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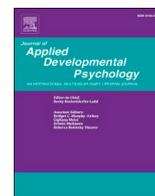
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Patterns of problematic teacher–child relationships in upper elementary school

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ABSTRACT

This study focused on (1) whether dimensions of relationship quality (i.e., closeness, conflict, and dependency) jointly form distinct relationship patterns in a normative sample of upper elementary schoolers ($N = 1078$), (2) the extent to which patterns observed in the normative sample could be found in a problematic sample ($N = 241$) consisting of children that teachers experienced relationship problems with, and (3) whether children's gender, ethnicity, and behavior problems are related to relationship patterns. Three relationship patterns were found in the normative sample: A supportive pattern (73.2%), a mildly insecure pattern (17.6%), and a dysfunctional pattern (9.2%). Most children from a problematic sample could be assigned to one of these patterns with high certainty, providing evidence for validation of normative patterns in a more problematic sample. The distribution of children over the relationship patterns differed significantly between samples. Boys and children with problem behavior were overrepresented in unfavorable patterns.

Introduction

An increasing amount of evidence demonstrates the importance of affective teacher–child relationships (TCRs) for children's functioning in school (Hamre & Pianta, 2001; Roorda, Jak, Zee, Oort, & Koomen, 2017). Children's positive relationship features with teachers serve as a source of security that encourages children's social and emotional development and academic success (Roorda et al., 2017; Verschueren & Koomen, 2012). In contrast, unsupportive or problematic TCR features reflect insecurity, impair children's academic success, and may amplify behavior problems (e.g., Hamre & Pianta, 2001; Spilt, Hughes, Wu, & Kwok, 2012).

TCRs are usually assessed using three moderately related dimensions, including the degree of closeness, conflict, and dependency. Following a variable-oriented approach, each of these dimensions is considered a separate indicator of TCR quality (e.g., Spilt & Koomen, 2009). In the present study, however, we used a person-centered approach to study patterns of TCR quality. This approach is focused on individuals rather than variables and captures combinations or patterns of dimensions that thereby can give a more complete description of an individual (e.g., Bergman & Magnusson, 1997). In this study, we focused on TCR quality in upper elementary schools using a person-

centered approach in which separate relationship dimensions were considered components of overarching TCR patterns.

There were several reasons to examine patterns of TCRs. One practical reason is that practitioners, such as school psychologists or teachers, when inspecting the quality of TCR for a particular child, will be inclined to combine the results of all three dimensions. For instance, a problematic score on dependency might indicate poor quality TCR. But the judgment of the practitioner about this TCR will probably also be affected by whether the child's high dependency is concomitant with low or high conflict, and maybe also by the closeness of the relationship. Thus, a practitioner will use all dimensions together and the pattern of scores will probably determine how the practitioner will support the teacher and child. Unfortunately, there is a scarcity of research about problematic or dysfunctional TCR patterns that can guide a practitioner to determine the relevance and commonality of an observed pattern of scores on separate dimensions.

There is also a theoretical reason why patterns of TCRs might be of interest. In parent–child relationship literature, the identification of specific combinations of relationship dimensions (i.e., sensitivity, responsivity, conflict, distrust) has been used to form attachment-based patterns of parent–child relationships (Ainsworth, Blehar, Waters, & Wall, 1978; Bosmans & Kerns, 2015). Since teachers are seen as ad hoc

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attachment figures (e.g., Verschueren & Koomen, 2012), attachment-based styles could also apply to TCRs. Several researchers have indeed found that a combination of specific relationship dimensions (i.e., closeness, conflict, and dependency) could reflect meaningful attachment-based patterns or styles in TCRs (Ahnert, Harwardt-Heinecke, Kappler, Eckstein-Madry, & Milatz, 2012; Pianta, 1994). To date, support for attachment-based relationship patterns in the school context has only been found in a limited number of studies focusing on children in the early elementary school years (Ahnert et al., 2012; Gregoriadis & Grammatikopoulos, 2014; Pianta, 1994). However, little is known about attachment-based TCR patterns in upper elementary schools. This is unfortunate, as the quality of TCRs continues to be important for older children's academic adjustment (e.g., Roorda et al., 2017; Zee, Koomen, & Van der Veen, 2013). Hence, our first goal was to identify attachment-based relationship patterns in a normative sample of TCRs of children in upper elementary school.

The second goal of the study was to use the pattern structure of the normative sample to examine relationship patterns in a sample of children with whom teachers qualified their relationship as problematic. Specifically, using an independent sample, we examined how children, who were identified as difficult to form a positive relationship with, varied over the known TCR patterns from the normative sample. This was done to validate the found normative patterns in a more clinically diverse sample of children (e.g., Rosellini & Brown, 2021) and to shed light on which types of relationship patterns, especially insecure relationships, were most prevalent when teachers nominated the children with whom they experienced relationship problems. As teachers' perspectives on troublesome relationships are especially important for children's behavioral, emotional and academic adjustment (Ettekal & Shi, 2020; Hamre & Pianta, 2001; Pakarinen et al., 2018; Roorda et al., 2017), it is important to see the prevalence of certain types of relationship patterns. In addition, by using well-validated relationship patterns, interventions can be aimed at and evaluated for each type of relationship pattern. Finding out what works for whom, instead of whether an intervention is in general successful, is highly recommended (Windgassen, Moss-Morris, Goldsmith, & Chalder, 2018; see for examples Van Lier, Muthén, van der Sar, & Crijnen, 2004; Hanno, 2022, Weeland et al., 2022).

The third goal of this study was to identify which child characteristics are associated with more problematic TCR patterns. Previous research has mainly focused on how characteristics of children, such as children's gender, ethnicity, or problematic behavior are associated with separate dimensions of TCRs (e.g., Murray & Murray, 2004). Far less is known about how child characteristics may be related to TCR patterns. Only two studies indicated that relationship patterns were also related to children's gender and behaviors in early elementary school (Ahnert et al., 2012; Pianta, 1994). It is important to investigate which child characteristics contribute to TCR patterns in problematic relationships in upper elementary school as well, because risk factors for developing problematic TCR patterns may increase the chance of further adjustment problems in school (e.g., Jerome, Hamre, & Pianta, 2009; Silver, Measelle, Armstrong, & Essex, 2005).

A theoretical framework of teacher–child relationships

Researchers have argued that teachers can function as ad hoc attachment figures for children (Verschueren & Spilt, 2021). Originally, attachment theory (Bowlby, 1969/1982) has been used to explain the affective bond between parents and children. Three basic attachment styles have been uncovered by Ainsworth et al. (1978): Secure, insecure-avoidant, and insecure ambivalent. Securely attached children explore the environment and trust that their needs will be met. Parents of securely attached children seem to respond sensitively to children's needs and support their autonomy development (Bernier, Matte-Gagné, Bélanger, & Whipple, 2014; Brenning, Soenens, Braet, & Bal, 2012). In an insecure-avoidant attachment relationship, children explore less and

display emotionally distant behavior, as a result of possible distant or disengaged behavior of the parents toward the child (Brenning et al., 2012). In an ambivalent attachment relationship, children display more anxious, angry, and preoccupied behaviors. Children are often not easily comforted in ambivalent relationships and parents may have displayed inconsistencies in providing warmth, and support and offered low autonomy support (Brenning et al., 2012).

Once children enter school, other adults besides their parents become increasingly important to children's functioning (Hamre & Pianta, 2001). As such, Bowlby's attachment perspective has been extended to theoretically frame TCR quality (Pianta, 1999; Verschueren & Koomen, 2012). Many TCRs are considered some form of attachment-based relationship as they at least fulfill a part of the functions of an attachment relationship (Bergin & Bergin, 2009). According to an extended attachment perspective (e.g., Pianta, Nimetz, & Bennett, 1997; Verschueren & Koomen, 2012), sensitive teachers may function as a secure base from which children can explore and develop favorably both academically and behaviorally in school. Children may also seek support and comfort from their teachers in times of discomfort or stress, which could reflect teachers' availability for children as a safe haven. When teachers are less sensitive and/or responsive toward children's needs, this may instead lead to insecurity in TCRs, which can interfere with children's functioning in school.

