Article

Validity and Utility of the Parent–Teacher Relationship Scale–II

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Abstract

Preliminary findings indicate that positive relations between parents and teachers are associated with successful school outcomes for children. However, measures available to assess parent–teacher relations are scant. The current study examined validity evidence for the Parent–Teacher Relationship Scale–II (PTRS). Specifically, the internal structure of the PTRS and the test–criterion relationships between the PTRS and several important child-level variables were examined. Primary school teachers (*n* = 120) completed the PTRS referencing two different parents of children in their classroom, as well as outcome measures about both of these parent's children (i.e., academic competence, student–teacher relationship, and behavior). Confirmatory factor analyses supported the two-factor solution originally proposed by the PTRS authors. Associations between the PTRS and child outcome variables provided further evidence in support of test–criterion relationships. School mental health professionals and researchers seeking to assess the contributions of parent–teacher relations to academic and behavioral outcomes of children should consider administering the PTRS.

Achievement in school is critical for improving the likelihood of future life success (Campbell, Ramey, Pungello, Sparling, & Miller-Johnson, 2002; Pianta & La Paro, 2003). One factor that has emerged as an important catalyst for children to develop the behavioral and academic skills necessary for school success is the level of parental involvement in their education (see Christenson & Sheridan, 2001; Hoover-Dempsey & Sandler, 1997), particularly in elementary grades. Owing to this factor, policymakers have implemented costly federal initiatives that include the promotion of early parental educational involvement (National Head Start [H.R. 1429, 2007], Individuals With Disabilities Education Act [H.R. 1350, 2004]).

Although the large literature base exploring parental involvement in children's education is sizable, it is largely contradictory, in part due to the inconsistency of the construct definition and of the methods used to assess the construct (cf. Fan & Chen, 2001; Fishel & Ramirez, 2005).[1] The majority of parental involvement definitions are static, considering contextual settings in isola-tion or as a one-way flow of information (i.e., how the parent involves himself or herself in the

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school activities; Christenson, 1995), rather than exploring the *dynamic* interactions between settings (i.e., how the parent involves himself or herself in the school activities *and* how the school facilitates, responds to, or perceives parent involvement in these activities). To address this gap in the literature, several researchers have investigated the role of the parent–teacher relationship to elucidate dynamic behaviors that may be uniquely associated with children's school success. The parent–teacher relationship is more focused on the behaviors indicative of partnership, collaboration, and alliance between the parent and teacher (Vickers & Minke, 1995). However, the field lacks consistency in terms of the scales used by researchers to assess the parent–teacher relationship (see Mautone, Marcelle, Tresco, & Power, 2014). Moreover, the various scales used to date to assess the parent–teacher relationship in elementary grades largely lack psychometric support (i.e., reliability and validity information). Thus, the goal of the current study is to assess validity evidence for one of these scales, the Parent–Teacher Relationship Scale–II (PTRS; Vickers & Minke, 1995), the only scale specifically designed to assess the parent–teacher relationship while adhering to the recommended steps of scale development (DeVellis, 2012).

The Parent–Teacher Relationship

In line with child development frameworks (Bronfenbrenner, 1986; Rimm-Kaufman & Pianta, 2000), a growing body of research indicates that the contribution of dynamic interactions between home and school contexts to children's school success is an important construct to examine (Christenson, 1995). A primary vector for such interactions is the relationship between the parent and the teacher (Mautone, Marcelle et al., 2014; Serpell & Mashburn, 2012; Vickers & Minke, 1995), particularly from the perspective of the teacher. The quality of the parent–teacher relationship is likely an important contributor to the overall quality of interactions between the school and the child's family, and perhaps more meritorious of federal funding than the unidirectional or static parental involvement construct. Research has demonstrated the relative strength of the parent–teacher relationship in predicting child outcomes critical to school success (e.g., academic and social competence/ability, student–teacher relationship, and child behavior) over and/ or above broader constructs of parent–school involvement (e.g., parent–school contact, parent involvement in school activities, and parent educational involvement at home; Hughes, Gleason, & Zhang, 2005; Mautone, Marcelle et al., 2014; Rimm-Kaufman, Pianta, Cox, & Bradley, 2003; Serpell & Mashburn, 2012). Across research teams assessing samples predominantly representative of children in early primary grades, teacher perceptions of the parent–teacher relationship quality emerged as a significant predictor (with small to moderate magnitudes of associations) of child academic and social competence (Rimm-Kaufman et al., 2003; Serpell & Mashburn, 2012), academic ability (Hughes et al., 2005), homework performance (Mautone, Marcelle et al., 2014), the student–teacher relationship (Mautone, Marcelle et al., 2014; Serpell & Mashburn, 2012), and child behavior (Serpell & Mashburn, 2012). Indeed, in the majority of these studies, the associations between parent–teacher relations and child outcomes remained in the presence of relevant covariates (e.g., maternal sensitivity, socioeconomic status, and child gender/ethnicity). In summary, teachers who perceived more positive parent–teacher relations also reported more positive child outcomes (e.g., academic and social competence); whereas, teachers who perceived less positive relations with parents reported more negative child outcomes (e.g., child misbehavior and student–teacher conflict). Although not yet explored, how teachers perceive their relations with parents is a potentially malleable factor that could be targeted via educational initiatives, professional development, or interventions (e.g., conjoint behavioral consultation; Sheridan & Kratochwill, 2008). Nonetheless, the malleability of teacher-reported parent–teacher relations rests on the reliability and validity of the measurement of this construct, which must first be established.

