Review

Teacher-student attachment relationship, variables associated, and measurement: A systematic review

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ABSTRACT

This systematic review offers an overview of the results of research from the last 10 years concerning the teacher-student relationship and its connection with other attachment theory constructs and child development variables. An exhaustive search of Web of Science, SCOPUS, and PsycINFO was performed, finding a total of 24 studies that met the established eligibility criteria. The evidence accumulated between 2010 and 2020 suggests that: 1) early care experiences have an effect on the formation of new relationships at primary school, although it is possible that children will construct new mental representations based on interactions in day to day life, 2) at the level of the teacher's characteristics, attachment style and the availability towards children's needs seem to be associated with school adjustment and problematic behaviour in children, and 3) the quality of the teacher-student relationship is significantly associated with externalizing and internalizing behaviour, school liking, peer acceptance, academic performance, self-concept and emotional regulation in children. For its part, when evaluating the quality of the teacher-student relationship, STRS continues to be widely used to study the teacher's perspective. However, in recent years other measurement instruments have become available that explore the perspective of the student, most notably CARTS and SPARTS. Advances in the study of the teacher-student relationship as a bond with important implications for the development of children in the primary education stage are discussed.

1. Introduction

Attachment theory has enabled a better understanding of the importance of emotional ties in childhood. It suggests that positive relationships between a child and a caregiver promote feelings of emotional security, which are necessary to guarantee enjoyment and exploration of the child's environment (Beckh & Becker-Stoll, 2016). Differences in the quality of child-attachment figure/caregiver interactions are the basis that shapes relational patterns or attachment orientation(Fraley & Shaver, 2000). One way to measure attachment orientation is through two orthogonal dimensions: anxiety and avoidance. Attachment anxiety refers to the degree to which people experience fear of abandonment, fear of separation, and the level of concern about the availability of the attachment figure in times of need. Avoidance in attachment refers to the lack of interest in closeness, emotional suppression, fear of dependency and excessive self-sufficiency. According to Bowlby, such modes of relating are organized in cognitive schemas called internal working models. These are mental representations that reflect expectations, beliefs and emotions about themselves, others, and interpersonal relationships.

Indeed, other models such as Bronfenbrenner's ecological systems theory and self-determination theory, also agree that the support and emotional connection adult carers provide to children are essential for positive child development (Sabol & Pianta, 2012). Consequently, the role of parents has been widely explored and in recent decades studies have expanded to encompass non-family caregivers. In this framework, the teacher has been identified as a key figure for the cognitive, social, and emotional development of children (Sierra et al., 2012). In fact, there has been debate about whether they can be regarded as attachment figures. The starting assumption is that children can form attachments with significant people other than their parents and, considering the amount of time children spend with them, teachers can be people who fill this important role (Riley, 2010). However, some authors argue that given the nature of this relationship, and the fact that the relationship is not exclusive, and does not last over time as the teacher changes each year, and the teachers' emotional investment is not comparable with that of parents, the child is unlikely to develop a proper attachment bond (Verschueren, 2015).

Even so, it cannot be denied that teachers' relationships with their students share significant similarities with the parent-child relationship. In fact, in many situations the teacher also acts as a secure base children turn to in stressful moments for comfort, or they can act as a source of support that enables students to explore and interact with the social world (Muñoz et al., 2016). Therefore, although the relationship does not fulfil the conditions for being regarded as an attachment relationship, teachers can act as secondary or substitute attachment figures, as they tend to establish an affective bond with their students, and the nature of their interactions includes similar components with regards to care, instruction, and discipline (Verschueren & Koomen, 2012). For Schuengel (2012), while it is still unclear whether teachers have a place in the hierarchy of attachment figures, it is apparent that the child's relationship with the teacher has attachment components as the teacher is the object of the search for support, promotes social behaviour, and supports emotional regulation processes (Beckh & Becker-Stoll, 2016). On these grounds, Schuengel argues that this relationship is sufficiently important to have an impact on the child's development and so, therefore, should be regarded as an aspect of development in its own right.