In empirical research, the extended attachment perspective on TCRs mainly focuses on three separate dimensions. These dimensions are usually operationalized using teacher-perceived dimensions of the Student–Teacher Relationship Scale (STRS; Koomen, Verschueren, van Schooten, Jak, & Pianta, 2012; Pianta, 2001; Tsigilis & Gregoriadis, 2008). A positive attachment-related dimension is closeness, referring to warmth, trust, and open communication between teachers and children. When there is a close bond, children use teachers as a safe haven. A negative attachment-related dimension is conflict, which refers to disharmony and resistance in TCRs. Relationships high in conflict are often characterized by discordant and coercive interactions. A third attachment-related dimension is dependency – theoretically also regarded as a negative relationship dimension – referring to teachers' concern about children's overreliance on them. This overreliance of children on the support of teachers can be expressed by strong reactions to separation from teachers, requests for help when it is not necessary, and overly clingy behavior. In this situation, children do not use the teacher as a secure base (Verschueren & Koomen, 2021). In several studies, teacher–child dependency, as operationalized using the STRS, was negatively related to children's executive functioning, engagement, and school achievement (Bosman, Roorda, van der Veen, & Koomen, 2018; Roorda, Zee, & Koomen, 2021; Vandenbroucke, Spilt, Verschueren, Piccinin, & Baeyens, 2018). However, some other studies found nonsignificant or contradictory associations between dependency and children's socio-emotional competencies (Garner, Mahatmya, Moses, & Bolt, 2014; Sette, Spinrad, & Baumgartner, 2013). Therefore, dependency does not emerge as a clear-cut negative dimension, indicating that its effects could be moderated by child factors or contextual factors (cf., Verschueren & Spilt, 2021).

Patterns of teacher–child relationships

Overall, closeness, conflict, and dependency are considered unique dimensions that reflect teachers' perceptions of their affective relationship with individual children (Koomen et al., 2012). Nonetheless, together, the three dimensions of relationship quality could reflect certain attachment-based styles that, by analogy with parent–child relationships, affect how children and teachers, function in school (cf. Ahnert et al., 2012; Ainsworth et al., 1978). To date, support for attachment-like relationship patterns in the school context has been found in a limited number of studies focusing on children in the early elementary school years (Ahnert et al., 2012; Gregoriadis & Grammatikopoulos, 2014; Pianta, 1994). Overall, these studies, with samples

from the United States, Germany, and Greece, found patterns reflecting secure attachment styles, indicated by high levels of closeness and low levels of conflict and dependency. Such a secure relationship pattern characterized the vast majority of TCRs (percentages ranging from 59.5% to 74.5%). To a lesser extent, TCRs were found to be negative and reflected either ambivalent (percentages ranging from 18% to 40.5%) or, to a lesser extent, avoidant attachment styles (percentages ranging from 7.3% to 17.1%). In general, these three studies found two to four different relationship patterns reflecting various secure or insecure relationship patterns.

To our knowledge, the present study is the first that examined TCR patterns in upper elementary schools. In upper elementary school, children become more sensitive to their environments and face more demanding academic tasks in school (Mah & Ford-Jones, 2012). In this developmental period, it may be especially important for teachers to help children navigate through the school years (Malecki & Demaray, 2006). Multiple studies have found that TCRs remain important throughout the entire elementary school period (Bosman et al., 2018; Roorda et al., 2017; Spilt, Hughes, Wu, & Kwok, 2012). It is possible, however, that attachment-based styles between teachers and children in upper elementary school are different from those in kindergarten or the early elementary school years. In parent-child research, it has been shown that attachment styles and relationship patterns tend to change over the years (Theisen, Fraley, Hankin, Young, & Chopik, 2018). More avoidant and ambivalent attachment styles were found when children grew older. Based on longitudinal research on separate dimensions of TCRs (Bosman et al., 2018; Spilt, Hughes, Wu, & Kwok, 2012), it could be expected that children tend to have less close and more distant relationships with their teachers in upper elementary school compared to relationships in kindergarten. This could perhaps lead to an increase in children with more ambivalent or avoidant attachment styles in upper elementary school.

Next to identifying normative TCR patterns in upper elementary school, the second goal of the study was to understand whether TCR patterns can be used within a group of children that teachers have identified as problematic to develop positive relationships with. We used a novel statistical approach to examine whether children from another selected, problematic sample could be adequately categorized in patterns from the normative sample (see Method section). There were multiple reasons for including this second aim.

From a scientific perspective, it is important to identify whether relationship patterns from a normative sample could be validated in a more clinically diverse sample of children. Previous research into relationship patterns only involved convenience samples for which TCR patterns were determined (e.g., Ahnert et al., 2012). Including a more problematic diverse sample is important, as clinical researchers have emphasized using clinical samples, next to normative samples, to cover the full range of expression of possible problems in the constructs of interest (Rosellini & Brown, 2021). If the found patterns from the normative sample could be validated in a more problematic TCR sample, this would mean that the normative patterns may be sufficient to categorize children into these TCR patterns. Furthermore, with the validated normative patterns, school professionals will be able to use a short screening questionnaire to determine the position of individual children on the TCR patterns, informing them about what may be necessary to improve TCRs. Without using this validation method, we cannot conclude that the found TCR patterns in the normative sample are sufficient to identify all problematic relationship patterns of individual teacher-child dyads. If the found patterns from the normative sample could not be adequately validated in a problematic TCR sample, this would mean that the used questionnaire or method of identifying relationship patterns is not sufficient to capture the wide variety of possible teacher-child relationship problems.

From an applied perspective, it is important to identify how children from a problematic TCR sample are distributed over known TCR patterns. This would be the first step toward a better understanding of the

variation in TCR patterns among children that have been identified by teachers as difficult to form relationships with. Considering that teachers' judgments about relationships with students are one of the most important factors that determine school adaptation (e.g., Hamre & Pianta, 2001; Roorda et al., 2017), even above and beyond their judgments of children's problematic behaviors (Hamre, Pianta, Downer, & Mashburn, 2008), it is vital to identify which *types* of relationship patterns were most prevalent when teachers are asked to nominate children with whom they experienced relational difficulties. Evidently, we expected that the overall majority of the children with whom teachers report to experience relationship problems would fit best in the insecure TCR patterns of the normative sample. However, two issues are less evident. Firstly, the proportion of children in the problematic sample that is categorized in the secure relationship pattern is not clear. If this concerns a substantial proportion, it suggests that the three relationship dimensions cannot account for all children with whom teachers experience a problematic relationship. It would mean that, whereas the relationship with these children is regarded as problematic by their teacher, this is not captured by the three most common dimensions of TCR, closeness, conflict, and dependency. This could mean that teachers have a partly different view of problematic relationships as compared to the dimensions of TCRs examined in the most common questionnaires. Secondly, it is not evident which type of insecure patterns the teachers find particularly problematic, that is, how children are distributed over the various insecure patterns and whether this differs from the distribution found in the normative sample. Finding these insecure relationship patterns that burden teachers most often may help in finding ways to support teachers with problematic relationships.

Risk factors of negative teacher-child relationships

Next to identifying relationship patterns in upper elementary school, it is important to examine which child characteristics are associated with more problematic relationship patterns. Previous research has indicated that relatively stable characteristics of children, such as behavioral tendencies, gender, or ethnicity, contribute to dimensions of TCR quality in elementary school (e.g., Baker, 2006; Murray & Murray, 2004). No research to date has focused on associations between children's characteristics and relationship patterns in upper elementary school.

Of all stable child characteristics, children's behaviors are considered one of the most important predictors of TCR quality (e.g., Lei, Cui, & Chiu, 2016). Ample evidence has shown that children's externalizing behaviors (i.e., children's negative outward behavior toward the external environment; Eisenberg et al., 2001), such as hyperactivity or conduct problems, are related to higher levels of teacher-reported conflict and dependency during elementary school years (Jerome et al., 2009; Lei et al., 2016). Mixed evidence has been found for (longitudinal) associations between children's externalizing behavior and teacher-reported closeness in upper elementary school (e.g., Jerome et al., 2009; Thijs, Westhof, & Koomen, 2012).