Measuring Parent–Teacher Relationship Quality

Despite the consistency of findings that demonstrate the importance of teacher perceptions of the parent–teacher relationship, the investigation of this construct has a number of limitations. Chief among these limitations is that all of the studies reviewed above used different scales, or different combinations of scales, to assess the parent–teacher relationship. For example, to compare constructs that tap parent involvement and relational factors, Rimm-Kaufman et al. (2003) divided items on the Parent–Teacher Involvement Questionnaire (PTIQ; Kohl, Lengua, McMahon, & Conduct Problems Prevention Research Group, 2000) into two groups: "attitudes" and "activities"; however, this was done without clear statistical support or a precedence for doing so. Whereas, in Hughes and colleagues' (2005) investigation, they combined select items from the PTRS and PTIQ without a clear rationale for these adaptions and then proceeded with their combined scale despite obtaining inadequate model fit indices.

Second, many of the measures used within these studies were not developed following the recommended methods for measurement development (i.e., define the construct, generate item pool, design scale, expert panel review, incorporate validation items, initial scale administration, evaluate items, and optimize scale length; DeVellis, 2012). Furthermore, many of these measures lack psychometric support, such as evidence of reliability or validity. For example, the Home–School Relationships Questionnaire (HSRQ; seven items, Barbarin, 2000), used in the study by Serpell and Mashburn (2012), has no published information about steps taken in its development and has no psychometric support beyond its alpha coefficient. However, the measure validated by Mautone and colleagues (2014) is one exception. These researchers followed steps to cross-validate and confirm a variation of a factor, "*quality of the parent teacher relationship*," from the PTIQ (Kohl et al., 2000) through confirmatory factor analysis (CFA). Mautone and colleagues (2014) tested this measure in a sample of parents/teachers of children with attention-deficit/hyperactivity disorder (ADHD). As these authors note, given the classroom-related difficulties associated with children with ADHD, the relationships shared between parents and teachers of these children are particularly tense (Mautone, Carson, & Power, 2014) when compared with the majority of schoolchildren without ADHD; hence, the generalizability of their findings is limited. Furthermore, they used the PTIQ which has several limitations in its original form, including not being developed with the purpose of assessing the parent–teacher relationship construct, using principal components analysis (PCA) to develop this measures subscales instead of exploratory factor analysis (EFA; cf. Osborne, 2014), and retaining items with low factor loadings (Kohl et al., 2000; Miller-Johnson & Maumary-Gremaud, 2000). As such, no measure to date that is specifically intended to measure the parent–teacher relationship was developed via the advocated steps of scale development (cf., DeVellis, 2012) *and* supported with confirmatory evidence of its validity.

Without establishing the psychometric properties of measures used in research, scientists cannot have confidence in their ability to quantify the abstract (or latent) concepts they are intending to measure, which calls into question the validity of conclusions drawn from using such measures. Taken together, in lieu of research utilizing more consistent and psychometrically sound measures of the parent–teacher relationship, the contribution of this construct to child outcomes is not nearly as definitive as one may believe it to be.

PTRS

The PTRS appears to be the best available scale to assess the quality of parent–teacher relationships. The PTRS was published in a measure development paper with empirical and theoretical backing supporting its development (Vickers & Minke, 1995). The authors designed the scale to specifically assess the parent–teacher relationship and adhered to the initial suggested steps of sound scale development. The PTRS examines two features of the parent–teacher relationship,

namely, *joining* (a 19-item factor consisting of parent–teacher affiliation, support, dependability, availability, shared expectations, and beliefs) and *communication-to-other* (a five-item factor representing the "need" of parents/teachers "to express themselves to each other as part of fulfilling their own roles in the life of a given child," p. 144; Vickers & Minke, 1995). The PTRS was primarily developed for the elementary grades (i.e., 85% of teachers in their development study taught Kindergarten through sixth grade).

