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4 Young children's perceptions of teacher-child relationships: An evaluation of two instruments and the role of child gender in kindergarten*

The psychometric qualities of two instruments that measure children's perceptions of teacher-child relationships were evaluated in a sample of kindergartners (*N* = 150): The Young Children's Appraisals of Teacher Support (Y-CATS) and the Kindergartner-Teacher Interaction Computer test (KLIC). On the Y-CATS, children judged propositions on a dichotomous response format. On the KLIC, children evaluated pictures according to a two-step response procedure to obtain a 4-point scale. Furthermore, these instruments were employed to explore gender differences in the associations between the teacher-child relationship and indices of maladaptive behavior. Teachers completed measures of relationship quality and children's behavior problems. A three-dimensional structure of the Y-CATS (Warmth, Conflict, and Autonomy Support) was found, whereas the KLIC's structure was unidimensional. The KLIC showed high reliability but stronger evidence was obtained for the validity of the Y-CATS. Consistent with attachment-based research, the results indicated that children display gender-typical problem behavior when having non-close teacher-child relationships.

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4.1 Introduction

Teacher-child relationships have been widely acknowledged as an important correlate of children's school readiness and subsequent school success. It has been demonstrated that children entering school adapt more easily when they are successful in forming positive relationships (e.g., Birch & Ladd, 1997). Supportive teacher-child relationships facilitate the mastery of skills necessary for a successful school career, and there is compelling evidence that relationship quality affects children's cognitive and social-emotional outcomes (Hamre & Pianta, 2001; O'Connor & McCartney, 2007; Pianta, Steinberg, & Rollins, 1995; Pianta & Stuhlman, 2004). For children at risk of school failure, a positive teacher-child relationship constitutes a protective factor, whereas a discordant teacher-child relationship exacerbates risk (Baker, 1999; Hughes, Cavell, & Jackson, 1999; Ladd & Burgess, 2001; Meehan, Hughes, & Cavell, 2003; Pianta et al., 1995; Silver, Measelle, Armstrong, & Essex, 2005). These findings imply that the quality of interpersonal teacher-child relationships can be viewed both as a concurrent indicator of children's school adjustment and as a factor either promoting or hindering children's future development (e.g., Hamre & Pianta, 2001).

It should be noted, however, that especially in early grade school most evidence is limited to teacher reports. Little is known about the meanings that young children attribute to their relationships with teachers, and the developmental significance of children's interpersonal experiences. Interviews with elementary school children confirm that children want to experience emotionally and cognitively supportive relationships with their teachers (Daniels & Perry, 2003). Considering that relationships are dyadic constructs, we argue that an understanding of both teachers' and young children's relationship perceptions early in school is critically needed.

Researchers are in the early stages of developing measures that assess young children's relationship perspectives (Harrison, Clarke, & Ungerer, 2007; Mantzicopoulos & Neuharth-Pritchett, 2003). In this study, we contribute to these efforts by investigating the psychometric qualities of two child instruments that share the same measurement aim but have different item and administration formats. In addition, we examine the differential significance of the teacher-child

relationship for boys and girls through an analysis of the associations between relationship quality and problem behaviors.

Children's versus teachers' perspectives on teacher-child relationships

Guided by attachment theory, research on teacher-child relationships has primarily relied on assessments based on teachers' perceptions. A significant body of that work has used the Student-Teacher Relationship Scale (STRS; Pianta, 2001), a measure that has empirically documented a 3-dimensional structure for teacher-student relationships. Key relational dimensions are closeness, which reflects the degree of warmth and trust, conflict referring to discordant and coercive interactions, and dependency that refers to overly dependent and clingy behavior of the child. The STRS has been validated in Pianta's own research and has been used in independent studies investigating academic and adjustment outcomes with diverse samples (Birch & Ladd, 1997; Kesner, 2000; Koomen, Verschueren, & Pianta, 2007).

However, reliance on teacher reports may limit our understanding of teacher-child relationships. Guided by attachment theory, it is postulated that both teachers and children construct internal working models (IWMs) of the teacher-child relationship (Pianta, Hamre, & Stuhlman, 2003). These internalized models are thought to function as frameworks for interpreting and understanding relationships with others and guide behavior in social interactions (Bowlby, 1969/1982). Thus to understand children's classroom behavior, insight in children's understanding and perceptions of their relationship with their teacher is considered necessary. This contention is supported by research that showed how child reports about the trustworthiness and psychological availability of teachers are related to their social responding and stress reactivity to negative interpersonal events (Little & Kobak, 2003). Moreover, IWMs of relationships are rooted in a social history with significant others. Both teachers and children are thought to bring their own relational history to the classroom and have generalized feelings, cognitions, and expectations about interpersonal relationships (Pianta et al., 2003). This implies that a child and a teacher may appraise their relationship quality differently in the face of shared interpersonal experiences. Indeed, there is some evidence that teacher and student reports are related to their concurrent relationships or relationship history with other caregivers (Howes & Hamilton,

1992a; Kesner, 2000). Consistently, the few studies that have assessed children's views report minimal teacher-child agreement in both early and late grade school, and even when parallel assessments of teacher and child perspectives were employed (Harrison et al., 2007; Mantzicopoulos & Neuharth-Pritchett, 2003; Murray, Murray, & Waas, 2008; Rey, Smith, Yoon, Somers, & Barnett, 2007; Valiente, Lemery Chalfant, Swanson, & Reiser, 2008). Importantly, though teacher-child convergence was modest, it was also found that both teacher and child reports made a unique contribution in the prediction of cross-year changes in adjustment (Hughes & Villarreal, 2008). Furthermore, results from these studies indicated that teacher perceptions are best at predicting teacher-rated adjustment outcomes, whereas children's perceptions are the best predictors of child-rated outcomes. Reliance on one informant only most likely yields inflated correlations as a result of shared-source variance. Together, these studies substantiate that insights into children's perceptions are critical to our understanding of how teacher-child relationships might foster or hinder children's development.

