reports of children’s prosocial behavior and close teacher–child relationships (although the correlational nature of this study precludes a direct test of this hypothesis). That is, close teacher–child relationships are likely to enhance children’s prosociality, and children’s prosocial qualities are likely to maximize teacher–child closeness. The corollary to this, however, is that young children with behavioral or peer adjustment problems also tend to experience more negative teacher–child relationships (as discussed below). Thus, it is particularly critical for these children to experience positive interactions with their teachers to mitigate a trajectory that might lead to short- and long-term school adjustment problems and school failure.

The fact that the relation between teacher–child closeness and academic readiness was only partially mediated by child behavior and social status suggests that there may be other school-related factors that could further explain this relationship. For example, having a close teacher–child relationship is likely to enhance the quality of a child’s experiences in preschool by increasing individual attention and providing a more optimal learning environment. In turn, these factors are likely to elicit greater learning and classroom participation and engagement in school-related tasks, which, ultimately, are likely to maximize preschoolers’ school readiness (e.g., Ladd et al., 1999). Future research is needed to test this hypothesized model.

Slightly different patterns were obtained for the negative dimensions of the quality of teacher–child relationships (dependency and conflict). The relations between these variables and academic readiness were fully mediated by child behavior and peer exclusion in the primary model. The findings of our primary model suggested that children who had conflictive or dependent teacher–child relationships were likely to behave more aggressively and less prosocially. Aggressive behavior was positively and prosocial behavior was negatively related to exclusion by peers and, in turn, diminished academic readiness for kindergarten.

The alternative model did not support the hypothesis that negative aspects of the teacher–child relationship mediated child behavior. Contrary to the findings for teacher–child closeness, no evidence of a transactional pattern of effects was obtained. Rather, our alternative model suggested that whereas preschoolers’ behavior was associated with the teacher–child relationship quality, with prosocial behavior diminishing conflict and

aggressive behavior increasing dependency and conflict, the effects did not transcend into children's peer relationships and academic readiness. Thus, aggregating the findings from both the primary and alternative models suggests that the relation between the negative aspects of the teacher-child relationship, children's behavior, and academic readiness may be unidirectional. In other words, although negativity in the teacher-child relationship is linked with children's behavior, it appears to be more strongly associated with hindering school readiness than children's own behavioral qualities.

Given that many children form a foundation for academic performance and achievement in preschool that is likely to have an impact on their long-term academic adjustment (Alexander et al., 2001; Magnuson, Meyers, Ruhm, & Waldfogel, 2004), it is important to highlight the fact that in our primary model social-relational factors predicted preschoolers' academic readiness. As such, our findings highlight the critical role that social adaptation plays in children's early academic adjustment. Our findings suggest that the development of successful social relationships is an essential precursor of young children's academic adjustment. Positive social relationships with teachers and peers may maximize young children's academic adjustment by engendering a greater sense classroom inclusion that increases children's motivation to engage in academic tasks (Birch & Ladd, 1997; Ladd et al., 1997). Additionally, positive peer relationships may promote academic adjustment by providing positive experiences with learning materials that enhance academic skills via peer modeling, reinforcement, engagement, and encouragement (Caprara et al., 2000). Peers also provide support and help for solving everyday problems that enhance academic and cognitive advancement (Wentzel, 1999). Thus, as noted previously, enhancing children's early social skills and relationships may have an impact on their long-term academic adjustment.

6.1. Strengths, limitations, and conclusions

Our study had several noteworthy strengths. First, our diverse sample of young children from either university-sponsored, community-based, or Head Start preschools allows for greater generalizability of the findings than studies that rely primarily on less diverse samples of children. Secondly, by assessing multiple aspects of the teacher-child relationship in preschool, the present study suggests a working model of how teachers contribute to preschoolers' academic readiness. Finally, because we jointly examined the contributions of preschoolers' teacher-child relationship quality and peer status on academic readiness, the present findings provide a more complete picture of how young children's social context is linked with school readiness. When taken together, our findings demonstrate that the teacher-child relationship provides an avenue for maximizing young children's successful entry into kindergarten by increasing positive school experiences in preschool.

This study had some limitations as well. In particular, the data were all gathered from teachers. Thus, the results may be affected by common-method variance, which may inflate the relationship between the variables. As such, our study is mainly a reflection of teachers' perceptions of their relationships with children, children's behaviors, peer experiences, and academic readiness. Although teachers' perceptions have been found to be influenced by factors such as their gender (Lance, 1988), educational levels (Mashburn & Henry, 2004) and ethnicity (Saft & Pianta, 2001), their perceptions have important implications for children's potential academic success. For instance, Seyfried (1998) found that teacher's perception of school-age children's social skills (cooperation, assertion, and self-control) impacted children's academic achievement (GPA), even after accounting for the effect of children's own academic ability (as measured by standardized assessment). In future preschool studies, it would be useful to gather data from multiple sources to assess the generalizability of our findings across different reporters.