However, the PTRS is not without limitations. For example, the creators of the PTRS used PCA to distill its subscales. PCA is not a form of factor ("latent variable") extraction, and instead is a data reduction method (Floyd & Widamen, 1995; Tabachnick & Fidell, 2007), which is less likely to create factors that can be confirmed in CFA than factors derived from EFA (Floyd & Widamen, 1995). As such, it remains unclear whether the joining and communication-to-other components revealed in the initial scale development paper can be confirmed via CFA, which would underscore validity evidence for the internal structure of the PTRS. Another type of validity evidence often evaluated to support the use of a scale is that of test–criterion relationships, which includes the examination of the associations shared by the construct in question, the parent–teacher relationship, and theoretically related variables. Previous researchers have noted the associations between the parent–teacher relationship constructs and important student-level variables such as the student–teacher relationship, student behaviors, and student academic outcomes. Therefore, associations between the PTRS subscales and these child outcomes would strengthen the validity evidence supporting the utility of the PTRS for assessing teachers' perceptions of the parent–teacher relationship.

There currently lacks sufficient confirming evidence of the two-factor structure of the PTRS given the absence of cross-validation studies. As such, few research teams have utilized the two factors put forward by the measure developers. For example, Sheridan and colleagues (2012) collapsed across the PTRS's two factors (i.e., joining and communication-to-other) to create one total scale score without clear statistical support for doing so (as did Moorman Kim, Sheridan, Kwon, & Koziol, 2013). CFA analyses allow the capability to directly compare the model fit of a one-factor solution with a two-factor solution for conceptualizing the structure of the PTRS. Thus, a CFA of the PTRS could help to determine the most appropriate and valid format of the PTRS.

Current Study

Although the parent–teacher relationship appears to be associated with child-level variables in a consistent pattern across research teams, the various measurements utilized to investigate the construct of the parent–teacher relationship largely lack empirical support. The PTRS measure offers promise as it was developed following the advocated steps of scale development specifically to measure this construct. However, at the present time, the PTRS lacks cross-validation to support its use in research. Thus, this study intended to examine evidence for the validity of the PTRS by exploring the internal structure of the PTRS as well as the test–criterion relationships between the PTRS and other important child-level variables. Specifically, we sought to examine the statistical fit of the two-factor model put forward by Vickers and Minke (1995), and the one-factor solution utilized by other research teams (e.g., Sheridan et al., 2012). To assess the test–criterion relationship between the PTRS and relevant child-level variables, we examined associations between the PTRS and measures of student school-related outcomes previously linked with parent–teacher relations (i.e., student–teacher relationship, student academic competence, and student behavior).

Method

Participants

A total of 137 teachers consented to participate. From the teachers who consented to participate, 120 teachers from across 15 U.S. States (i.e., California, Colorado, Connecticut, Florida, Illinois,

Kentucky, Maryland, Minnesota, Missouri, New Jersey, New York, Ohio, Pennsylvania, Texas, and Virginia) completed the PTRS. The teachers were predominantly female (96.5%), Caucasian (93.1%), and ages 22 to 63 years ($M = 38.7$, $SD = 12.5$), with a mean annual salary of US\$47,536 ($SD = $ US\$16,080; whereas the recent national average for public elementary school teachers was reported to be US\$56,383; National Center for Education Statistics [NCES], 2013a). Approximately 73% of the participating teachers taught in public schools (preschool through sixth grade), and approximately 76% of teachers taught at schools where more than half of the student body received free/reduced-priced lunch (somewhat higher than that which would be expected considering the national average, where 49.6% of public students are eligible for free/reduced-priced lunch as of 2011-2012; NCES, 2013b).

Procedures

Teachers were recruited through multiple methods. School administrators were approached in the districts surrounding the authors' university (approximately 50 elementary schools). Advertisements were also sent through applicable electronic mail listservs (e.g., Center for School Mental Health Listserv) and posted on Facebook, where snowball sampling was inherent within this method (i.e., the advertisement could be forwarded to potential participants). Individuals who participated completed the questionnaires as part of a 30-min single online survey. Teachers were compensated US\$15 for completing the entire measurement battery. Prior to completing this survey, participants indicated their informed consent with a digital acknowledgment. This study was approved by the University Social-Behavioral Institutional Review Board.

Teachers were asked to identify two parents of students in their classroom. They were instructed to only select parents with whom they have had contact and parents who speak English fluently. Teachers were to identify one parent with whom they have had "*a good working relationship*" (hereafter referred to as "good relationship") and one with whom they have had "*a difficult time seeing eye-to-eye*" (hereafter referred to as "difficult relationship"). Therefore, teachers completed all below measures regarding the parent, or the parent's child (i.e., teacher's student), for two different parent/child dyads in their classroom.

Because teachers were asked to complete ratings on relations with two different students and those students' respective parents (i.e., good and difficult relationship), the data were nested. To not compound shared method variance and to avoid multilevel modeling with our relatively small sample, the data were randomly split into two rating groups (RG) where no teacher completed more than one survey in each RG. Both RGs had similar numbers of surveys about "good" and "difficult" teacher–parent relationships (i.e., RG 1: 46% good relationships; RG 2: 54% good relationships). See the "Data Analytic Strategy" section of this article for more information about the handling of rating groups.