Measuring young children's perceptions

To date, several studies have successfully investigated the perceptions of five- to seven year-old children about teacher-child relationships. Though these studies share similar orientations grounded in attachment research, they have focused on different key relational dimensions and have employed different test formats. Mantzicopoulos and Neuharth Pritchett (2003) developed the Young Children's Appraisals of Teacher Support (Y-CATS) to assess young children's perceptions of teacher-child relationships. Using a dichotomous response format, the researchers asked children to indicate agreement or disagreement with an item by placing a card in either a mailbox (true) or trashcan (untrue). There was support for three hypothesized dimensions that largely correspond with the theoretical constructs underlying teachers' reports: Warmth reflected whether the child feels cared for and valued. In contrast, conflict referred to perceived harshness and criticism of the teacher. Autonomy support represented appraisals of teacher behaviors that stimulate children to pursue their own choices and interests. Children's reports were modestly associated with teacher-rated relationship quality and school adjustment measures (Mantzicopoulos, 2005; Mantzicopoulos

& Neuharth-Pritchett, 2003). More recently, Murray and colleagues (2008) focused on different forms of teacher support and used an adapted version of the My Family and Friends-Child (MFF-C) with a two-step response format: Children were first asked to affirm ('yes') or deny ('no') whether their teacher provided a certain type of support. When the answer was 'yes', children were asked to indicate the amount of support on a large picture of a barometer that contained four levels ranging from 'not at all' to 'a lot'. Only the total scale was both reliable and modestly associated with children's school liking, but unrelated to teacher-rated relationship quality. In contrast to these studies, Harrison and colleagues (2007) mainly focused on relational negativity. They used an indirect approach and examined young children's drawings of the self and teacher. The results showed modest teacher-child agreement and moderate associations with children's school liking, adjustment problems, and competencies.

All measures tapped into affective qualities of teacher-child relationships, but only the Y-CATS clearly differentiated between warmth and conflict, and was constructed along a three-dimensional framework that was theoretically consistent with that found in teacher reports. Also, relatively good support was obtained for the reliability and validity of its subscales in a sample of Head Start children. However, the results have not yet been replicated in different samples or countries. Replication of the factor structure in a sample that differs from the original sample in risk status and ethnicity will contribute to the construct validity of the Y-CATS. In the present study we pursue this goal with a sample of Dutch children and provide additional support for the reliability of the measure's subscales by examining stability over time.

It could be argued that the Y-CATS obtains a relatively rough measure of children's perceptions because it utilizes a dichotomous response format (i.e., true or untrue). This may account for the relatively limited variability in mean subscale scores and the negatively skewed distributions. However, although a 3- or 4-point scale could be more sensitive to variations in children's interpersonal experiences, 5- to 6-year-old children have a tendency to respond at the extremes of Likert-type scales (Chambers & Johnston, 2002). A solution would be to adopt a two-stage process by first presenting the child with two opposing statements representing the opposite ends of a continuum (e.g., my teacher likes me vs. my teacher does not like me). After being selected by the child, the statement is

followed by dichotomous response option to obtain a finer assessment of the child's perception. This two-stage procedure has been successfully used in research on young children's self-concept (PSPCSA; Harter & Pike, 1984). In addition to the above-noted considerations, it has been argued that children's understanding of the test items could be improved when items are presented together with corresponding pictures (Eder, 1990; Eiser, Mohay, & Morse, 2000).

To address these issues, we included a new measure of children's perceptions of relationship quality that was entitled in Dutch: Kleuter-Leerkracht Interactie Computer test or KLIC when abbreviated (English translation: Kindergartner-Teacher Interaction Computer test; Van Dijk, De Graaff, Knotter, & Koster, 2006). On the KLIC, children evaluate photographs of teacher-child interactions according to a two-step response procedure. Photographs represent emotional closeness and teacher support (e.g., My teacher always listens to me), conflict (e.g., My teacher often gets angry), and independence versus dependency (e.g., My teacher helps me; see appendix for detailed information). Thus, using a Dutch sample of kindergarten children, we sought to cross-validate the Y-CATS and to explore the psychometric properties of the KLIC. Assuming adequate qualities, we further aimed to advance understanding of gender differences in young children's relationship perceptions.

Gender differences

Gender differences play an important role in interpersonal relationships, with preschool girls being more nurturing and oriented towards social relationships than boys (Maccoby, 1998; Zahn-Waxler et al., 2008). With their teachers, girls tend to have more favorable relationships than boys as indicated by teacher reports of less conflict and more closeness (e.g., Baker, 2006; Birch & Ladd, 1997; Hamre & Pianta, 2001). However, we do not know whether these gender differences also exist in young children's perceptions. Previous studies have reported no results on sex differences, and research with the Y-CATS has yielded inconsistent findings (Mantzicopoulos, 2005; Mantzicopoulos & Neuharth-Pritchett, 2003). In the first study, boys judged their relationship with teachers as more conflictual than girls but no differences were found in the later study.

Furthermore, there is some evidence that the developmental significance of teacher-child relationships is different for boys and girls. Recently, Ewing and

Taylor (2009) discussed two theoretical perspectives that could explain these gender differences. Th*e gender role socialization perspective* predicts that girls are more sensitive to relationship quality because they are more socially oriented (Maccoby, 1998). This implies that girls profit more from close teacher-child relationships but also that they will be more hindered by poor relationships. According to the *academic risk perspective* especially children at-risk of school failure will be sensitive to the social environment (Hamre & Pianta, 2001). Hence, teacher-child relationships may have a larger impact on the school adjustment of boys compared to girls. A third perspective based on attachment research draws attention to sex-stereotypic behavior in poor child-caregiver relationships. Turner (1991) argues that insecurity or 'lack of confidence' in interpersonal relationships may be manifested in gender-typical problem behavior, that is withdrawn behavior for girls and disruptive or 'acting out' behavior for boys. Her research showed that insecure mother-child attachment was related to disruptive behavior in boys but to social inhibition in girls. Moreover, no gender differences in maladaptive behavior were found for children with secure attachments.

Few studies have examined gender differences in the association between teachers' perceptions of relationship quality and school adjustment. In line with the gender role socialization theory, positive relationships more strongly predicted social skills, work habits, and school competence for girls than boys (Baker, 2006; Ewing & Taylor, 2009; Hamre & Pianta, 2001). Conflict was found to be correlated with boys' but not girls' school competence as predicted by the academic risk perspective (Ewing & Taylor, 2009; Hamre & Pianta, 2001). However, Hamre and Pianta found this in upper elementary school classes only. Furthermore, consistent with the hypothesis of sex-stereotypic behavior in unfavorable relationships, Ewing and Taylor showed that boys were rated as more antisocial than girls when having conflictual relationships with their teacher. However, there was no evidence that internalizing behavior was more typical for girls than boys with poor relationships. Since these studies were conducted entirely from the teacher's perspective, an important step forward would be to examine those theoretical perspectives on gender differences using data based on children's relational views.

Summary of research objectives

The overarching goal of this research was to support the value of young children's reports of teacher-child relationships. A descriptive study was therefore conducted to investigate psychometric properties of two relatively new instruments and to examine concurrent linkages between relationship perceptions of young children and indicators of socio-emotional malfunctioning. The first goal of the present study was to investigate the psychometric qualities of the KLIC and to cross-validate the Y-CATS in a Dutch non-risk sample. Exploratory factor analysis (EFA) was employed to examine the factor structure of the instruments because we were interested in scale development rather than testing the fit between theory and data structure. We evaluated the internal consistencies of the resulting factors and examined test-retest reliabilities to assess stability over time. To obtain support for convergent validity, we examined teacher-child agreement and associations with teacher-rated socio-emotional maladjustment (Aggression, ADHD, and Social Inhibition). In line with previous research, modest associations were expected.