This situation has resulted in an extensive production of knowledge on the subject. Indeed, referring to the accumulated evidence, Sabol y Pianta, noted that up to 2012, study of the teacher-student relationship had explored: a) the connection between early attachment relationships with parents and problematic care experiences and subsequent relationships, b) the teacher as facilitator of healthy development, c) the effect of the teacher-student relationship on problems with behavioural adjustment and academic risk, and d) the beneficial impact of teachers on children from disadvantaged sociodemographic groups. They also note that it is still necessary to harmonize measurements and instruments that collect both the perceptions of the teacher and those of the students, thus clarifying the validity of the results. Other authors also suggest that given the variability of teachers and the complexity that the bond acquires as children move through primary and secondary school, it is necessary to develop empirical designs that make it possible to predict the experience with a new teacher (J. Hughes, 2012; Sabol & Pianta, 2012; Schuengel, 2012).

Some meta-analyses on the topic have considered children's security in relationships with non-parental caregivers (Ahnert et al., 2006), the teacher-student relationship and its association with academic performance and school engagement (Roorda et al., 2011), and also the effect of this affective relationship on externalizing behaviour (Lei et al., 2016). The studies included in these reviews use samples of children aged under three or a combination of students from early years, primary school, secondary school, and bacca-laureate; however, we are not currently aware of any systematic reviews focused solely on primary education.

During the transition to primary school, classroom dynamics change significantly as the demands are different and so teacher-student interactions acquire new aspects that differ from those observed in children in the early years educational stage (Ver-schueren, 2015) or other educational stages. Therefore, it is advisable to analyse the accumulated empirical evidence relating to this developmental stage and to update the knowledge currently available. In this context, the present systematic review synthesizes the main research results regarding the teacher-student relationship. This relationship is analysed in the primary education stage using the theoretical framework of attachment theory.

Specifically, the aim is to identify available empirical evidence regarding: 1) the role of the teacher as an attachment figure, 2) the teacher-student relationship linked to other attachment constructs, 3) other development variables that have been studied in relation to the teacher-student relationship, and 4) the main instruments, based on attachment theory, that measure the quality of the teacher-student relationship.

Table 1
Keywords used in the searches.

Database	Key words by search field	Key words by search field
Web of Science	Theme	Title
Scopus	Title-abs-key	Title
PsycInfo	"SU – Subjects"	"TI- Title"
	'attachment' OR 'attachment style' OR 'adult attachment' OR 'teacher sensitivity' OR 'mental representations' OR 'mentalizing' OR 'reflective functioning'	AND (teacher) OR (educator) OR (school*) OR ('teacher-student') OR ('teacher-child') OR ('student-teacher') OR ('child-teacher').

Note: the search terms were used in both Spanish and English.
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2. Method

2.1. Search strategy

This systematic review was carried out using the PRISMA declaration for systematic reviews and meta-analyses (Moher et al., 2009) as its reference point. We searched for studies between March and May 2020 in the three databases – Web of Science, SCOPUS, and PsycINFO – using the keywords listed in Table 1. The searches were filtered by fields relevant to the study. It included research articles published between 2010 and 2020, which analyse the teacher-student relationship from the focus of attachment theory, in association with other attachment constructs and other child development outcomes.

2.2. Inclusion and exclusion criteria

The studies were chosen in accordance with the following eligibility criteria:

a) Design: articles referring to original empirical studies were included without a preference for any particular type of design. They were required to assess the quality of the teacher-student relationship from the perspective of attachment theory and, therefore, to use instruments based on this conceptual approach.
b) Informants: Studies in which the teacher-student relationship was evaluated by students, teachers, or external observers.
c) Participants: Only articles with primary school students were included, that is to say, children aged 6 to 13 and their teachers.
d) Language: Only articles in Spanish or English.
e) Contents: Studies that analysed the teacher-student relationship as a result of or as a mediating variable of other variables, whether from attachment theory or relating to child development (self-concept, psychological adjustment, academic achievement, regulation, etc.).