Measures

PTRS. The PTRS is a 24-item scale purported to have two factors: a 19-item joining factor (representing parent–teacher affiliation, support, dependability, availability, shared expectations, and beliefs) and a five-item communication-to-other factor (representing the need to express oneself to the other). Items are rated on a 5-point scale (1 = *strongly disagree* to 5 = *strongly agree*). Select items were reverse-coded so that higher scores reflect more positive/collaborative parent–teacher relations. The developers of the PTRS found high internal consistency across factors, with alpha coefficients for the joining and communication factors at .97 and .86, respectively (Vickers & Minke, 1995). Within the current sample, the internal consistency was acceptable (>.70; DeVellis, 2012; Nunnally, 1978; see Table 1 for alpha coefficients per subscale and across RGs).

Table 1. Descriptive Information of Child Demographic and Study Variables Across Rating Groups 1 and 2.

Demographic variables	Rating Group 1		Rating Group 2		Difference[a]
Child age: *M* (*SD*)	7.84 (2.25)		7.82 (2.29)		*p* = .95
Child gender (% boys)	60.7%		64.3%		*p* = .56
Child race (% Caucasian)	68.4%		65.2%		*p* = .68
Study variables	*M* (*SD*)	α	*M* (*SD*)	α	Difference
PTRS Joining	3.53 (1.10)	.97	3.60 (1.12)	.97	*p* = .59
PTRS Comm.	4.21 (0.73)	.80	4.32 (0.60)	.71	*p* = .24
STRS Closeness	4.15 (0.71)	.80	4.06 (0.87)	.89	*p* = .41
STRS Conflict	2.56 (1.20)	.92	2.38 (1.09)	.91	*p* = .24
HARTER SC	8.13 (3.07)	.92	8.99 (2.97)	.90	*p* = .03
IOWA OD	9.77 (4.67)	.89	8.97 (4.55)	.92	*p* = .19
IOWA HY	6.65 (2.94)	.86	6.60 (2.86)	.83	*p* = .90
IOWA IN	5.16 (2.16)	.86	4.74 (2.17)	.90	*p* = .14

Note. PTRS = Parent–Teacher Relationship Scale–II; PTRS Comm = PTRS Communication-to-Other; STRS = Student–Teacher Relationship Scale, Short Form; HARTER SC = HARTER scholastic competence; IOWA OD = IOWA Conners Rating Scale Oppositional–Defiant Behaviors; IOWA HY = IOWA Conners Rating Scale Hyperactive/Impulsive Behaviors; IOWA IN = IOWA Conners Rating Scale Inattentive Behaviors.
[a]All comparisons were done using independent sample *t* test with the exception of the categorical variables: child gender and child race, which were compared using chi-square tests.

Child behavior. The IOWA Conners Rating Scale (IOWA; Loney & Milich, 1982; Pelham, Milich, Murphy, & Murphy, 1989) is a 10-item measure assessing common externalizing behaviors. Items are rated on a 4-point scale (1 = *not at all* to 4 = *very much*). The IOWA has been validated for use with teachers using a three-factor model, including Oppositional–Defiant, Hyperactive/Impulsive, and Inattentive factors (Waschbusch & Willoughby, 2008); hence, these three subscales were used in the current study. Sum scores were only computed for individuals who had complete data on each item per subscale. Within the current sample, the internal consistency was acceptable (see Table 1).

Child academic performance. Teachers completed three items from the Child's Actual Behavior Scale (Harter, 1985). These three items have been highly correlated with scholastic competence (e.g., *r* = .57, *p* < .01 relating to elementary school grade point average [GPA]; Mahoney, 2010). Owens and Hoza (2003) reported a high internal consistency of the teacher-reported scholastic competence scale (α = .96). The Scholastic Competence score was only computed for complete data on the three items. Within the current sample, the internal consistency was acceptable (see Table 1).

Student–teacher relationship. The Student–Teacher Relationship Scale, Short Form (STRS; Pianta, 2001) consists of 15 items rated on a 5-point Likert-type scale with anchors at 1 = *definitely does not apply* and 5 = *definitely applies*. This measure has two subscales, Closeness (e.g., "I share an affectionate, warm relationship with this child) and Conflict (e.g., "This child and I always seem to be struggling with each other"), where higher scores on each subscale indicate higher levels of closeness and conflict, respectively. Mean subscale scores were computed for individuals who answered greater than 70% of the items per subscale. Internal consistency has been found to be high (>.80) across studies implementing this measure (e.g., Jerome, Hamre, & Pianta, 2008). Within the current sample, the internal consistency was acceptable (see Table 1).