With regard to internalizing behavior (i.e., problems of children's internal psychological environment, such as anxious and inhibited behavior; Eisenberg et al., 2001), studies have shown that in general, internalizing behavior is related to higher conflict and dependency in TCRs (Jerome et al., 2009; Murray & Murray, 2004). However, mixed results have been found regarding specific subtypes of internalizing behavior. For instance, children's emotional symptoms were not associated with dimensions of TCR quality from third to sixth grade (Zee & Roorda, 2018). In contrast, children's shyness appeared to be related to low levels of closeness and also low conflict (e.g., Rudasill, 2011; Zee & Roorda, 2018), and children's anxious behaviors were related to high conflict and high dependency (e.g., Zee & Roorda, 2018). Furthermore, children's prosocial behavior (i.e., behavior that helps others, such as sharing and comforting; Gross, Stern, Brett, & Cassidy, 2017) was associated with higher levels of teacher-reported closeness and lower

levels of teacher-reported conflict and dependency (e.g., Baker, 2006; Koomen et al., 2012).

To our knowledge, only one study explored how different child behaviors were related to TCR patterns. Pianta (1994) found that children in early elementary school with dysfunctional and angry/dependent relationship patterns had more externalizing behavior problems and symptoms of shyness and anxiety compared to children in functional relationship patterns. Furthermore, children in the functional and positively involved relationship patterns appeared to have better social skills or prosocial behaviors with peers compared to other, more problematic, relationship patterns (Pianta, 1994). These results indicate that not only single dimensions of relationships relate to children's behavior, but that patterns of relational aspects together are also associated with children's behavior. For this study, we expected that children with more externalizing and internalizing behavior and lower prosocial behavior are overrepresented in insecure relationship patterns.

Other characteristics of children that are associated with TCR quality are children's gender and ethnic background. Relationships with boys are more often perceived by teachers as higher in conflict and dependency, and lower in closeness compared to relationships with girls in (upper) elementary school (e.g., Baker, 2006; O'Connor, 2010; Spilt, Koomen, & Jak, 2012). In studies that focused on patterns of relationships in early elementary school, similar results were found. In more supportive relationship patterns, with high closeness and low conflict, girls were overrepresented. In contrast, boys were overrepresented in patterns that consisted of high conflict (Ahnert et al., 2012). Ahnert et al. (2012) did not find gender differences in a distant relationship pattern, that was characterized by low teacher-child dependency and relatively low teacher-child closeness. It was expected that similar associations between children's gender and TCR patterns would appear in upper elementary school.

In addition, relationships with ethnic minority children are likely to be characterized as unfavorable, reflecting more conflict and dependency (e.g., Saft & Pianta, 2001; Spilt & Hughes, 2015; Thijs et al., 2012). For instance, a large study conducted in the United States concluded that African American children were more than twice as likely than ethnic majority children to develop increasingly conflictual relationships with their teachers throughout elementary school (Spilt & Hughes, 2015). Associations with teacher-child closeness have not consistently been found in upper elementary school (Jerome et al., 2009; Thijs et al., 2012). In the Netherlands, ethnic minority children are most often Turkish-Dutch or Moroccan-Dutch (see for an overview Verkuyten & Thijs, 2010). They are considered minorities because they face relatively high levels of discrimination, have on average a low socioeconomic status (SES), and show consistently lower academic performance (Gijsberts & Dagevos, 2010; Thijs et al., 2012). Previous research concluded that ethnic minority children had higher levels of teacher-child conflict and dependency compared to ethnic-Dutch (majority) children (Thijs et al., 2012). No empirical research to date has focused on associations between teacher-perceived relationship patterns and ethnicity. However, based on an increasing body of research focusing on ethnicity and separate TCR dimensions (e.g., Spilt & Hughes, 2015; Thijs et al., 2012), it was expected that ethnic minority children are overrepresented in insecure or unfavorable relationship patterns that consist of high conflict or dependency.

Present study

The present study had three aims. First, we examined which TCR patterns were present in a normative sample of teachers and children from upper elementary school. In early elementary school, all of the previous studies found at least one supportive relationship pattern (Ahnert et al., 2012; Gregoriadis & Grammatikopoulos, 2014; Pianta, 1994), and several negative relationship patterns. Based on attachment theory and previous research in early elementary school using the same teacher questionnaire as the present study (Ahnert et al., 2012;

Gregoriadis & Grammatikopoulos, 2014), we hypothesized to find three distinct patterns of TCRs: 1) A supportive relationship pattern reflecting a secure relationship (high levels of closeness, low levels of conflict and dependency); 2) a dysfunctional relationship pattern which reflects an ambivalent relationship style (low levels of closeness, high levels of conflict and dependency); and 3) a distant or independent relationship pattern which reflects an avoidant relationship style (low levels of closeness, conflict, and dependency).

Second, we aimed to explore the distribution and prevalence of TCR patterns for children that teachers identified as problematic to develop high-quality relationships with. We examined how well children from this problematic relationship sample fitted into patterns obtained from the normative sample. We expected that the distribution of teacher-child dyads across relationship patterns differed significantly between the two samples. Within the sample of problematic TCRs, we expected that teacher-child dyads with a secure relationship pattern would be underrepresented, whereas teacher-child dyads with insecure relationship patterns were expected to be overrepresented.

Third, we explored which child characteristics appeared to be over- or underrepresented in more insecure relationship patterns of problematic TCRs. Based on previous research, we expected that children with more problem behavior (i.e., higher externalizing behavior, higher internalizing behavior, lower prosocial behavior), boys, and ethnic minority children would be overrepresented in problematic or insecure relationship patterns (Ahnert et al., 2012; Pianta, 1994).

Method

Participants and procedure

Data for this study were collected in two different samples (normative sample and problematic TCR sample), which means that schools, teachers, and children from both samples were collected independently of each other.

Normative sample

Data for the normative sample were previously collected with the purpose of validating the Dutch version of the Student-Teacher Relationship Scale (Koomen et al., 2012). Children were randomly selected from their classrooms, and balanced across teachers, age groups, and gender. The distribution of children across different regions of the Netherlands was highly similar to that of the general Dutch population (Koomen et al., 2012). More information about this dataset, procedures and selection of schools and children can be found in Koomen, Verschueren, and Pianta (2007) and Koomen et al. (2012).

For the purpose of the present study, only the teachers and children from upper elementary grades were included. In this normative sample, a total of 437 teachers from 92 elementary schools across the Netherlands reported about their relationships with children that were randomly selected from school registers. The majority of the teachers were female (57.9%). Teachers reported on average about two to three children from their classroom, resulting in a total sample of 1078 children. Boys (52.5%) and girls (47.5%) were almost evenly divided in this sample. Children were enrolled in grades three ($n = 261$), four ($n = 265$), five ($n = 255$), and six ($n = 295$), and were 10.72 years on average ($SD = 1.28$, ranging from 8.0 to 13.3 years). For two children, no information about their grade was available. Most children had parents with a Dutch ethnic background (94.0%), and some children had parent(s) with an ethnic minority background (6.0%). Missing data for all of the included study variables for the normative sample ranged from 0 to 0.2%.

Problematic TCR sample

Data for the problematic TCR sample were collected as part of a study on the evaluation of a larger intervention study in regular elementary schools in the Netherlands (Bosman, Zee, de Jong, & Koomen, 2021). This problematic TCR sample is an independent sample from the

normative sample that is described before. Teachers were asked to select four children from their classrooms with whom they experienced difficulties in the relationship. Examples of relationship difficulties were provided, such as experiencing conflicts during interactions, low levels of warmth, or difficulties getting through to the child. The problematic TCR sample consisted of 74 teachers from 45 Dutch regular elementary schools. The majority of the teachers were female (78.8%). Teachers reported about their relationships with 241 children. Some teachers found it difficult to select four children with whom they experienced relationship difficulties, and therefore only selected three children. In addition, some children were not included because parents did not give their active informed consent for participation in the study. Children (63.1% boys, 36.9% girls) were in grade three ($n = 40$), grade four ($n = 58$), grade five ($n = 64$), and grade six ($n = 79$). They were on average 9.9 years old ($SD = 1.23$, ranging from 8.0 to 13.0 years). The majority of the children had parents with a Dutch background (60.2%), and the remaining children had (one) parent(s) with an ethnic minority background (39.8%). Missing data for the study variables for the problematic TCR sample ranged from 0 to 5.4% and were missing completely at random (Little's MCAR test: $\chi^2(3) = 0.43$, $p = .933$).