Our second and third goals were to explore: (a) sex differences in children's perceptions of teacher-child relationships; and (b) whether the association between relationship quality and problem behaviors was moderated by sex. Because of conflicting results with the Y-CATS in past research, we did not state hypotheses regarding sex differences in mean levels of children's relationship perceptions. Because none of the three perspectives about the moderating role of sex noted earlier (i.e., gender role socialization, academic risk, and gender-stereotypic behaviors) have received strong support yet nor have they been studied employing children's relational views, three sets of competing hypotheses were examined. First, according to the gender role socialization perspective, stronger associations were expected between girls' relationship perceptions and problem behaviors (i.e., Aggression, ADHD, and Social Inhibition). Second, consistent with the academic risk perspective; stronger associations were hypothesized between boy's relationship perceptions and Aggression, ADHD, and Social Inhibition. Third, considering the hypothesis of sex-stereotypic behavior in poor child-caregiver relationships, we expected girls' perceptions of non-close or conflictual relationships to have stronger associations with Social

Inhibition, whereas boys' relationship perceptions were predicted to be related to Aggression and ADHD.

4.2 Method

Sample

The sample included 150 kindergarten children (54% boys) and their 16 (lead) teachers (one male[1]) from 6 regular primary education schools in the Netherlands. The mean age of the children was 69.5 months (*SD* = 6.23). The mean age of the teachers was 44.9 years (*SD* = 9.1). Teachers had on average 19.7 years (*SD* = 10.38) of teaching experience and worked 4.3 days per week in the same class (*SD* = .68). Kindergarten starts when children are four years old and lasts for two years in Dutch schools, so most children had already spent about one year with the same teacher.

Schools were recruited in neighborhoods with relatively low concentrations of non-western immigrants (2-9%). The participating schools were located in different parts of the Netherlands in neighborhoods with 27-44% of the families falling into the low-income category (i.e., 40% lowest incomes in the Netherlands) and 15.5-47% into the high-income category (i.e., 20% highest incomes).

Selection criteria

Only teachers working at least three days a week were allowed to participate because we presumed that children would have more stable representations of their relationships with these teachers compared to teachers who are spending half time or less with them. Participating children had to be at least 5 years old. Children who had been in class with the particular teacher for less than two months were excluded. From the children who met the selection criteria, ten children were randomly selected in each class. Informed consent was obtained

[1] This might be considered problematic since the pictures of the KLIC portray a female teacher. However, the examiners did not notice poorer test understanding in this class and exclusion of these students did not alter the internal structure.

from parents. Fifty children (33.3%) of six classes from two different schools were randomly selected to participate in the retest.

Procedure

Data were gathered in January and February because these months were considered relatively calm periods in most schools. The instruments (Y-CATS and KLIC) were administered individually to the children outside the classroom in a quiet setting during regular school days in the morning. Prior to administration, children were asked to tell the name of their teacher to focus attention. They were assured that their responses would not be made known to their teacher or anyone else. The Y-CATS was administered first, and the KLIC was administered a full week later. Teachers completed two questionnaires measuring children's behavior problems (BQTSYO-M) and relationship quality (STRS). Retests took place three weeks later according to similar administration procedures as described above.

Measures

Young Children's Appraisals of Teacher Support. The Young Children's Appraisals of Teacher Support (Y-CATS; Mantzicopoulos & Neuharth-Pritchett, 2003) was developed to measure young children's perceptions of the relationship with their teacher. The Warmth subscale measures children's perceptions of teacher support, encouragement, and acceptance (11 items: e.g., My teacher is my friend). The Conflict subscale assesses the child's perception of negativity in interactions with teachers (10 items: e.g., My teacher gets angry with me). Children's perceptions of teacher practices that promote autonomy and self-directed activities are measured with the Autonomy Support subscale (6 items: e.g., My teacher lets me do activities I want to do). Cronbach's alphas are reported ranging from .58 to .75 for Warmth, .72 to .78 for Conflict and .57 to .70 for Autonomy (Mantzicopoulos, 2005; Mantzicopoulos & Neuharth-Pritchett, 2003). The validity of the scales was supported by modest teacher-child agreement and moderate associations with academic achievement, social skills, and problem behaviors. Items were presented on small cards that were read to the child by the examiner. The original format utilized a mailbox to place cards that were judged by the child as '*true*' and a trashcan for '*untrue*' propositions. In the

present study, a safe was used instead of a mailbox because a safe was considered more representative of confidentiality. Furthermore, we used two easily verifiable practice items: an untrue (i.e., My teacher has blue hair) and a true proposition (i.e., My teacher is taller than I am). Total administration time was about 10 minutes.

Kindergartner-Teacher Interaction Computer test (KLIC). The Kindergartner-Teacher Interaction Computer test or KLIC (Dutch abbreviation) was developed to measure children's perceptions of the relationship with their teacher (Van Dijk et al., 2006). We conducted pilot work including interviews with children and closely examined items used in other instruments (e.g., Y-CATS) in order to develop items with corresponding photographs that represented the three key relational dimensions (i.e., closeness, conflict, and dependency). This resulted in a computer test comprising twelve items (see Appendix) that was pilot tested in two kindergarten classrooms. The items reflected a variety of interactions between a teacher and a child in specific situations reflecting emotional closeness and teacher support (5 items: e.g., My teacher always listens to me) and conflict in teacher-child interactions (4 items: e.g., My teacher often gets angry). In addition, several items reflecting teacher assistance or absence were included to measure independence versus over-reliance on the teacher (3 items: e.g., My teacher helps me; I am scared when my teacher is not there). The same adult and child acted on all photographs. Since almost all kindergarten teachers are female, the teacher on the photographs was female. Different sets of photographs were utilized for boys and girls, with target children of the same sex displayed on the photographs.

For each item, two corresponding photographs were presented on a computer. Children first depicted the photograph that applied best to their teacher. Second, they indicated to what extent the photograph was representative of their teacher by choosing between a small and a large circle. For example, item 3 'My teacher listens' was presented with one photograph on which a teacher actually attended to the target child that asked for assistance and one on which the same teacher looked in the same direction but did not attend. The examiner discussed the content of the photographs with the child according to a standardized protocol (i.e., 'Where are you on the picture and what are you doing? Yes, that's right, you want to ask something and you hold your finger in the air. What is your teacher doing on this picture, and what on this picture? Yes, that's right, she is listening

to you and you may ask your question but on the other picture she does not look at you'). Then the examiner asked which photograph was thought to be most representative of his or her teacher (i.e., 'Which picture applies most to your teacher <name>'?). Children had to click on that particular photograph with their mouse. Then the photograph that did not apply disappeared from the screen and two circles became visible under the chosen photograph. The instructor asked the child to what extent the photograph applied to his or her teacher. When the child chose the 'attentive teacher', the instructor asked: 'Does your teacher <name> *often* listens or does she *always* listen when you want to ask her something?'. In case the child chose the photograph displaying the teacher not attending the child, the instructor asked: 'Does your teacher <name> *sometimes* listens or does she *never* listen when you want to ask her a question?'. Children were instructed to click on the large circle as the photograph was thought to be very representative and on the small circle when the photograph was considered a little representative. In this way, four response options were possible (e.g., my teacher *never* listens; my teacher *sometimes* listens; my teacher *often* listens; my teacher *always* listens). The instructor provided explanation and instructions according to a standardized protocol. Furthermore, assistance was given with use of the mouse when needed. The test was presented on a computer to engage children's interest and sustain attention. Administration time was about 10 minutes.