Data Analytic Strategy

Given the primary aim of this study, data were cleaned and examined for missingness on the PTRS. Because all items apply to every individual, these missing fields were determined to be illegitimately missing (i.e., a result of participants skipping items; Osborne, 2014). Cases were included in the analyses if the respondent had minimal missing data (i.e., answered 85% or more of the items) on the PTRS. In the cases with minimal missing data, mean substitution was used. Means were determined for the item in question from the appropriate relational group (e.g., if the item in question was from the survey about a "good relationship," then the mean of the item responses for completed surveys on the good teacher–parent relationships was imputed). Cases with more than minimal missingness (i.e., answered less than 85% of items) on the PTRS were excluded from analyses. Accordingly, complete PTRS data, including imputed data, existed for 117 cases in RG 1 and 117 cases in RG 2. Two cases were removed from RG 1 for missing over 15% of the PTRS items, while mean imputation was used with three cases in RG 2 that had minimal missing data. Notably, six teachers completed the PTRS only once; thus, three teachers were only in RG 1, and three teachers were only in RG 2 (hence, a total of 120 teachers completed the survey at least once but were not necessarily included in both RGs; see Table 1 for the means and standard deviations for all measures included in the study across RGs).

Independent samples t tests were conducted to assess differences across RGs for each variable examined. Only one significant difference emerged across RGs, the HARTER scholastic competence, $t(228) = -2.16$, $p = .032$, Hedges $g = -0.28$, where students in RG 2 had higher scores, on average, than students in RG 1. Chi-square tests (or independent samples t tests, where appropriate) were performed to examine difference between RGs on child demographic information and no significant differences emerged. Differences were also assessed between the parent/child dyads classified as "good relationship" and "difficult relationship" by teachers as a type of "manipulation check." Independent t tests indicated significant differences between groups across all study variables, where scores were more positive and less negative for "good relationships" as opposed to "difficult relationships" (PTRS Joining: $t = 18.27$, $p < .001$, Hedges $g = 2.39$; PTRS Communication: $t = 5.07$, $p < .001$, Hedges $g = 0.66$; STRS Closeness: $t = 5.60$, $p < .001$, Hedges $g = 0.73$; STRS Conflict: $t = -8.10$, $p < .001$, Hedges $g = -1.06$; IOWA Conners Rating Scale Oppositional–Defiant Behaviors [IOWA OD]: $t = -5.65$, $p < .001$, Hedges $g = -0.74$; IOWA Conners Rating Scale Inattentive Behaviors [IOWA IN]: $t = -5.58$, $p < .001$, Hedges $g = -0.73$; IOWA Conners Rating Scale Hyperactive/Impulsive Behaviors [IOWA HY]: $t = -2.82$, $p = .005$; Hedges $g = -0.37$; HARTER: $t = 6.62$, $p < .001$, Hedges $g = 0.87$).

Using the complete data, the factor structure was examined via CFA in each RG separately. CFA was conducted in Mplus 7.11 (Muthén & Muthén, 2012) using the weighted least squares estimator robust to data nonnormality for categorical data. Model fit indices used in this study were χ^2/df ratio, root mean square error of approximation (RMSEA), comparative fit index (CFI), and the Tucker–Lewis index (TLI). Generally, a model that obtains a χ^2/df ratio of 5:1 or less may suggest sufficient fit (Hooper, Coughlan, & Mullen, 2008). In addition, a model is considered a good fit for the data when RMSEA $\leq .06$, CFI and TLI $\geq .95$ (Hu & Bentler, 1999). Because Sheridan and colleagues (2012) used a one-factor solution, both a one- and a two-factor solution were examined for model fit and compared (via a chi-square difference test) within both RGs. Once the best fitting model was determined, the PTRS subscale score(s) were created by taking the mean of the items of a factor, which were then used for the correlation analyses. Bivariate correlation analyses with pairwise deletion were used to assess associations between the PTRS and constructs included to assess test–criterion relationships (i.e., child behavior, child academic competence, and the student–teacher relationship).
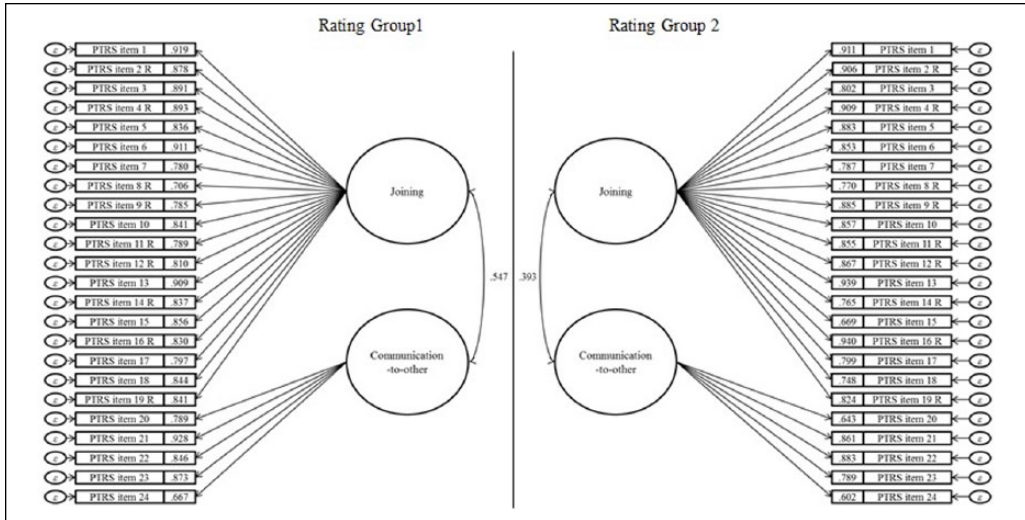
Figure 1. The two-factor model of the PTRS across both RG 1 and RG 2 per confirmatory factor analyses.
Note. All standardized regression weights and correlations depicted are significant at the *p* < .001 level. Items followed by an "R" indicate reverse coding. PTRS = Parent–Teacher Relationship Scale–II; RG = rating groups.