Instruments

Teacher-child relationship quality

The Dutch version of the Student-Teacher Relationship Scale (STRS) was used to examine teachers' perceptions of their relationship with specific children. A total of 15 items from the full version of the STRS were used to construct a shorter version of the Dutch STRS. These 15 items were chosen based on their high factor loadings and sufficient substantive coverage of the constructs (Koomen et al., 2012). These items comprised three separate dimensions: Conflict, Closeness, and Dependency (e.g., Zee et al., 2013).¹ Closeness refers to the degree of warmth and support in the TCR (e.g., "I share an affectionate and warm relationship with this child"). Conflict refers to the degree of coercion and discordance in the TCR (e.g., "This child and I always seem to be struggling with each other"), and Dependency refers to the degree of overly dependent child behavior and reliance on the teacher, even if this is not necessary (e.g., "This child reacts strongly to separation from me"). Teachers rated the items on a 5-point Likert scale ranging from 1 (*definitely does not apply*) to 5 (*definitely applies*). Cronbach's alphas were .85, .83, and .77 for Conflict, Closeness, and Dependency in the normative sample. For the problematic TCR sample, Cronbach's alphas were .84, .81, and .83 for Conflict, Closeness, and Dependency, respectively.

Children's behavior

Teachers from the problematic TCR sample (and not teachers from the normative sample) reported about various child behaviors through the Dutch version of the Strength and Difficulties Questionnaire (SDQ; Goodman & Scott, 1999; Van Widenfelt, Goedhart, Treffers, & Goodman, 2003). Four types of behavior were derived from 20 items: Hyperactivity/Inattention (e.g., "Restless, overactive, cannot sit still for long"), Conduct Problems (e.g., "Often has temper tantrums or hot tempers"), Emotional Symptoms (e.g., "Many worries or often seems worried"), and Prosocial Behavior (e.g., "Considerate of other people's feelings"). Teachers reported on the degree to which each description applied to the child on a 5-point Likert scale, ranging from 1 (*definitely does not apply*) to 5 (*definitely applies*). Previous research has indicated good construct validity in previous research (Zee, de Jong, & Koomen, 2016). Cronbach's alphas of the SDQ subscales in the present study were .85 for Hyperactivity/Inattention, .75 for Conduct Problems, .79 for

Emotional Symptoms, and .83 for Prosocial Behavior.

Data analysis

We conducted several statistical analyses to answer our research questions. Regarding our first research question, to examine TCR patterns in the larger normative sample, finite mixture modeling was performed in Mplus (version 7; Muthén & Muthén, 1998–2012). The nested structure of the data was taken into account using the TYPE = COMPLEX option in Mplus (e.g., children were nested within teachers). Finite mixture modeling, or model-based clustering, is preferred over more common cluster methods such as k-means clustering techniques (Magidson & Vermunt, 2002) because it allows classification into patterns using model-based posterior membership probabilities estimated by maximum likelihood (ML) methods. This approach reduces the chance of misclassification bias (Magidson & Vermunt, 2002; Vermunt, 2011). In finite mixture modeling, the posterior membership probabilities, the likelihood that a particular child belongs to a certain pattern or class, are computed from the parameter estimates of the model. Class membership is determined by the highest probability.

Several statistical indicators were used to determine the number of patterns. The Sample Size Adjusted Bayesian information criterion (SSBIC) is a preferred indicator of model fit (Nylund, Asparouhov, & Muthén, 2007). The model with the lowest SSBIC is regarded as the best-fitting model. Furthermore, we based the determination of the number of patterns on the entropy (should be near 1) and posterior membership probabilities (should be near 1; Jung & Wickrama, 2008). Therefore, we based our model selection on the SSBIC, entropy, and posterior probabilities. Next to these indices, we included more subjective aspects to determine the number of patterns, namely model parsimony, theoretical interpretability, and previous research on the clustering of relationship patterns (Jung & Wickrama, 2008).

Concerning our second research aim, using the problematic TCR sample, we used a statistical technique that enabled us to categorize children from the problematic TCR sample into the same relationship patterns that were obtained in the normative sample. To do so, we applied the parameters derived in the finite mixture model conducted with the normative sample to categorize children into the relationship patterns identified in the first mixture models of the normative sample. The parameters of the new model, with the problematic TCR sample, were set equal to the final parameter estimates in the normative sample. As a result, the posterior probabilities in the problematic TCR sample and normative sample were computed in the same way and consequently, children of the problematic TCR sample were sorted into the same patterns as the children in the normative sample. After doing that, multiple analyses were performed to shed light on the validity of relationship patterns in the problematic TCR sample and the changes in distributions over the two samples.

Concerning the question about validity, we first inspected the posterior probabilities of the children in the problematic TCR sample. Children with a posterior probability of .80 or higher for one of the normative patterns were assumed to be reliably assigned to one of the normative patterns. Furthermore, we investigated whether mean scores of relationship dimensions within TCR patterns in both samples were different from each other. This was done to ensure that the estimation of the relationship patterns was similar in both samples. It could be that by forcing the same patterns in the problematic TCR sample by using the parameter estimates of the normative model, mean scores of relationship dimensions within TCR patterns can still vary substantially. If mean scores are highly similar, this supports the validation of the patterns in the problematic sample. To investigate this, class membership of all children obtained in the finite mixture models was included in both datasets in SPSS. After merging both datasets, repeated measures generalized linear models were performed in SPSS for each TCR pattern separately. In each model, the type of dataset was a between-subjects factor and the three different dimensions (Conflict, Closeness, and

¹ In the normative sample, the correlations between the original and the short version of the Dutch version of the STRS were 0.96, 0.95, 0.98, for Conflict, Closeness, and Dependency, respectively.

Dependency) were the within-subjects factor with three levels. Of particular interest was the interaction effect between relationship dimensions and sample, which reflected whether profiles of the degree of closeness, conflict, and dependency were different between the normative sample and the problematic TCR sample. When this interaction was significant, this meant that mean scores of relationship dimensions (Closeness, Conflict, and Dependency) within a specific pattern were different in the normative sample compared to the problematic TCR sample. We used simple contrasts to identify which of the relationship dimensions differed significantly between the normative and the problematic TCR sample. To account for multiple testing, we only regarded the effects as significant when $p < .01$.

In addition, we were interested in how the distribution of children over relationship patterns changed from the normative sample to the problematic TCR sample. Therefore, we used a Pearson chi-square test to compare whether the distribution of children in the normative sample was different from the distribution of children over patterns in the problematic TCR sample.

Concerning our third research question, we tested whether there were group differences between relationship patterns in children's demographics and behaviors for the problematic TCR sample. For categorical variables, we produced contingency tables and performed Chi-square tests to identify whether there was an association between relationship patterns and characteristics of children, such as ethnicity and gender. For continuous variables, we conducted separate ANOVAs to identify whether children's behavior differed between relationship patterns.

Results

Teacher-child relationship patterns in the normative sample

Finite mixture models with two, three, four, and five patterns were estimated and all models reached convergence (see Table 1). A model with six patterns did not reach convergence. Despite the four-pattern and five-pattern solutions having good statistical fit indices, the smallest classes contained very few teacher-child dyads (e.g., 3% and 2%), and several of the patterns did not differ meaningfully from the other patterns. More specifically, mean scores of separate dimensions between patterns were found to be highly similar. Model parsimony and theoretical interpretability indicated that a three-pattern solution was to be preferred (see Table 1).

The first class contained 789 (73.2%) of the teacher-child dyads and was characterized by high Closeness, low Conflict, and low Dependency. This was considered the most favorable, positive relationship pattern and was labeled as supportive. The second class contained 190 (17.6%) teacher-child dyads. This relationship pattern was characterized by moderate Closeness, moderate Conflict, and moderate Dependency and was therefore labeled as mildly insecure. The third class contained 99

Table 1
Model fit indices for the mixture modeling analysis of the normative sample.