Evaluation of test understanding. Instructors evaluated children's understanding of each child instrument on a 4-point scale (i.e., *poor; moderate; good; very good*) according to their own impression. The rationale for misunderstanding was recorded from four prescribed explanations: verbal difficulties, inattentiveness, difficulties concerning test method, and other/not specified.

Behavior checklist. Teachers completed the Behavior Questionnaire for Two- to Six-Year-Olds-Modified (BQTSYO-M; Thijs, Koomen, De Jong, Van der Leij, & Van Leeuwen, 2004), which is a Dutch adaptation of the Preschool Behavior Questionnaire (PBQ; Behar, 1977). The checklist aims to measure teachers' perceptions of internalizing and externalizing problems and is especially developed for young children. Items are rated on a 4-point Likert scale, ranging from 1 (*absolutely not characteristic*) to 4 (*very characteristic*). In the present study, three subscales were included. Aggression refers to confrontative and

hostile antisocial behavior (4 items: e.g., 'hits of kicks other children'). The subscale ADHD-related behavior contains items that represent hyperactivity and inattention (4 items: e.g., 'a busy child'). Social Inhibition (5 items: e.g., 'Shy or timid') refers to withdrawal from social interactions out of shyness or social anxiety. Adequate psychometric qualities have been reported, and the validity of the scales has been supported by significant associations with subscales of the Child Behavior Checklist (CBCL) in the expected directions (Goossens, Dekker, Bruinsma, & De Ruyter, 2000). Furthermore, the measure has been successfully employed in research into teachers' pedagogical practices (e.g., Thijs, Koomen, & Van der Leij, 2008). The internal consistency is good for all subscales with Cronbach's alpha coefficients between .81-.93 in previous research (Thijs et al., 2004), and .72, .77, and .84 in the current sample for Aggression, ADHD-related behavior, and Social Inhibition, respectively.

Teacher-rated relationship quality. The Student-Teacher Relationship Scale (STRS; Pianta, 2001) measures teacher perceptions of the relationship quality with a particular student. In the present study, an authorized Dutch translated and adapted version of the STRS was employed (Koomen et al., 2007). The scale comprises three dimensions labeled Closeness (e.g., 'I share an affectionate, warm relationship with this child'; 'If upset, this child will seek comfort from me'), Conflict (e.g., 'Dealing with this child drains my energy'; 'This child and I always seem to be struggling with each other'), and Dependency (e.g., 'This child is overly dependent on me'; 'This child asks for my help when he/she really does not need help'). Closeness reflects the degree of warmth and open communication between the teacher and child. Conflict refers to negative and coercive interactions, whereas Dependency represents levels of clinginess and overdependence of the child. Items are rated on a 5-point scale ranging from 1 (*not at all applicable*) to 5 (*highly applicable*). In comparison to the original STRS, the subscales Closeness and Conflict were highly comparable. The Dependency scale was altered because of its mediocre internal consistency in previous research (α = .64; Pianta, 2001). Research has reported internal consistency scores ranging between .88-.93 for Closeness, .88-.91 for Conflict, and .75-.82 for Dependency (Doumen, Verschueren, Koomen, & Buyse, 2008; Koomen et al., 2007). The validity of the scale is supported by significant associations with classroom observations, teacher stress indices, and children's

behavioral adjustment (Doumen et al., 2008; Koomen et al., 2007). In the present study, a shortened version was used comprising the 5 items with the highest factor loadings per subscale. Cronbach's alpha coefficients were .85, .75, and .81 for Closeness, Conflict, and Dependency, respectively.

Data analyses

A series of explorative factor analyses (EFA) using Maximum Likelihood (ML) were performed on the correlation matrix of each of the child instruments. When the assumption of normality was violated, principal factor procedures (PAF) were also performed (Fabrigar, Wegener, MacCallum, & Strahan, 1999). To decide the number of components to retain, we examined Cattell's scree test (Cattell, 1966) and performed Velicer's minimal average partial (MAP) test (O'Connor, 2000). Components were rotated using the oblique direct oblimin procedure (Fabrigar et al., 1999). Items with factor pattern coefficients below .30 were excluded as well as items loading on multiple components, indicated by a difference in factor pattern coefficients smaller than .10.

With respect to evaluations of reliability, scores between .60-.70 are in the acceptable range for research purposes, whereas scores > .70 are considered satisfactory (Nunnally & Bernstein, 1994).

Linear regression models were tested to examine whether children's sex moderated the association between the teacher-child relationship and behavior problems using interaction terms between sex and relationship qualities. Sex was dummy coded: 0 = male and 1 = female. Simple slopes for boys and girls, and regions of significance were examined to probe moderation effects (Aiken & West, 1991; Preacher, Curran, & Bauer, 2006). The region of significance indicates the values of the independent variable at which the regression lines of boys and girls become significantly different. Because unequal numbers of participants per class, predictors were mean centered within clusters (Enders & Tofighi, 2007). Thus, children's relationship ratings reflected scores relative to their classmates. Though child reports were nested within teachers, no multilevel analyses were conducted because there was no significant between-subject variance for all outcome variables, intraclass correlations (ICC) ranged from 0-7,6%; $p > .05$. Residual plots were inspected to discover violations of assumptions of normality. In addition, regression diagnostics were examined to

detect extreme outliers (standardized residual > 3) and problems with multicollinearity among the independent variables in the models.

Missing values

One child was not present when the Y-CATS was administered, and another child was not present when the KLIC was administered resulting in 1 missing score for both the Y-CATS and KLIC. Also, one teacher had not completed questionnaires for all participating children in her class (n = 8). Listwise deletion was used under the assumption of completely random missingness (MCAR).

4.3 Results

Evaluation of children's test understanding

According to the examiners, the large majority of children (87.9%) showed good to very good understanding of the Y-CATS (M = 3.46, SD = 0.79). Poor (3.4%) and moderate (8.7%) understanding was attributed to (a) verbal difficulties (6.7%), (b) inattentiveness (2%), (c) difficulties concerning test method (15.3%), and (d) other/not specified (76%). The majority of children (84.6%) showed good to very good understanding of the test method of the KLIC as well (M = 3.40, SD = 0.79). According to the instructors, poor (0.7%) and moderate (14.7%) understanding was due to a) verbal difficulties (10%), b) inattentiveness (5.3%), c) difficulties concerning test method (10%), and d) other/not specified (74.7%).