Results

The two-factor structure as proposed by Vickers and Minke (1995) was assessed for model fit via CFA for purposes of validation. The two-factor structure evinced adequate fit for the two-factor model for RG 1, with the exception of the RMSEA value, and a good model fit for the two-factor model for RG 2, RG 1: $\chi^2(251) = 510.18$, $p < .001$; RMSEA = .094, CFI = .974; TLI = .971; RG 2: $\chi^2(251) = 326.23$, $p < .001$; RMSEA = .051, CFI = .993, TLI = .992. The one-factor solution obtained poor fit to the data across RGs, RG 1: $\chi^2(252) = 1,013.91$, $p < .001$, RMSEA = .161, CFI = .923, TLI = .916; RG 2: $\chi^2(252) = 854.79$, $p < .001$, RMSEA = .143, CFI = .941, TLI = .935. The chi-square difference test indicated that the two-factor solution fit the model significantly better than the one-factor solution in both RGs, RG 1: $\Delta\chi^2(1) = 503.73$, $p < .001$; RG 2: $\Delta\chi^2(1) = 528.56$, $p < .001$. Thus, across both RGs, the two-factor model (see Figure 1) best fit the data.

According to the analyses, mean subscores were created for the two PTRS factors. To examine evidence for the test–criterion relationships between the PTRS and relevant variables within both RGs, summary scores were correlated with the child-level variables: student–teacher relationship (closeness and conflict), academic competence, and student misbehavior (oppositional–defiant, hyperactive/impulsive, and inattentive behaviors; see Table 2 for correlations). In both RGs, the correlation coefficient representing the association between the Joining subscale and all child-level variables was moderate to large; whereas, the Communication-to-Other subscale was generally unrelated to the child-level variables. The one consistent exception was the moderate strength of association between the Communication-to-Other subscale and the teachers' reported closeness with the student.

Fisher's *r*-to-*z* transformations were conducted to compare differences in magnitude for correlations across RGs; no significant differences were detected (all *p*s > .05). In general, when teachers reported greater joining with a child's parent, they also reported higher level of positive child outcomes (e.g., student–teacher relational closeness, student scholastic competence) and lower levels of negative child outcomes (e.g., student–teacher relational conflict, and student oppositional, hyperactive/impulsive, and inattentive behaviors).

Table 2. Correlations Among Study Variables Across Sample 1 and Sample 2.

		1.	2.	3.	4.	5.	6.	7.	8.
1.	PTRS Joining		.46**a	.36**c	−.61**b	.45**c	−.48**b	−.29**b	−.41**b
2.	PTRS Comm.	.31**a		.20*c	−.18b	.06c	−.13b	−.03b	−.01b
3.	STRS Closeness	.46**b	.32**b		−.43**c	−.29**d	−.30**c	.02c	−.28**c
4.	STRS Conflict	−.56**b	−.10b	−.52**b		−.32**c	.85**b	.56**b	.60**b
5.	HARTER SC	.46**c	.20*c	.21*c	−31**c		−.25**c	−.29**c	−.58**c
6.	IOWA OD	−.45**c	.04c	−.37**c	.82**c	−.13d		.54**b	.53**b
7.	IOWA HY	−.18*c	.10c	−.07c	.55**c	−.24**d	.65**c		.65**b
8.	IOWA IN	−.40*c	−.10c	−.33**c	.62**c	−.55*d	.55**c	.65**b	

Note. PTRS = Parent–Teacher Relationship Scale–II; PTRS Comm = PTRS Communication-to-Other; STRS = Student–Teacher Relationship Scale, Short Form; HARTER-SC = HARTER scholastic competence; IOWA OD = IOWA Conners Rating Scale Oppositional–Defiant Behaviors; IOWA HY = IOWA Conners Rating Scale Hyperactive/Impulsive Behaviors; IOWA IN = IOWA Conners Rating Scale Inattentive Behaviors. The correlations above the diagonal represent those in Rating Group 1; the correlations below the diagonal represent those in Rating Group 2. Pairwise deletion was used to conduct correlation analyses; therefore, sample size varied per analysis, and this was noted with superscripts (i.e., [a]n = 117; [b]n = 116; [c]n = 115; [d]n = 114).
*p < .05. **p < .01.