	SSBIC	Entropy	Posterior Probabilities	% of teacher-child dyads in each class
2-pattern solution	6716.4	.94	.94-.99	15%, 85%
3-pattern solution	6557.3	.91	.88-.98	18%, 9%, 73%
4-pattern solution ^a	6472.7	.93	.91-.98	10%, 20%, 66%, 3%
5-pattern solution ^a	6312.7	.95	.88-.99	2%, 7%, 8%, 20%, 63%

Note. ^a One or more of the patterns consisted of a very small group of teacher-child dyads and did not meaningfully differ from the other. Model parsimony was therefore taken into account. The 6-pattern model did not reach convergence.

(9.2%) teacher-child dyads with a relationship pattern characterized by moderate Closeness, very high Conflict, and high Dependency. We refer to this relationship pattern as dysfunctional. The mean levels of Conflict, Closeness, and Dependency differed significantly between each of the three relationship patterns, which indicates that truly different relationship patterns could be uncovered in the normative sample (see Table 2).

Teacher-child relationship patterns in the problematic TCR sample

Next, we examined if the patterns from the normative sample could be validated in a problematic sample. Therefore, the final solution of the mixture model from the normative sample was fixed and applied to the data of the problematic TCR sample, which resulted in a good fitting model (entropy = .86). For each child, posterior probabilities of membership to each class were calculated. We found that 86.3% of the children ($n = 208$ children) were assigned to one of the three relationship patterns with a posterior probability above .80. The other children (13.7%, $n = 33$, $M = 0.68$) had lower probabilities to be assigned to the correct relationship patterns. Further inspection of these teacher-child dyads indicated that levels of closeness, conflict, and dependency were in between average levels of closeness, conflict, and dependency from the supportive and mildly insecure relationship pattern (7.5%) or between the mildly insecure and dysfunctional relationship pattern (6.2%). Thus, the children who were sorted with less certainty did not seem to represent another pattern of TCRs and it is therefore unlikely that we missed a particular relationship pattern in one or both samples. Overall, this indicated that a large majority of children could be adequately categorized into one of the normative relationship patterns.

A repeated measures GLM was conducted to identify if mean scores within TCR patterns, as measured by closeness, conflict, and dependency, differed between the normative and the problematic TCR sample (see Fig. 1 for a graphical display of the three patterns across the normative sample and the problematic TCR sample). This was done to find out that the estimation of both models resulted in similar mean scores within each pattern and between the two datasets. For the supportive relationship pattern, there was a small, significant interaction effect between the relationship dimensions of the normative and problematic dataset, $F(2, 879) = 17.71, p < .001, \eta^2 = 0.020$. Using simple contrasts, it appeared that the level of closeness within the supportive pattern was significantly lower in the problematic TCR sample

Table 2
Descriptive statistics (means, standard deviations) and analyses of variance of the three-class solutions of the normative sample and the problematic TCR sample.

	Supportive Relationship	Mildly Insecure Relationship	Dysfunctional Relationship	<i>F, p</i>
<i>Normative Sample</i>	<i>n</i> = 789 (73.2%)	<i>n</i> = 190 (17.6%)	<i>n</i> = 99 (9.2%)	
Closeness	4.01 (0.73) ^a	3.51 (0.79) ^b	3.23 (0.87) ^c	70.76, $p < .001$
Conflict	1.17 (0.24) ^a	2.24 (0.33) ^b	3.52 (0.47) ^c	3575.95, $p < .001$
Dependency	1.79 (0.70) ^a	2.10 (0.76) ^b	2.67 (0.93) ^c	68.79, $p < .001$
<i>Problematic TCR Sample</i>	<i>n</i> = 93 (38.6%)	<i>n</i> = 95 (39.4%)	<i>n</i> = 53 (22.0%)	
Closeness	3.57 (0.91) ^a	3.43 (0.85) ^a	3.17 (0.71) ^b	3.81, $p = .023$
Conflict	1.26 (0.24) ^a	2.33 (0.34) ^b	3.71 (0.55) ^c	766.02, $p < .001$
Dependency	1.71 (0.70) ^a	2.49 (0.89) ^b	2.86 (0.84) ^c	40.30, $p < .001$

Note. Class means in the same row that do not share subscripts (e.g., a, b, and c) differ at $p < .05$ using the Fisher least significant difference procedure.

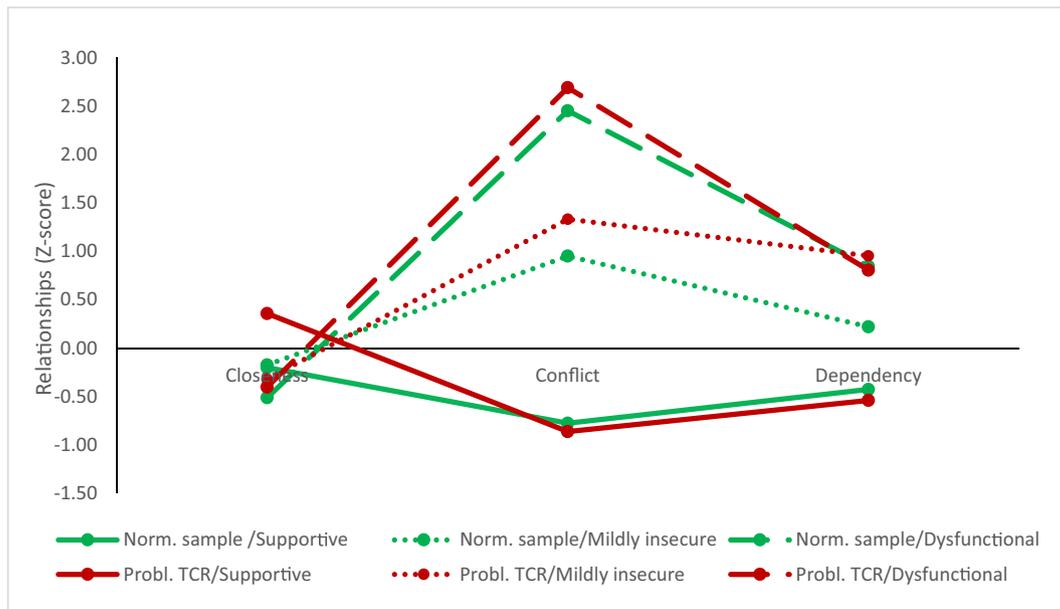


Fig. 1. Relationship Patterns in the Normative Sample vs. the Problematic TCR Sample.

Note. The degree of teacher–child closeness was recoded for interpretation purposes. Consequently, in this figure, higher closeness, conflict, and dependency reflect more relational difficulties. Mean levels and standard deviations of closeness, conflict, and dependency from the normative sample were used to calculate z-scores for the normative sample and z-scores of the problematic TCR sample.

compared to the normative sample, $p < .001$, $\eta^2 = 0.032$, whereas the level of conflict was significantly higher in the problematic TCR sample, $p = .001$, $\eta^2 = 0.012$. These effects were considered small. No differences were found between children from the normative sample and the problematic TCR sample regarding teacher–child dependency in the supportive pattern.

Concerning the mildly insecure pattern, there was again a significant, but small interaction effect between the relationship dimensions and the type of dataset, $F(2, 282) = 8.43$, $p < .001$, $\eta^2 = 0.029$. Using simple contrasts, we found that children from the problematic TCR sample had slightly higher levels of teacher–child dependency, $p < .001$, $\eta^2 = 0.051$. No differences were found in teacher–child closeness and conflict.

Last, with regard to the dysfunctional relationship pattern, no significant interaction effect was found between the relationship dimensions and the type of dataset, $F(2, 149) = 1.30$, $p = .275$, $\eta^2 = 0.017$. This means that profile of the relationship dimensions within the dysfunctional pattern was highly similar across the normative sample and the problematic TCR sample.