The exclusion criteria used were:

a) Disorders: Studies with samples of children who displayed significant neurodevelopmental disorders or other diagnosed disorders.
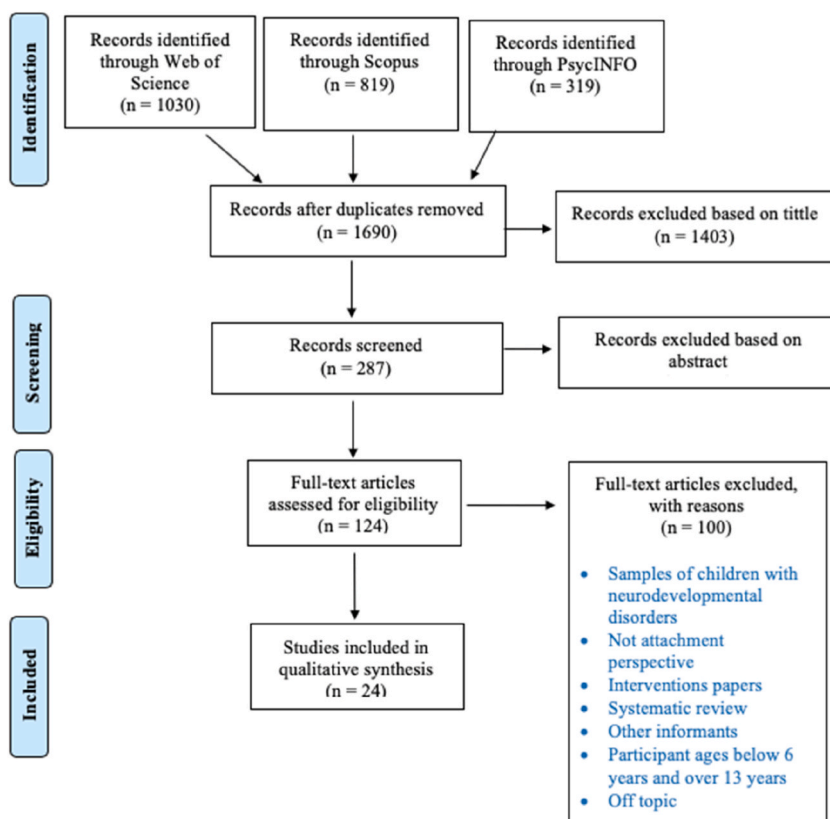

Fig. 1. Information flow through the different phases of the systematic review.

b) Theory: Studies that approach the teacher-student relationship using a conceptual framework other than attachment theory.

c) Intervention: Articles on interventions.

d) Type of study: Systematic reviews or meta-analyses.

2.3. Selection process

As mentioned above, we searched three databases regarded as relevant to the subject. Having obtained the results from each database, we exported them into the Mendeley program (Version 1.19.4, Elsevier). Using this program, we first filtered the results by title, then by abstract, and finally by the full text, in each phase considering the previously established inclusion and exclusion criteria.

2.4. Analysis

For the qualitative analysis of the complete texts, we used the Prisma protocols for reporting and performing systematic reviews as reference points (Shamseer et al., 2015). The revision of the complete texts was used to extract information regarding: 1) identifying information of the study (authors, country, year of publication), 2) conceptualization of the teacher-student relationship, 3) variables analysed (as well as the teacher-student relationship), 4) study design, 5) characteristics of the sample, 6) instruments used to measure the teacher-student relationship, and 7) results. The information extracted was recorded in Excel spreadsheets and used for subsequent analysis. The merging process of findings was carried out according to the research questions. For each research question, the findings of the studies were grouped based on the outcome variables analysed regarding the teacher-student relationship. The frequency of the outcome variables and conceptual closeness to each other were considered for findings report. No additional analysis was performed.

Table 2
Measurements used in the studies.