Additionally, although we tested hypothesized and alternative models, the data were cross-sectional, which does not allow for the assessment of longitudinal relations necessary to determine causality. Thus, care must be taken not to draw causal inferences about the direction of effects. Nonetheless, the findings of this study suggest processes through which the teacher–child relationship quality may relate to young children’s academic readiness for kindergarten; thus they provide a foundation for future longitudinal research aimed at maximizing children’s readiness for school. Future research should examine the long-term influence of the teacher–child relationship on children’s school adjustment, as well as further delineate the processes that account for this association.

The results of this study have important implications for maximizing young children’s academic readiness. The findings suggest that the teacher–child relationship quality may be an early marker of children’s academic readiness that operates similarly to the parent–child relationship at home by guiding young children’s behavior towards peer relationships and, ultimately, school readiness. In other words, the teacher–child relationship appears critical to promoting positive school experiences and maximizing the quality of the preschool classroom environment, which has been associated positively with children’s long-term school adjustment (Peisner-Feinberg et al., 2001). Preschoolers who develop successful relationships with both teachers and peers may enjoy school more and, ultimately become more motivated towards engaging in learning activities (see Birch & Ladd, 1997; Ladd & Coleman, 1997). Intervention programs that not only build close teacher–child relationships (for an example see Howes, Galinsky, & Kontos, 1998), but also promote positive behavior may enhance young children’s school readiness by increasing social adaptation in the classroom. Children with negative teacher–child relationships and problematic behavior may benefit most from these intervention efforts.

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Fig. 1.
Hypothesized model for the observed associations between the teacher-child relationship, children's behavior, peer group exclusion, and academic readiness for kindergarten.

Fig. 2. Alternative model for the observed associations between children's behavior, the teacher-child relationship, peer group exclusion, and academic readiness for kindergarten.

Fig. 3.
The moderation of teacher–child dependence on academic readiness by age.

Fig. 4.

Standardized path coefficients for the final model.

Note: * $p < .01$, ** $p < .001$. All mediated pathways were statistically significant.

Fig. 5.

Standardized path coefficients for the alternative model.

Note: $*p < .01$, $**p < .001$. All mediated pathways were statistically significant.

Table 1

Bivariate correlations, means, and standard deviations

	1	2	3	4	5	6	7
1. TC conflict							
2. TC dependency	.51***						
3. TC closeness	-.30***	.09					
4. Aggression	.82***	.56***	-.14				
5. Prosocial	-.62***	-.36***	.58***	-.51***			
6. Exclusion	.61***	.50***	-.24*	.67***	-.51***		
7. Readiness	-.32***	-.21*	.33**	-.34**	.44***	-.51***	
<i>M</i>	.18 (1.67)	.17 (1.63)	-.30 (3.83)	.49 (6.01)	2.22	.11 (1.36)	2.83
<i>SD</i>	.18 (.82)	.17 (.76)	.13 (.64)	.55 (9.23)	.56	.13 (.44)	.73

Note. Teacher-child closeness, teacher-child dependency, teacher-child conflict, aggression, and exclusion were logarithmically transformed. Means in parentheses are for untransformed variables. Degrees of freedom = 93.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Table 2Summary of the hypothesized and alternative models fit indices ($N = 95$)

	χ^2 (df)	χ^2 (df) change	RMSEA	CFI
Hypothesized model controlling for age and gender	20.35 (13) ($p > .05$)	–	.07	.98
Hypothesized model controlling for age	8.53(8) ($p > .05$)	–	.03	1.00
Final primary model controlling for age	13.53 (14) ($p > .05$)	5 (6) ($p > .05$)	.00	1.00
Alternative model controlling for age and gender	18.07 (10) ($p > .05$)	–	.09	.98
Alternative model controlling for age	4.17 (5) ($p > .05$)	–	.00	1.00
Final alternative model controlling for age	22.78 (16) ($p > .05$)	18.61 (11) ($p > .05$)	.07	.98

Table 3

Summary of the mediated effects from the bias-corrected bootstrap resampling method

Mediated path tested	Lower C.I.	Upper C.I.	β
Primary model			
1. TC closeness to readiness via prosocial beh. and exclusion	.066	.577	.27*
2. TC dep. to readiness via prosocial beh. and exclusion	-.260	-.017	-.10*
3. TC con. to readiness via prosocial beh. and exclusion	-.439	-.007	-.13**
4. TC dep. to readiness via aggressive beh. and exclusion	-.558	-.021	-.19**
5. TC con. to readiness via aggressive beh. and exclusion	-1.259	-.220	-.66**
Alternative model			
1. Prosocial beh. to readiness via tc closeness	.016	.336	.18**
2. Aggressive beh. to readiness via TC closeness	.010	.132	.06*
3. Aggressive beh. to readiness via exclusion	-.588	-.141	-.37**

Note: TC, teacher-child; dep., dependency; con., conflict; beh., behavior; C.I., confidence interval.

*
 $p < .05$.

**
 $p < .01$.