Factor analyses, construction of subscales, and descriptives

Y-CATS. Given nonnormality of 10 of the 27 items (skeweness ≥ 2), EFA was performed using both ML and PAF. The ML solution is reported because ML and PAF produced very similar results (see Table 1). Both Cattell's scree test and the MAP test indicated a three-factor solution. Eigenvalues (EV) of the retained components were 3.3, 2.6, and 1.9. Factor pattern coefficients lower than .30 emerged (items 2, 16, 19, 21, and 25) as well as one cross-loading (item 18). We recomputed EFA without these items. The factor solution fitted the data adequately, $x^2(150, N = 149) = 162.396$, $p > .05$. Together the three factors explained 37.04% of the total variance. Items were largely distributed across the factors as expected. Following this analysis we calculated mean scores for each

subscale by averaging the items making up each factor. Warmth and Autonomy Support were somewhat negatively skewed with 50.3% and 34.7% of children respectively having the highest possible score (sk = -1.64 and -1.48, respectively). Still, a reasonable amount of variability was observed. Cronbach's alpha coefficients were .65, .72, and .61 for Warmth, Conflict, and Autonomy Support, respectively. To evaluate stability over time, Pearson's correlations were computed between the scores obtained at the first administration and at retest. Test-retest correlations were in the acceptable range for Warmth and Conflict, but appeared questionable for Autonomy Support: .67 ($p < .001$), .62 ($p < .001$), and .53 ($p < .001$), respectively.

KLIC. Both Cattell's scree test and the MAP analyses indicated a one-factor solution (EV = 4.9). For three items (6, 8, and 11), factor pattern coefficients lower than .30 were observed. The factor structure was explored again without these items. The chi-square statistic indicated a reasonable fit, $x^2(27, N = 150) = 41.281$, $p = .04$. The explained variance was 48.7%. Both positive and negative items were distributed along the same dimension in the expected direction. A relatively low factor pattern coefficient of .32 was observed for the item 'My teacher smiles'. For the other items, coefficients between .63-.86 were observed with the highest loadings for 'My teacher punishes me', 'I obey my teacher', and 'My teacher praises me' (see Appendix). Mean scores were calculated by reversing negative items and averaging all item scores. High scores indicated perceptions of a positive relationship characterized by warmth, affirmative feedback, and lack of correction. The scale was highly internally consistent ($\alpha = .89$) and stable over time (test-retest Pearson $r = .84$, $p < .001$).

Table 1 Rotated factor solution of the Y-CATS (N = 149)

	Factors		
Questionnaire Items	1	2	3
My teacher…			
10. Is my friend (w)	**.76**	-.08	.11
1. Likes my family (w)	**.56**	.01	-.09
13. Says nice things about my work (w)	**.50**	.11	-.05
3. Tells me I am smart (w)	**.49**	.05	-.03
7. Likes me (w)	**.47**	-.05	.16
27. Smiles a lot (w)	**.35**	.05	-.11
16. Helps me when I don't understand (w)-	-	-	-
19. Tells good stories (w)	-	-	-
21. Remembers special days for me (w)-	-	-	-
25. Answers my questions (w)	-	-	-
8. Tells me that I am doing something wrong (c)	.01	**.61**	.13
14. Gets (easily) angry with me (c)	.05	**.57**	-.07
5. Tells me to do work that is too hard for me (c)	-.01	**.56**	.14
11. Tells me to stop doing work I like doing (c)	.02	**.53**	.06
17. Is (sometimes) mean (c)	-.06	**.51**	.06
20. Tells me that I don't try hard enough (c)	.05	**.49**	-.23
26. Tells me to do work I don't want to do (c)	.03	**.43**	.12
22. Has too many rules for our class (c)	-.03	**.42**	-.01
24. Tells me I do not listen (c)	-.05	**.39**	-.05
2. Tells me I am going to get into trouble a lot (c)	-	-	-
9. Lets me choose work that I want to do (a)	-.08	.06	**-.69**
15. Lets me do activities that I want to do (a)	-.06	-.09	**-.68**
12. Lets me do different activities (a)	.12	.07	**-.44**
23. Chooses me as a special helper (w)	.02	.04	**-.38**
4. Makes the class fun (w)	.01	-.11	**-.33**
6. Does activities with me (a)	.22	-.09	**-.32**
18. Lets me choose where I sit (a)	-	-	-

Note: Expected pattern: (w) = Warmth, (c) = Conflict, (a) = Autonomy Support

Descriptive statistics. In general, kindergarten children reported high levels of Warmth and Autonomy Support, and moderate levels of Conflict. Evaluations on the KLIC were also relatively positive. Table 2 presents the means, standard deviations, and inter-correlations of the subscales of the Y-CATS and KLIC. Warmth was positively correlated with Autonomy Support. Ratings on the KLIC were modestly related to Autonomy Support.

Sex differences

No significant Sex differences emerged on the subscales of the Y-CATS (Warmth: t (146) = -1.105, $p > .05$; Conflict: t (146) = 1.376, $p > .05$; Autonomy Support: t (146) = -.899, $p > .05$). Also on the KLIC, no sex differences were found (t (147) = .145, $p > .05$).

Teacher-student agreement

To examine teacher-student agreement on relationship quality, bivariate correlations were computed between ratings of children and teachers. All correlations were in the expected directions and of modest magnitude (see Table 2). Children's perceptions of Warmth were positively correlated with teacher-rated Closeness and negatively with Conflict. In contrast, Conflict reported by children was negatively related to teacher-rated Closeness and positively to Conflict. Children's appraisal of Autonomy Support was positively related to teacher-rated Closeness. No significant correlations with teacher reports were found with the KLIC.

Associations with behavior problems

As expected, children's perceptions of the teacher-child relationship were modestly related to indices of maladaptive behavior (see Table 2). Warmth was negatively associated with Aggression and Social Inhibition. Conflict correlated positively with Aggression and ADHD, whereas Autonomy Support was negatively related to Aggression. Children's ratings on the KLIC correlated negatively with Aggression and ADHD.