In addition, the change in the distribution of children over relationship patterns was inspected using Pearson's chi-square test. Table 2 displays the distribution of children over the three relationship patterns for both samples. As expected, the distribution of teacher–child dyads over the three relationship patterns differed significantly between the normative and the problematic TCR sample ($\chi^2(2) = 106.60$, $p < .001$). In the problematic TCR sample, the supportive relationship pattern contained 38.6% of the teacher–child dyads against 73.2% in the normative sample. The number of teacher–child dyads in the mildly insecure relationship pattern was more than twice as large in the problematic TCR sample ($n = 39.4\%$) compared to the normative sample ($n = 17.6\%$). In addition, the teacher–child dyads with dysfunctional relationship patterns were also more than twice as large in the problematic TCR sample ($n = 22.0\%$) compared to the normative sample ($n = 9.2\%$). Importantly, however, the distribution over the two insecure patterns was similar in the normative and the problematic sample. In both samples, the proportion of children assigned to the mildly supportive category was about twice as large as the proportion categorized into the dysfunctional relationship pattern.

Children's characteristics and relationship patterns

Table 3 presents the demographic profile of the problematic TCR sample concerning each of the three relationship patterns. Boys were overrepresented in both the mildly insecure relationship pattern and the dysfunctional relationship pattern, whereas they were underrepresented in the supportive relationship pattern, $\chi^2(2) = 18.56$, $p < .001$. No significant differences were found for the distribution of ethnic minority and majority children across the relationship patterns, $\chi^2(2) = 0.09$, $p = ns$.

Table 4 presents how children's behaviors differed between the three relationship profiles. As expected, higher levels of children's Hyperactivity ($F(2, 237) = 26.26$, $p < .001$, $\eta^2 = 0.18$) and Conduct Problems ($F(2, 237) = 46.55$, $p < .001$, $\eta^2 = 0.28$) were found in the mildly insecure relationship pattern and the dysfunctional relationship pattern compared to the supportive relationship pattern. The children in the dysfunctional pattern also had higher levels of Hyperactivity and Conduct Problems compared to those in the mildly insecure relationship pattern. Higher levels of Emotional Symptoms ($F(2, 237) = 6.02$, $p = .001$, $\eta^2 = 0.06$) and lower levels of Prosocial Behavior ($F(2, 237) = 12.63$, $p < .001$, $\eta^2 = 0.10$) were found for the mildly insecure relationship pattern and dysfunctional relationship patterns compared to the supportive relationship pattern.

Table 3 Demographics of teacher–child dyads for each relationship pattern in the problematic TCR sample.

	Supportive Relationship		Mildly Insecure Relationship		Dysfunctional Relationship	
	Actual	Expected	Actual	Expected	Actual	Expected
Gender ¹						
Boys	43	58.7	71	59.9	38	33.4
Girls	50	34.3	24	35.1	15	19.6
Ethnicity						
Majority	56	56.0	58	57.2	31	31.9
Minority	37	37.0	37	37.8	22	21.1

Note. ¹ Pearson χ^2 was significant at $p < .001$.

Table 4

Mean values, standard deviations, and outcomes of analyses of variance of children's behavior across relationship patterns in the problematic TCR sample.

	Supportive Relationship	Mildly Insecure Relationship	Dysfunctional Relationship	<i>F</i> , <i>p</i> , η^2
Hyperactivity	2.39 (1.08) ^a	3.18 (0.91) ^b	3.54 (1.01) ^c	26.26, <i>p</i> < .001, $\eta^2 = 0.18$
Conduct Problems	1.54 (0.64) ^a	2.10 (0.75) ^b	2.74 (0.84) ^c	46.55, <i>p</i> < .001, $\eta^2 = 0.28$
Emotional Symptoms	2.00 (0.85) ^a	2.37 (0.96) ^b	2.55 (0.94) ^b	6.02, <i>p</i> < .01, $\eta^2 = 0.06$
Prosocial Behavior	3.86 (0.84) ^a	3.37 (0.88) ^b	3.19 (0.87) ^b	12.63, <i>p</i> < .001, $\eta^2 = 0.10$

Note. Class means in the same row that do not share subscripts (e.g., a, b, and c) differ at *p* < .05 using the Fisher least significant difference procedure.

Discussion

In the present study, we investigated 1) patterns of TCR quality in a normative sample of upper elementary school children; 2) the extent to which patterns from the normative sample could also be validated in a problematic TCR sample; and 3) child characteristics associated with the relationship patterns in the problematic TCR sample.

Normative relationship patterns

In this study, we used a person-centered approach to investigate TCR quality in upper elementary school children. In a large normative sample, we found three distinct relationship patterns which partly overlapped with the patterns reported in earlier studies with younger children (Ahnert et al., 2012; Gregoriadis & Grammatikopoulos, 2014; Pianta, 1994). These relationship patterns reflected to some extent the attachment styles that are often reported in parent-child attachment relationships (Ainsworth et al., 1978). The supportive pattern reflected interactions that were indicative of a secure relationship. In this relationship pattern, which was most prevalent, children feel comfortable sharing emotional expressions, experience trust and open communication, and interactions that are accompanied by positive affect, instead of conflict or overly dependent behavior from the child on the teacher (Verschuereen & Koomen, 2012). This supportive pattern was highly similar to what was found in samples with younger children, where also a large majority of TCRs (ranging from 59.5% to 74.5%) were considered supportive or functional (Gregoriadis & Grammatikopoulos, 2014; Pianta, 1994).

The mildly insecure relationship pattern and the dysfunctional pattern both reflected, to various degrees, an ambivalent-attachment style. In these ambivalent relationships, teachers do seem to provide some support or warmth in the relationship, but there are also many conflictual interactions and overly dependent behaviors of children on teachers. In previous research on TCR patterns in kindergartners, similar patterns were found that also could be considered ambivalent TCRs (Ahnert et al., 2012; Gregoriadis & Grammatikopoulos, 2014; Pianta, 1994).

In contrast to previous research (Ahnert et al., 2012; Pianta, 1994), no avoidant-attachment style was detected. There are several reasons for not detecting an avoidant-attachment style. In previous research on TCR, Ahnert et al. (2012) characterized their distant-independent pattern as a reflection of an avoidant relationship style, but we argue that this could also be seen as a rather supportive relationship as they report still moderate levels of closeness. Pianta (1994) characterized the uninvolved pattern also as an avoidant relationship style because together with other dimensions of low closeness and conflict, he found

that children were less inclined to share personal information or emotions. This was measured using an extra dimension of relationship quality, namely the degree of open communication. This may have resulted in a different pattern that could not be uncovered when measuring relationship quality based on the three dimensions that were used in the present study and by Ahnert et al. (2012) and Gregoriadis and Grammatikopoulos (2014).

There are also several reasons for finding fewer attachment styles than in prior parent-child research and research with younger elementary school children. First, TCRs differ from parent-child attachment relationships, as TCRs are more temporary (i.e., teachers usually interact with a child for one school year) and less exclusive (i.e., teachers have relationships with all children in the classroom). As such, TCRs may just reflect fewer attachment styles or less extreme attachment styles. Second, attachment styles in parent-child relationships are usually assessed using observational experiments, in-depth interviews, projective assessments, or secure base script assessments (for a review, see Bosmans & Kerns, 2015). These are highly different from questionnaires of teachers' perspectives of relationships that were used in the present study. Thus, before we can conclude that attachment patterns in parent-child and TCRs are (partly) different, we need more in-depth information on TCRs. To further investigate attachment styles in TCRs, it is important to use other instruments as well, such as the Teacher Relationship Interview (TRI; Bosman, Zee, & Koomen, 2019; Spilt & Koomen, 2009). Furthermore, observational instruments that are already used in parent-child research could be used within upper elementary schools to investigate TCRs (e.g., Middle Childhood Attachment Strategies Coding System; Brumariu et al., 2018). Third, younger children such as kindergartners may be more prone to form attachment bonds with their teachers because they spend a lot of time with their teachers and their teachers still have a more caring role (Bergin & Bergin, 2009). In upper elementary school, this specific caring role is less pronounced, as more attention is placed on cognitive growth and supporting autonomy development. It may be that in upper elementary school only some, but not all, aspects of attachment are relevant (Bergin & Bergin, 2009), and therefore, fewer attachment styles were found.