Measure	No. of articles	Dimensions	Type of measure	Informants	Countries
Teacher Relationship Scale (STRS) [a]	18	Quality of the relationship: closeness, conflict, and dependence	Scale	Teachers	Netherlands, USA, Italy, Belgium, Canada, Australia and UK
Teacher Relationship Interview (TRI) [b]	1	Mental representations of the relationship with a particular child. Content, affect, and coherence dimensions.	Semi-structured interview	Teachers	Netherlands
Priming effect experiment (PEE) [c]	1	Mental representations of the relationship with students		Teachers	Belgium
Student Perception of Affective Relationship with Teacher Scale (SPARTS) [d]	5	Quality of the relationship: Closeness, conflict, and negative expectations	Scale	Students	Netherlands
Child Appraisal of Relationship with Teacher Scale (CARTS) [e]	1	Quality of the relationship: Closeness, conflict, and dependence	Scale	Students	Netherlands
People in My Life (PIML) [f]	1	Teacher-student attachment	Scale	Students	Australia
Separation Anxiety Test-School Version (SAT-SV) [g]	1	Security in internal working models of the relationship with the teacher. Self-confidence, attachment, and avoidance scales.	Scale	Students	Italy
Narrative Story-Stem Task (NSST) [h]	1	Mental representations of the teacher and peers. Dimensions of attachment, exploratory, caring, and aggression with peers' behaviours.	Narrative measurements	Students	USA
Children's Appraisal of Teacher as a Secure Base (CATSB) [i]	1	Use of the secure base. Children's perceptions of availability in times of need, acceptance, reassurance, and the teacher as a rejecting figure.	Scale	Students	Israel

Note: Numbers indicate the studies using that measure. *STRS.*

[a] [Arbeau et al. (2010), Koomen et al. (2012), O'Connor et al. (2012), Verschueren et al. (2012), Quaglia et al. (2013), Vervoort et al. (2015), Koomen and Jellesma (2015), Jellesma et al. (2015), Mejia and Hoglund (2016), McFarland et al. (2016), Caputi et al. (2017), Collins et al. (2017), de Jong et al. (2018), Zee and Roorda (2018), Koenen et al. (2019), Evans et al. (2019), Pallini et al. (2019), Magro et al. (2019)]; *TRI.*

[b] [Bosman et al. (2019)]; *PEE.*

[c] [Koenen et al. (2019)]; SPARTS.

[d] [Koomen and Jellesma (2015); Jellesma et al. (2015); Thijs and Fleischmann (2015); Geerlings et al. (2017); de Jong et al. (2018)]; *CARTS.*

[e] [Vervoort et al. (2015)]; *PIML.*

[f] [McFarland et al. (2016)]; *SAT-SV.*

[g] [Valle et al. (2019)]; *NSST.*

[h] [Page et al. (2021)]; *CATSB.*

[i] [Lifshin et al. (2020)].

3. Results of the articles selection process

The search of the databases gave a total of 2168 results published between 2010 and 2020 (as Fig. 1 shows). After detecting and eliminating duplicate publications by reviewing by title and abstract, 124 articles were identified that complied with the criteria established. Of these, we selected 24 for inclusion in the systematic review for subsequent qualitative synthesis (see Table 3). The remaining records were removed because they met the exclusion criteria, for example systematic review and metaanálisis papers. Also, the samples did not meet the inclusion criteria, the teacher-student relationship was not analysed from the attachment theory, and one record was off-topic. This case was a paper that, from the attachment theory, analysed the motivation of teachers to choose a profession of service and care. It was considered that was not in line with our objectives. In addition, three doctoral dissertations were identified but none of them fulfilled the inclusion criteria and so they were excluded. Seven articles with combined primary, early years, and secondary education samples were detected. These were included due to the fact that the study variables or design (longitudinal studies) provided relevant information for the present systematic review.

PRISMA Declaration (Moher et al., 2009).

The studies included in this systematic review were done by research groups from 11 different countries, namely: Netherlands (n = 9), USA (n = 4), Italy (n = 4), Belgium (n = 2), Canada (n = 2), Australia (n = 1), UK (n = 1), Israel (n = 1).

Among the articles included in the review, it was notable that one of them considered the adaptation and validation of the Student-Teacher Relationship Scale (STRS) (Koomen et al., 2012). Similarly, two articles were dedicated to the design and validation of instruments to evaluate the teacher-student relationship from the perspective of students (Koomen & Jellesma, 2015; Vervoort et al., 2015) and one article focused on the design of story stems for completion by children to measure their mental representations with regards to the bond with their teacher (Page et al., 2021).

Table 3
Description of included studies.