Table 2 Descriptive statistics and inter-correlations of the study variables

Scales	*M*	*SD*	1	2	3	4	5	6	7	8	9	10
Y-CATS (n = 149)												
1. Warmth	.85	.20	-	-.12	.28**	.11	.22**	.30**	-.11	-.20*	-.12	-.16*
2. Conflict	.37	.26		-	-.06	-.03	-.22**	.17	-.01	.20*	.15*	.09
3. Autonomy	.81	.22			-	.15*	.25**	-.09	-.11	-.15*	-.12	-.01
KLIC (n =149)												
4. Mean score	2.94	.78				-	.03	-.05	-.12	-.14*	-.18*	.12
STRS (n =142)												
5. Closeness	4.04	.78					-	-.20**	.02	-.18*	-.03	-.38**
6. Conflict	1.44	.66						-	.32**	.58**	.55**	-.18*
7. Dependency	1.86	.86							-	.14*	.17*	.03
BQTSYO-M (n =142)												
8. Aggression	1.16	.31								-	.43**	-.28**
9. ADHD	1.53	.62									-	-.41**
10. Social Inhibition	1.52	.64										-

Note 1: Y-CATS = Young Children's Appraisals of Teacher Support; KLIC = Kindergartner-Teacher Interaction Computer test; STRS = Student-Teacher Relationship Scale; BQTSYO-M = Behavior Questionnaire for Two- to Six-Year-Olds-Modified
Note 2: *$p < .05$, **$p < .01$ (one-tailed)

Table 3 Hierarchical regression models predicting Aggression, ADHD, and Social Inhibition

	Aggression (n = 138)				ADHD (n = 140)				Social Inhibition (n = 139)			
	B	*SE B*	β	ΔR^2	*B*	*SE B*	β	ΔR^2	*B*	*SE B*	β	ΔR^2
Step 1				*.08***				*.10***				*.01*
Sex (female)	-.13	.04	-.24**		-.36	.10	-.29**		.15	.11	.12	
Step 2				*.08**				*.10***				*.03*
Warmth	-.52	.16	-.35**		.24	.28	.07		.29	.39	.08	
Conflict	.16	.09	.14		.28	.20	.11		.41	.22	.16	
Autonomy	.14	.15	.11		-.19	.24	-.06		.01	.26	.00	
KLIC	-.06	.05	-.09		-.43	.12	-.29**		.16	.13	.11	
Step 3				*.05**				-				*.05***
Warmth x Sex	.65	.25	.28*		-	-	-		-1.50	.60	-.28**	
Conflict x Sex	-	-	-		-	-	-		-	-	-	
Autonomy x Sex	-.41	.21	-.22*		-	-	-		-	-	-	
KLIC x Sex	-	-	-		-	-	-		-	-	-	

Note 1: KLIC = Kindergartner-Teacher Interaction Computer test
Note 2: *p < .05, **p < .01 (two-tailed)

Differential associations with behavior problems for boys and girls

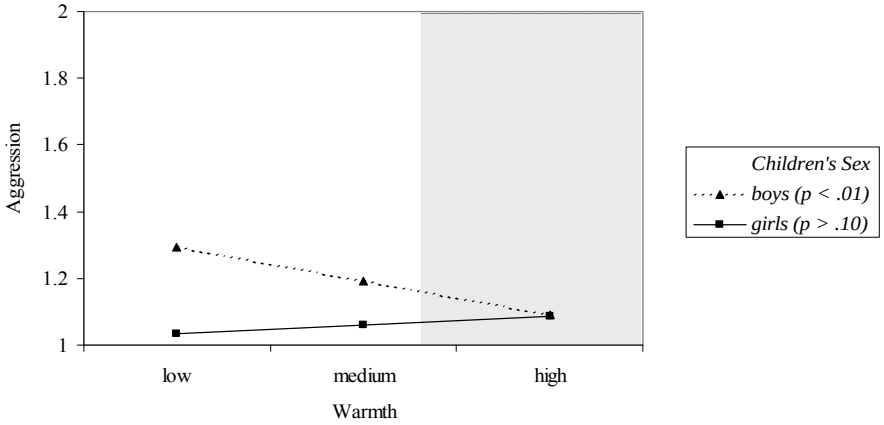
Regression analyses proceeded in three steps. First, child sex was entered into the model. In the second step, we added children's cluster-mean centered relationship reports. And thirdly, interactions terms between relationship perceptions and sex were entered. Non-significant interaction terms were removed from the model. Child (demographic) characteristics (i.e., ethnicity and age) appeared non-significant covariates and were therefore not included in the models ($p > .05$). For the models predicting Social Inhibition and Aggression, one and two extreme outliers respectively were removed from the analyses. Results are shown in Table 3.

Aggression was negatively predicted by Sex and Warmth. Children's sex moderated the association between Aggression and Warmth. Inspection of the simple slopes revealed that Aggression was negatively associated with Warmth for boys only (see Figure 1). Estimation of the region of significance showed significant sex differences when children's appraisals of Warmth were low to moderate (below 0.3 *SD*). Children's Sex also moderated the linkage between Aggression and Autonomy Support. Simple slope analyses revealed a marginally significant association for girls only. As shown in Figure 2, girls showed less aggression when levels of Autonomy Support were moderate to high (above -0.4 *SD*). The final model explained 21,4% of the variance (F (7,130) = 5.056, $p < .01$).

ADHD was negatively predicted by Sex and KLIC mean scores. No significant interaction terms emerged and the final model explained 20,4% of the variance (F (5,134) = 6.877, $p < .01$).

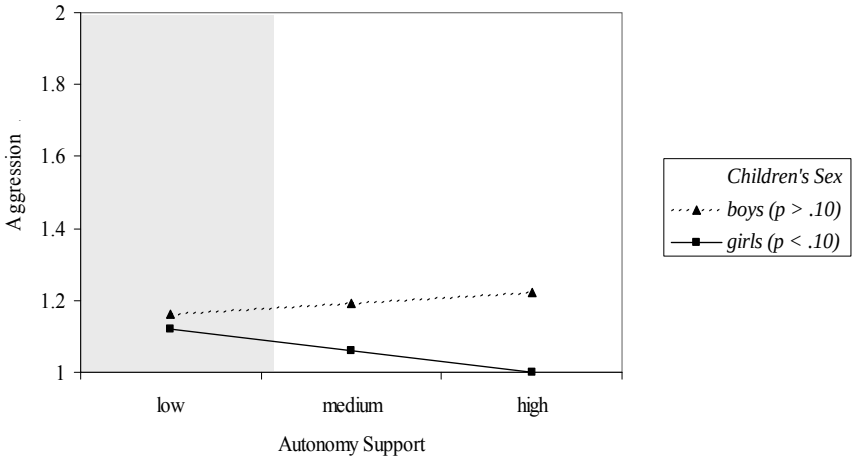
Furthermore, no main effects on Social Inhibition were found. However, the association between Social Inhibition and Warmth was moderated by Sex. Inspection of simple slopes showed a negative association for girls only (see Figure 3). Girls with below average scores on Warmth (below -0.2 *SD*) were more likely to be rated socially inhibited than boys. The final model accounted for 8% of the variance and was marginally significant (F (6,132) = 1.980, $p = .07$).