Related to this last aspect of attachment, it seems that the severity of TCR problems, rather than specific types of attachment styles, was especially relevant when distinguishing TCR patterns from this study. This severity of TCR problems seemed to be mostly determined by the level of teacher-child conflict and, to a lesser extent, the level of teacher-child dependency. The level of teacher-child closeness was highly comparable between the three TCR patterns. Previous research also found the most variation between teacher-child dyads in the degree of conflict (Bosman et al., 2018; Spilt, Hughes, Wu, & Kwok, 2012) and dependency (Bosman et al., 2018). This means for practitioners that, when inspecting the results of the STRS for a teacher-child dyad, especially conflict is of interest to determine the degree of relationship problems or insecurity in the relationship.

Categorization of problematic relationships

The second goal of the study was to use the pattern structure of the normative sample to examine relationship patterns in a sample of children with whom teachers qualified their relationship as problematic. This was done to validate the found normative patterns in a more clinically diverse sample of children (e.g., Rosellini & Brown, 2021) and to shed light on which types of relationship patterns were prevalent when teachers nominated the children with whom they experienced relationship problems.

It appeared that the sorting method of the children in the problematic TCR sample into known patterns was highly successful: 86.3% of the children fitted with high certainty (i.e., above 80% certainty) into one of the three patterns. For these children, it seemed relatively easy to categorize their relationship into one of the three patterns from the

normative sample. This percentage was comparable to the percentage of children from the normative sample that was clustered with high certainty (i.e., above 80%) into one of the three patterns (92.9%). This implies that the patterns in the normative sample are also patterns that occur in more problematic relationship samples as well.

Only a small minority of the children (13.7%) of the problematic TCR sample were sorted into one of the classes with less certainty (i.e., lower than 80% certainty). However, further inspection revealed that the children who were sorted with less certainty did not seem to represent another pattern of TCRs and it is therefore unlikely that we missed a particular relationship pattern in one or both samples. Next to comparing the certainty of categorizing children into known patterns, we inspected mean scores within relationship patterns between the two samples. The means of relationship dimensions between samples were very similar for the two insecure relationship patterns but slightly different for the supportive pattern. The supportive pattern in the problematic TCR sample was considered less positive (lower closeness, higher conflict) compared to the supportive relationship group in the normative sample. This implies that, although children from the problematic sample could be adequately categorized into the normative patterns, relationships, in general, were somewhat more problematic compared to those in the normative sample. In general, the results imply that the patterns found in the normative sample were nicely validated in the problematic TCR sample, suggesting that the found patterns generalize across samples and are thus the most important relationship patterns when the three dimensions of the STRS are used.

Evidently, the distribution of children across relationship patterns was very different in the problematic TCR sample compared to the normative sample. When teachers selected children with whom they experienced relationship problems, 61.4% of the teacher–child dyads were considered either dysfunctional or mildly insecure, compared to 26.8% in the normative sample. However, and more importantly, we found no shift in the distribution within the insecure relationship patterns. In both samples, approximately 35% of the children with an insecure relationship pattern were assigned to the dysfunctional category. This implies that teachers do not experience relatively more often problematic relations with the children with the most dysfunctional relationship pattern.

Unexpectedly, however, in the problematic sample still 38.6% of the teachers reported a supportive relationship with a child as measured by the STRS, although the children in this sample were deliberately selected by teachers because they experienced difficulties in the relationship. The first explanation for this finding is that teachers may feel negative about a child, which was a reason for selecting the child, and also feel that they share a moderately warm relationship. Previous research also indicated that teachers perceive their relationship with a specific child as simultaneously high in closeness and high in conflict (e.g., Spilt & Koomen, 2009). This could have led to a relatively high incidence of children from the problematic sample that was sorted in the supportive relationship pattern.

A second explanation of why over a third of the teachers reported having a supportive relationship is that teachers may have selected children for a different reason than is reflected in the three relationship dimensions (closeness, conflict, dependency) that are generally used to reveal teachers' perceptions of affective relationships with individual children (Koomen et al., 2012; Pianta, 1999). It may be that some aspects of teachers' experiences with problematic relationships are not fully captured by the three dimensions. For instance, the teachers' ability to get through to the child or teachers' beliefs of making a connection with children are not included in the three dimensions. These aspects are featured in for example the Teacher Relationship Interview (TRI) and have been found to be important teacher views that contribute to relationship quality (Bosman et al., 2019; Spilt & Koomen, 2009). It could be that especially these aspects were important reasons for teachers to select children that were sorted into the supportive group. Future research could examine more specifically which relationship problems

are experienced by teachers, even when relationship patterns appeared to be rather supportive.

In sum, there are several insights we get from including the problematic TCR sample. First, patterns found in a normative sample could be used very well in a more clinically diverse sample, meaning that it is unlikely that other relationship patterns were missed. We can conclude with more certainty that these three patterns are valid relationship patterns. Second, the distribution over the insecure patterns was similar in both samples. Teachers clearly did not only experience highly dysfunctional relationships. Third, teachers' qualification of a relationship with a child as problematic seemed to be based on more aspects than the three relationship dimensions of the STRS. A relatively large group of children selected by teachers based on problematic relationships were sorted into the supportive relationship pattern.

Risk factors for insecure relationship patterns

Previous research has indicated that children's characteristics are related to dimensions of conflict, closeness, and dependency (e.g., Murray & Murray, 2004). We identified whether these child characteristics were also more prevalent in attachment-based relationship styles of the problematic TRC sample. In general, we found that in more insecure relationship patterns, boys were overrepresented and the degree of problematic behavior was higher. This is consistent with previous variable-centered research (e.g., Jerome et al., 2009; Thijs et al., 2012; Zee & Roorda, 2018) and person-centered research (Ahnert et al., 2012; Pianta, 1994). It appears that children's characteristics were associated with relationship patterns in a similar way as with the separate dimensions of TCR quality. On top of that, a distinction could be made between the different types of problematic relationship patterns. It appeared that boys and children with more externalizing behavior more often have relationship patterns that reflect high conflict, high dependency, and moderate closeness. This adds to the existing literature but also highlights that children's characteristics can have a unique contribution to relationship patterns.

In research focusing on separate dimensions of relationship quality, ethnic minority children in upper elementary school appear to have elevated levels of conflict and dependency in relationships with teachers (e.g., Thijs et al., 2012). However, in the relationship pattern with the highest levels of conflict and dependency, that is the dysfunctional pattern, there was no indication of ethnic minority children were overrepresented. Therefore, we cannot conclude that ethnic minority children are automatically more likely to have an insecure TCR pattern. This does not mean that ethnicity is not important in relationships. It can still be the case that ethnic minority children have in general more adverse relationships. However, in this study, we found that ethnicity did not play a large role in the three found relationship patterns from the problematic relationship sample.

In this study, ethnic minority status was not significantly associated with the three relationship patterns of the problematic sample. It is important to note that the percentage of selected children with ethnic minority backgrounds was much larger in the problematic sample than in the normative sample (39.8% versus 6%). This might suggest that teachers from the problematic sample were more inclined to experience problematic relationships with ethnic minority children in general. However, the normative sample was recruited to provide national norms for the Dutch version of the Student Teacher Relationship Scale (Koomen et al., 2012), whereas the problematic sample was originally recruited for a project in which schools with higher proportions of children from ethnic minority backgrounds were oversampled. Indeed, in the problematic sample, the percentage of ethnic minority children in the entire classroom was highly similar (36.7%) to the percentage of children that were selected by teachers because of a problematic teacher–child relationship (39.8%). Thus, in the problematic sample, teachers did not significantly nominate more children from an ethnic minority background than could be expected based on the ethnic

composition of the classroom. Because of the large difference in ethnic composition in both samples, no comparison was made between the two different samples regarding ethnicity and relationship patterns.

With regard to children's externalizing behavior, we found that the level of externalizing behavior (i.e., hyperactivity and conduct problems) was higher in more insecure relationship patterns, and children with a dysfunctional relationship had the highest levels of externalizing behavior compared to the other patterns. This again confirms that externalizing behavior is a very important factor in assessing TCRs (e.g., Lei et al., 2016) and that it also is associated with TCR patterns.