Discussion

A growing body of literature indicates that the dynamic quality of the interaction between the home and school, the parent–teacher relationship, may be a better indicator of the risks and benefits for children's educational outcomes than the various static measures of parent involvement (Hughes et al., 2005; Mautone, Marcelle et al., 2014; Rimm-Kaufman et al., 2003; Serpell & Mashburn, 2012). Although a number of scales are used to assess the parent–teacher relationship construct, no psychometrically sound scales exist that are known to validly measure facets of the parent–teacher relationship in a generalizable sample. Having a psychometrically sound measurement of the parent–teacher relationship that can reliably produce similar findings is essential to continue replicable and meaningful research.

Therefore, the current study explored types of validity evidence for the teacher version of the PTRS (Vickers & Minke, 1995). Results of the CFA indicated support for the original two-factor solution proposed by the measure developers, as opposed to the one-factor solution used by other researchers (Moorman Kim et al., 2013; Sheridan et al., 2012). Indeed, these two factors only shared, at most, 30% of their variance, further indicating the merit in analyzing these factors separately. In addition to this type of validity evidence, the relationship between the PTRS subscales and children's education-related outcomes was also examined. Notably, only the Joining subscale of the PTRS emerged to have moderate to strong associations with all teacher-reported child-level variables examined (i.e., student–teacher relationship, academic competence, and child behaviors), further highlighting distinct, non-overlapping factors.

The acceptable fit detected herein, despite the relatively small sample size, helps to provide support for the importance of following the empirically advocated steps of scale development (cf. DeVellis, 2012) in creating a strong, replicable scale that can evince reliable and valid latent factors. That is, the work put forward by Vickers and Minke (1995) to develop this scale is in large part why this scale appears to hold together in the predicted manner and evince internally consistent factors. Arguably too few researchers emphasize the psychometric properties supporting the measures used within their examinations. However, without establishing the psychometric properties of measures used within research, scientists cannot have confidence in their ability to adequately quantify the abstract concepts they are intending to measure. Vickers and Minke (1995) did noteworthy work on the front end in developing the PTRS, and our ability to

cross-validate this scale for use in future research potentially makes the PTRS a valuable tool for examining important child educational outcomes. Indeed, in an attempt to explore validity evidence for test–criterion relationships, associations between the two PTRS subscales and variables generally associated with children's proximal and distal school successes were examined. Below, these associations within the context of the extant literature are highlighted in detail in addition to suggestions for future research.

The present study extends the prior research by replicating previously indicated associations with the parent–teacher relationship within a sample of preschool through sixth-grade teachers. In line with research by Mautone and colleagues (2014) and Serpell and Mashburn (2012), higher levels of parent–teacher joining appeared to be significantly correlated with higher levels of closeness and lower levels of conflict in the student–teacher relationship, as reported by the teacher. Therefore, relational factors experienced in the student–teacher relationship may have a significant carryover into the parent–teacher relationship, or perhaps, vice versa.

In line with Rimm-Kaufman and colleagues (2003) and Hughes and colleagues (2005), higher levels of parent–teacher joining were associated with higher levels of student scholastic competence, as reported by teachers. Therefore, it may be that teachers transfer their perceptions about a child's academic capabilities to their perception of collaboration with that child's parent (or vice versa). That is, to speculate, teachers may perceive that if a parent can join with the adult responsible for their child's education, that child is more likely to have the academic skills or supports to help them succeed in school. On the other hand, it may be that teachers who perceive children as more academically competent have more collegial conversations with parents regarding that child's academic struggles or successes.

Finally, similar to findings reported by Serpell and Mashburn (2012), higher parent–teacher joining was associated with lower levels of student problem behavior as perceived by teachers. The present study extended Serpell and Mashburn's (2012) work by examining the associations between the parent–teacher relationship and various types of problem behaviors displayed by children (i.e., inattentive, /impulsive, and oppositional–defiant behaviors) to assess relative magnitude of association. All behavioral variables examined were associated with the parent–teacher relationship joining factor. However, it appeared that of all the behaviors examined, children's displays of oppositional–defiant behaviors in the classroom had a stronger association with teachers' perception of decreased relational joining with that child's parent. It is conceivable that parents and teachers likely have more contentious conversations when the shared child in the dyad presents with problematic behavior; however, less is known about whether these strained relations translate to actual parent or teacher behaviors. Future research might examine the various attributions that teachers make about children's displays of particular behaviors and how those attributions affect the teacher's relations with that student's parent. School administrators might be able to find avenues to support the parent and teacher dyad to better facilitate the educational development of the student with problematic behaviors (e.g., provide parents/teachers psychoeducation about particular childhood disruptive behavior disorders, or provide workshops to enhance communication style between parents/teachers).