Figure 1 Warmth x Sex interaction predicting Aggression



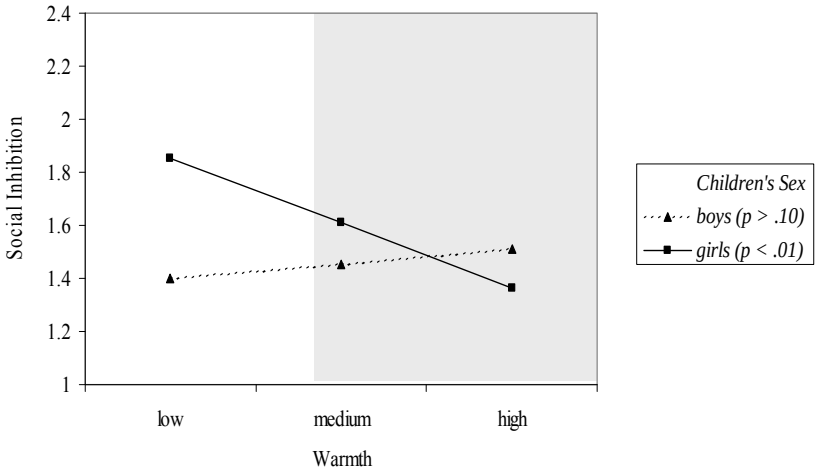
Note 1: White area is region of significance
Note 2: Low, medium, and high refer to –1 *SD*, mean, and +1 *SD*, respectively

Figure 2 Autonomy Support x Sex interaction predicting Aggression



Note 1: White area is region of significance
Note 2: Low, medium, and high refer to –1 *SD*, mean, and +1 *SD*, respectively

Figure 3 Warmth x Sex interaction predicting Social Inhibition



Note 1: White area is region of significance
Note 2: Low, medium, and high refer to –1 *SD*, mean, and +1 *SD*, respectively

4.4 Discussion

Our research contributes to the growing literature on young children's relational perspectives in several important ways. First, we add to the knowledge base by providing evidence on the psychometric qualities of two instruments designed for use with young children. On the Y-CATS, children responded to propositions about the teacher as 'true' and 'untrue' for them by putting small cards in either a safe or a trashcan. The KLIC was a newly developed computer test that employed photographs of teacher-child interactions to facilitate children's comprehension. Children evaluated the photographs according to a two-step procedure that was adapted from a measure of young children's self-competence beliefs (Harter & Pike, 1984). Second, in line with attachment-based research, the results suggest that children display sex-stereotypic problem behavior when having non-close teacher-child relationships.

Measuring children's relational perspectives

The first goal of the present study was to evaluate the psychometric qualities of the Y-CATS and the KLIC. Examiner ratings confirmed that children had a good understanding of the items and test format of both instruments. However, the results indicated different psychometric strengths and weaknesses for the two instruments. In line with prior research (Mantzicopoulos & Neuharth-Pritchett, 2003), a three-dimensional structure of the Y-CATS was found that largely correspond with the theoretical constructs underlying teacher reports (Pianta, 2001; Koomen et al., 2007). Warmth reflected whether children perceived their teacher as caring and affectionate. Conflict comprised children's perceptions of their teacher as unkind, demanding, and harsh. Autonomy support represented children's perceptions of a classroom climate in which teachers create opportunities for children to initiate and direct their own activities. In comparison to other measures for young children (e.g., Stipek & Ryan, 1997), it could be inferred that the first two scales show satisfactory reliability for research purposes. The reliability of autonomy support appeared questionable in both the present sample and previous research (Mantzicopoulos & Neuharth-Pritchett, 2003), and future efforts are needed to revise this scale. The validity of the Y-CATS was evidenced by modest associations with children's maladaptive behaviors. Ratings on the Y-CATS predicted children's aggressive behavior and socially inhibited behavior of girls. The finding that children's perceptions of warmth are related to teacher ratings of maladaptive behavior highlights the importance of considering the differential role of relationship domains on developmental outcomes. In addition, we found modest teacher-child agreement. This level of agreement is in line with previous research and confirms that there is some, yet relatively small overlap in children's and teachers' views of relationships (e.g., Harrison et al., 2007; Mantzicopoulos & Neuharth Pritchett, 2003; Murray et al., 2008; Rey et al., 2007). Considering that the two measures do not have parallel format or items, the findings most likely reflect method variance. An additional interpretation is that the relational perceptions of teachers and students are guided by mental representations that are based on their unique social history with significant others (cf. Kennedy & Kennedy, 2004; Kesner, 2000; Lynch & Cicchetti, 1992; Rydell, Bohlin, & Thorell, 2005). Although this study was not structured to investigate

the sources of non-shared variance between children's and teachers' relational views, it calls attention to the need for research on this issue.

On the KLIC, children evaluated the relationship with their teacher via photographs portraying teacher-child interactions. The KLIC was unidimensional. The small number of items may explain why the multidimensionality of children's perceptions was not captured with the KLIC. Promising features of the measure were its high internal consistency and stability over time, good comprehension of the item content and format by the children, and the normal distribution of scores. We obtained limited support for the validity of the scale. Comparisons between scores on the KLIC and the STRS yielded only a marginally significant negative association with Dependency ($p < .10$). However, there were modest associations with children's maladaptive behavior. ADHD-related behavior was uniquely predicted by children's ratings on the KLIC but not by scales of the Y-CATS. It is possible that hyperactivity hinders circle conversations and seat work, and therefore has triggered recollections of reprimands (e.g., item 4) and relatively little recollections of praise (e.g., item 7). It could be argued that teachers' pedagogical practices involving classroom or behavior management (i.e., reprimand and praise) are overrepresented in the KLIC. Revisions of the scale should mainly focus on the measure's construct validity through the development of additional items that capture the expected multidimensionality of children's relationship perceptions. Items that portray distant or detached interactions are necessary as well as more variety across the school contexts (e.g., playground) within which teacher-child interactions occur. Waters and Cummings (2000) emphasize that secure attachment not only refers to children's confidence in the caregiver's availability but also to children's skillful use of this source of support. Inclusion of items such as 'When I am sad, I go to my teacher for comfort' might also add to this subject.

Only small associations between the Y-CATS and KLIC were found. Children with more positive appraisals on the KLIC reported higher levels of autonomy support. When correlations were calculated using within-cluster-centered mean scores, also a positive association between warmth and the KLIC emerged ($r = .16$, $p < .05$). Though the limited convergence may be partly due to the different formats of the measures, it is also possible that distinct constructs were measured. The Y-CATS exclusively focuses on each child's perceptions of attitudes and

interpersonal behaviors of the teacher to the child, whereas with the KLIC children are presented photographs that portray both teacher and child behaviors. Furthermore, photographs, more than verbally presented propositions, probably have triggered children's recollections of own experiences that have affected their responses. Lastly, due to the smaller number of items, the KLIC represents a smaller sample of interpersonal experiences.