For emotional symptoms, which reflect children's worrying and anxiety-related behavior, differences were found between children in a secure relationship (i.e., supportive relationship pattern) versus children in an insecure relationship (i.e., mildly insecure and dysfunctional relationship pattern). Children in the supportive pattern had lower levels of emotional symptoms compared to children in the other patterns. It must be noted, however, that the differences in emotional symptoms were rather small, and that teachers may not be the best informants for children's emotional symptoms (Youngstrom, Loeber, & Stouthamer-Loeber, 2000). Future research with other informants such as children or parents is necessary to confirm this finding.

For prosocial behavior, again differences were found between children in a secure relationship (i.e., supportive relationship pattern) as compared to children in an insecure relationship (i.e., mildly insecure and dysfunctional relationship pattern): children displayed more prosocial behavior in supportive TCRs. This finding is in accordance with recent research, which found that TCR quality in upper elementary school predicts children's prosocial behavior (Obsuth et al., 2017). Importantly, all findings concerning children's behavior were found in a sample where teachers already selected children with whom they experienced relationship problems. Nevertheless, there were still clear differences in problem behavior across the three patterns of TCRs.

Limitations

The findings of this study need to be interpreted in light of several limitations. First, we only included teachers' perspectives and not children's perspectives on relationship quality. Our focus on the teachers' perspective of relationship quality was prompted by research findings that children's school adjustment is mainly affected by teachers' views of the relationships and not by children's views (Hughes, 2011). Moreover, only relying on children's perspectives of relationships with teachers may lead to incorrect conclusions about children's relational risk factors (Wu, Hughes, & Kwok, 2010). Nevertheless, it would be interesting to examine relationship patterns and the categorization of children into various patterns taking both teachers' and children's perspectives of the relationship into account, as was done by Wu et al. (2010). Including the child's perspective in creating TCR patterns will increase insight into the similarities and differences of teachers' and children's perspectives of TCR quality.

Second, there is shared-source bias caused by using teacher reports of both TCR quality and problem behavior of children. This may have led to an overestimation of the strength of associations between relationship patterns and children's problem behavior. To prevent this, future research could use other informants to report on children's behavior problems, for instance, children's parents or the children themselves.

Third, and related to shared-source bias, our approach of asking teachers to nominate children with whom they experience relationship problems and afterward letting teachers rate the relationship using a questionnaire might appear tautological. However, these approaches are very different. When teachers were asked to nominate children with whom they experienced relational difficulties, we did not give them any extra instruction. This was the teachers' explicit general impression of their relationship with individual children. It is unclear how such an explicit general impression aligns with teachers' more implicit relationship perceptions using questions such as 'This child will seek

comfort from me when he or she is upset', and 'This child has the feeling that I treat him or her unfairly'. These, and multiple other questions, contain various aspects of the relationship that probably do not come into mind when teachers are asked to simply nominate children with whom they experience relationship difficulties. Therefore, this study is not tautological but gives insight into whether the results of a questionnaire align with teachers' general views of the relationships. However, future research should conduct interviews with teachers afterward to let them explain *why* they nominated these particular children. That is a more elaborate way of investigating how teachers' general views on dyadic relationships agree with their answers on questionnaires.

Fourth, we used several criteria to determine the number of TCR patterns, but it should be acknowledged that these criteria still reflect insecurities and that there is always the risk to select a solution with too many patterns (Hoeksma & Kelderman, 2006; Nylund et al., 2007). However, unlike previous studies, we used finite mixture modeling, which is to be preferred over for example k-means clustering (Vermunt, 2011). Moreover, it appeared that only a few children could not be sorted into one of the three relationship patterns with certainty both in the normative sample, in which the number of patterns was determined, as well as in the problematic sample. The latter result can be taken as a cross-validation of the patterns obtained in the normative sample. Also, the differentiation of problem behavior across the TCR patterns suggests that the differences among the patterns are meaningful. In all, there seems a solid base for the patterns that were obtained in the normative sample.

Fifth, we tried to provide a validation of the found normative patterns by including a sample in which teachers had to nominate four children with whom they experienced relationship difficulties. By asking them to nominate four children, teachers were possibly more inclined to, for instance, nominate children with whom they only experienced mild disagreements in their interactions. This could also have led to a relatively large group of children in the problematic sample with still a supportive relationship. Still, we found similar results when only inspecting the first or second nominated child by the teacher. However, future research could adjust the design by asking teachers to only select children with whom they experienced relationship difficulties, without giving them a specific number of children to select.

Practical implications and future directions

This study highlights the value of applying a person-centered approach to investigate teacher-child relationship quality in individual children. The current findings indicate that it is possible to distinguish between various relationship patterns in upper elementary school. We found three relationship patterns reflecting either a secure relationship pattern (supportive relationship pattern) or an insecure relationship pattern (mildly insecure and dysfunctional relationship pattern). It is promising that in this normative sample, the large majority of children appeared to have a secure relationship with their teachers in upper elementary school. This three-pattern solution also appeared with high certainty in a more problematic TCR sample, which implies that the three patterns can also be applied to less representative samples as well.

The found patterns, which are predominantly based on the severity of problems rather than specific relationship types, may indicate that a dimensional approach is preferred over a categorical approach. However, by using this categorical approach, we were able to empirically test, and validate using a problematic sample, various relationship patterns. This is in contrast to a dimensional approach in which clinical categories are constructed based on arbitrary cut-off points of separate relationship dimensions (e.g., using normal distribution and determining how many people score below or above a certain score). Using a categorical approach may be useful for selecting children and teachers for targeted intervention strategies, as was done in previous intervention research (cf., Hanno, 2022; Spilt, Koot, & van Lier, 2013; Van Lier et al., 2004; Weeland et al., 2022). Although we were able to validate the

found relationship patterns in a more problematic sample, future research should use different instruments (such as the TRI; Bosman et al., 2019; Spilt & Koomen, 2009) to assess whether additional TCR patterns emerge when more specific relationship dimensions are added.

The patterns could also be of use to practitioners. Using a short questionnaire such as the STRS, for instance, administered at the beginning of the school year, might be used to determine the position of a child on the three relationship patterns. This might provide practitioners with insights into which teacher–child dyads need extra attention. Practitioners, such as school psychologists, may use the questionnaire further on in the school year to identify whether relationships change from one pattern to another pattern while they help teachers improve their bond with a specific child.

The identification of three distinct relationship patterns suggests that intervention strategies targeting specific subgroups are needed (e.g., Hanno, 2022; Spilt et al., 2013; Van Lier et al., 2004). After all, the combination of relationship dimensions, reflecting various degrees of relationship problems, may require a different intensity of support strategies. Therefore, it is possible to find out what works for whom instead of finding out if an intervention works or does not work (Windgassen et al., 2018). It may be that, in the case of mildly insecure relationship problems, teachers could benefit from a relatively small (or less intensive) intervention, whereas teachers need more additional support to reduce dysfunctional relationships. Future intervention studies may use this person-centered approach and the found relationship patterns to identify whether intervention effects vary for different types of relationship problems (e.g., Hanno, 2022; van Lier, 2004). For mildly insecure relationships, it can be useful to carry out interventions already early in the school year to enhance affective TCRs to prevent or reduce children's problems in school (e.g., Roorda et al., 2017). For such mild relationship problems, suggestions from a school professional or a short intervention program, such as the Establish-Maintain-Restore method (Cook et al., 2018), may be sufficient to prevent further relationship problems and promote secure relationships. When dysfunctional relationship patterns emerge, more intensive intervention programs could be advised in upper elementary school, such as Teacher–Student Interaction Coaching (Bosman et al., 2021; Spilt, Koomen, Thijs, & van der Leij, 2012) or Key2Teach (Hoogendijk et al., 2018). When such more intensive interventions still prove insufficient, more specialized and tailored help for both the teacher as well as the child may be considered.

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Declaration of Competing Interest

None.

Data availability

The data that has been used is confidential.

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