Further validity evidence for the internal structure of the PTRS to be represented by two separate factors is the differential relationship that these two factors displayed with other variables included to assess test–criterion relationships. As opposed to the joining factor, the teacher's report of communicating to the parent (i.e., tell the parent when pleased, concerned, or worried, or ask the parent for suggestions or opinions) was *only* consistently associated with the teacher's perception of greater closeness in the student–teacher relationship. Perhaps when teachers perceive parents as receptive to their expressiveness, it creates feelings of relational closeness to that parent's child. Alternatively, when teachers feel closer to students, they may be more inclined to share information with or ask advice from that student's parents given their positive impression of that parent's child. However, this inclination of teachers to provide or request information to/

from parents may not be as influenced by other child-level variables (i.e., relational conflict, academic competence, student behavior). Future research should investigate how this factor relates to child outcomes, or, how this factor is related to teacher characteristics or teacher performance. Notably, a recent study using only the PTRS's communication-to-other factor found that when communication-to-other is congruent across parent and teacher reports; teachers, but not parents, perceived greater improvements in the target child's social skills within the context of the conjoint behavioral consultation intervention for children with behavioral concerns (Garbacz, Sheridan, Koziol, Kwon, & Holmes, 2015). Thus, it may be that only when parents and teachers perceive communication between them in a consistent fashion do teachers perceive the related student more positively. Regardless, the present study appears to demonstrate that this factor is a related but distinct facet from the joining factor, but part of the parent–teacher relationship. Less continues to be known about how the communication-to-other factor contributes to children's schooling or teacher's job performance.

Limitations and Future Directions

Although this work offers promising validity evidence for the use of the PTRS to assess teachers' perception of the parent–teacher relationship, several limitations of this current work must be noted. First, this study only utilized the teacher version of the PTRS despite the existence of a parent version of the PTRS. The teacher version was selected over the parent version because previous research has either predominantly relied on the teacher report (Hughes et al., 2005; Serpell & Mashburn, 2012) or found the preponderance of significant effects using the teacher report of the parent–teacher relationship (Mautone, Marcelle et al., 2014; Sheridan et al., 2012). As such, it may be that the teacher's perception of the parent–teacher relationship has the greatest influence on children's school-related outcomes; however, this remains largely an empirical question yet to be examined. Second, all measures in the current study were self-report scales collected from a sample inclusive of convenience sampling at one time point. This sample may not be representative of all primary school teachers and therefore introduce some systematic bias. Future research should explore associations between parent–teacher relationship quality and child outcomes measured independent of the teacher's report (e.g., standardized test scores, mother/father behavior ratings) as well as outcomes more distal from the teacher, but still relevant to school success (e.g., peer acceptance). Longitudinal studies are also needed to better refine prospective pathways between parent–teacher relationship quality and child outcomes.

Third, the present study utilizes a relatively small sample for CFA. However, there is not one guideline to inform the sample necessary for factor analysis (MacCullum, Widamen, Preacher, & Hong; 2001). Much effort went into minimizing this limitation by obtaining a sample similar to that of the measure development sample (i.e., preschool through sixth-grade teachers), obtaining variance in teacher responses (i.e., good and difficult relationships), and using the split sample procedure. Given that the results generally did not vary across rating groups (where one RG used imputation and one did not), it is likely that the results herein are replicable and this sample is suitable to provide cross-validation support for the PTRS. Of note, although soliciting relational extremes from teachers helps to increase variance, a potential limitation is that we did not obtain information about parents in the relational "middle." However, given that we replicated the findings of the initial PTRS study by Vickers and Minke (1995), which did collect information about parents not at the relational extremes, we are more confident that the absence of teachers reporting on how they related with parents in the middle did not adversely affect the generalizability of our results.

Similar to the investigation of Mautone and colleagues (2014), future research should explore the significance of the parent–teacher relationship among children at risk of academic underachievement, such as children with mental health disorders (e.g., ADHD) or individualized

education plans in school. It is reasonable that the PTRS measure could be used to help identify relevant situations/contexts when the parent–teacher relationship might be particularly important to students (e.g., meetings to evaluate special education needs). In addition, this measure might be useful in identifying teachers who may benefit from professional development (e.g., learning problem solving and communication skills when dealing with parents) or identifying parents who might require additional outreach from the school to engage in productive and supportive family–school relationships. Given the consistency across findings from various research teams highlighting the importance of family–school collaboration, the parent–teacher relationship appears an important construct in understanding child outcomes and school-focused interventions (e.g., Sheridan et al., 2012). Therefore, future research should investigate whether improving the collaboration between parents and teachers improves child academic and behavioral outcomes in school.

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Declaration of Conflicting Interests

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Note

1. "Despite its intuitive meaning, the operational use of *parent involvement* has not been clear and consistent . . . This somewhat chaotic state in the definition of the main construct not only makes it difficult to draw any general conclusion across the studies, but it may also contribute to the inconsistent findings in this area" (Fan & Chen, 2001, p. 3).

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