In sum, although the challenges in developing measures for young children are considerable, both instruments demonstrated potential value. The current findings with the Y-CATS were in line with previous reports, and extended evidence to a Dutch low-risk sample. Furthermore, this study indicated acceptable stability over time for the subscales Warmth and Conflict, and highlighted the multidimensionality of the Y-CATS as a highly important quality. Compared to the Y-CATS, the high reliability of the KLIC and the normal distribution of scores were considered major strengths of the measure. The children responded well to the two-step procedure that yielded results along a 4-point scale. Furthermore, we obtained evidence that young children are capable of understanding questions that are made contextually relevant through the use of pictures accompanied by verbal prompts. However, the measure is short and additional work is needed to establish its validity. To obtain support for the construct validity of the instruments, future studies could explore additional methods such as puppet interviews (Verschueren, Marcoen, & Schoefs, 1996) or peer nominations (Hughes, Zhang, & Hill, 2006).

The role of gender in the association of relationship quality with problem behaviors

Our second and third goals were to explore: (a) sex differences in children's perceptions of teacher-child relationships; and (b) whether the association between relationship quality and problem behaviors was moderated by sex. Teachers generally report less conflict and more closeness in relationships with girls compared to boys (e.g., Birch & Ladd, 1997; Hamre & Pianta, 2001). In contrast to their teachers, boys and girls did not seem aware of these differences in relationship quality and rated their relationships equally positive. Yet associations between relationship perceptions and maladaptive behavior did vary by sex. We found that warmth was more strongly related to aggression in boys

but to social inhibition in girls. More specifically, girls experiencing non-close or distant relationships were more likely to be seen as socially inhibited by their teacher, whereas boys with non-close relationships were rated as more aggressive. No mean differences were found in levels of maladaptive behavior between boys and girls with warm relationships. These findings were in line with the hypothesis derived from attachment research predicting that children display sex-stereotypic behavior when having poor child-caregiver relationships (Turner, 1991). It seems that feelings of insecurity and lack of confidence in the teacher are manifested in maladaptive behavior, but how this is expressed in particular behavior may depend, at least in part, on sex. Notably, additional analyses on teacher reports not reported here did not reveal similar moderating effects of children's sex, like it has not been found in prior research into teachers' perceptions of relationship quality (Ewing & Taylor, 2009).

Limited support was found for the gender role socialization perspective and the academic risk perspective. No consistent gender differences in the associations between teacher-child relationship qualities and indicators of maladjustment were found, though there was some evidence that girls but not boys display less aggression when they perceive more autonomy support from teachers. This was most consistent with the gender role socialization perspective. Notably, positive indices of social-emotional and academic competence are needed for a more comprehensive evaluation of the hypotheses.

Conclusions and implications

Our findings suggest some implications for practice. First, teachers and other practitioners need to consider problem behavior from an interpersonal perspective. It is important to recognize the possibility that maladaptive behaviors of children are manifestations of insecurity and the undermining feeling of children that they are not being valued. In our sample, the girls who were viewed as socially inhibited by their teachers were mostly the girls who sensed that their teacher didn't care for them, and who judged their relationship with their teacher as lacking warmth. Similarly, aggressive boys were more likely to report low levels of warmth. Teachers play a vital role in children's development and should be mindful of children's need for belongingness that is being cared about, valued and known as individuals. However, it is possible that even though teachers do

express affection, children may perceive otherwise due to a history of negative experiences with other caregivers (Howes & Hamilton, 1992a) or because of negative attribution styles (McElwain, Booth-LaForce, Lansford, Wu, & Dyer, 2008). Second, our findings highlight that we cannot rely on the teacher's perspective only. However, to our knowledge there are currently no child measures available that can be used in practice. Therefore, researchers are urged to continue to explore and evaluate measurement methods in order to obtain instruments that meet the criteria for individual assessments. The measures employed in the present study provided meaningful information about kindergartners' relationship experiences, and constituted promising approaches that merit attention in future research.

When considering practical implications, the limitations of the present research should be well understood. First, this study is among the first to explore sex differences from the perspective of the child and replication of findings is needed before firm conclusions can be drawn. Second, the data preclude causal inferences. Children's behavior problems could be antecedents as well as consequences of poor relationship quality, or both may result from a shared underlying cause, for instance poor mother-child attachment. Third, the present sample included five- and six-year old children from relatively ethnically homogenous and middle-class neighborhoods. This limits the generalizability of the findings to culturally diverse or at-risk populations. Of note, though Dutch kindergarten classes are comparable to those in other western countries and the US, there may be subtle cultural differences in education and teacher-child interactions.

In conclusion, we established that kindergarten children are capable of providing reliable and meaningful information regarding their perceptions of teacher-child relationships. The results confirmed previous research on the Y-CATS, and extended evidence to a Dutch low-risk sample. Although we did not obtain strong evidence for the validity of the KLIC, we did establish that it provides a reliable and promising tool that merits further attention. In addition, the study shows the importance of the child's perspective for understanding the significance of the teacher-child relationship for children's classroom problem behaviors, and how this may vary by gender.

Appendix

Content of the items and corresponding photographs presented with the KLIC

Item	Description of Situation: Photograph 1 / Photograph 2
1. My teacher smiles (w)	Circle conversation: Smiling face of teacher / Neutral face of teacher
2. My teacher punishes me (c)	Circle setting, teacher reads from a book: Child is placed outside circle by teacher / Child listens carefully
3. My teacher listens to me (w)	Child wants to ask question and holds finger in air: Teacher listens / Teacher body towards child but doesn't attend
4. My teacher rebukes me (c)	Circle setting, teacher reads from a book: Child makes fun and teacher points her finger / Child listens carefully
5. I am (dis)obedient (c)	Child at teacher's desk staring at teacher's pen while teacher points her finger: Child does nothing / Child grabs pen
6. My teacher helps me (d)	Child works on a difficult task: Teacher and child work together at teacher's desk / Child works alone
7. My teacher praises me (w)	Child sits on a table and solves a puzzle: Teacher gives thumbs up / Teacher only watches
8. We do things together (d)	Group seatwork, child solves a puzzle: Teacher assists child / Teacher assists another child
9. My teacher is angry (c)	Child has dropped bike at schoolyard: Teacher points her finger / Teacher with arms open, showing that it's all right
10. My teacher comforts me (w)	Child lays crying on the floor with face covered: Teacher gently touches the child / Teacher is absent
11. My teacher likes me (w)	Child on wall bars, while teacher standing next to him: Teacher strokes the child's head / Teacher only watches
12. I am scared (d)	Circle conversation with unknown teacher: Child in crouching position on seat / Child talks to teacher

Note 1: KLIC = Dutch abbreviation of Kindergartner-Teacher Interaction Computer test
Note 2: (w) = Warmth, (c) = Conflict, (d) = Dependency