Study	Study Characteristics	Country	Variables	Informant STR	Results
Arbeau et al. (2010)	Sampling type: Not available	Canada	-Shyness	Teachers (Student-Teacher Relationship Scale - STRS)	- Student-Teacher (S-T) *closeness* was negatively associated with *shyness, school avoidance, anxiety, asocial behaviour,* and *peer exclusion,* but positively with *prosocial behaviour. Conflict* and S-T was negatively associated with *prosocial behaviour,* and positively with *school avoidance, anxiety, asocial behaviour,* and *peer exclusion.* Positive correlations were observed between S-T *dependence* and *shyness, anxiety, asocial behaviour,* and *peer exclusion,* but negative correlations appeared with *prosocial behaviour.*
	esign: longitudinal study		-Student-Teacher Relationship (STR)		- Significant interactions between *shyness* and S-T *closeness.* A decrease in S-T *closeness* corresponds with an increase in the positive association between *shyness* and *school avoidance, anxiety,* and *asocial behaviour.*
	Sample: − 169 students		-Socioemotional adjustment		- Significant interactions between *shyness* and S-T *dependency.* An increase in S-T *dependence*

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Table 3 (*continued*)

Study	Study Characteristics	Country	Variables	Informant STR	Results
					corresponds with an increase in the positive association between *shyness, asocial behaviour,* and *peer exclusion.* - There were no significant interactions between *shyness* and *conflict* to predict *socioemotional adjustment.*
Koomen et al. (2012)	Sampling type: random selection of schools (in each region of the Netherlands) and of children in each class.	The Netherlands	-STR	Teachers (STRS)	- The 28-item version of the STRS showed adequate adjustment indices (by excluding 6 items). - The scale non-variance of the instrument for the gender was confirmed. - Satisfactory levels of internal consistency were obtained for the instrument dimensions.
	Design: Cross-sectional study.				
	Sample:		-Children's adjustment and psychopathology		- Positive associations between S-T closeness and prosocial behavior, but negative with conduct problems, hyperactivity, and peer problems.
	— 2335 students				- Positive associations between S-T conflict and emotional and conduct problems, hyperactivity, and peer problems, but negative associations with prosocial behavior.
	— 1047 teachers				- Negative associations of S-T dependency with emotional problems, hyperactivity, and peer problems, but negative with prosocial behavior.
O'Connor et al. (2012)	Sampling type: non-randomized sample. Children and families with varied characteristics from 10 different regions in the USA were included.	United States	- Behavior problems	Teachers (STRS)	- Cluster analysis of STR revealed groups of trajectories during primary education. For S-T closeness, the identified trajectories were: a) 'stable low (low levels of closeness during primary education), b) 'moderate incliners' (low levels of closeness at pre-kindergarten that increase linearly until fifth grade), c) 'high decliners' (high levels of closeness in pre-kindergarten and a non-

Table 3 (*continued*)

Study	Study Characteristics	Country	Variables	Informant STR	Results
					linear decrease in the amount of closeness from pre-kindergarten through primary education), and d) 'high' (high levels of closeness in pre-kindergarten and non-linear oscillations in the following years).
	Design: Longitudinal study.		- Maternal attachment		- For S-T conflict P-A six trajectories were identified: a) 'low peakers' (low levels of conflict at pre-kindergarten that increase at third grade and decrease at the end of primary school), b) 'low' (low conflict with slight oscillations in the following years), c) 'low incliners' (low S-T conflict at pre-kindergarten with non-linear increases in the following years), d) 'high incliners' (high levels of S-T conflict during primary education), e) 'moderate decliners' (moderate levels of conflict at pre-kindergarten with a slight increase at kindergarten, followed by a decrease over the following years), and f) 'moderate peakers' (moderate levels of conflict at first that increased until third grade and then decreased by the end of primary education).
	Sample:		- STR		- The S-T conflict was a significant predictor of conduct problems. 'Low peakers', 'low incliners', 'high incliners', 'moderate decliners', and 'moderate peakers' expressed higher levels of externalizing behaviors than their peers in the 'low' group. These differences were not found in externalizing behaviors.
	− 1140 children				- There were no differences in externalizing problems among the closeness groups. The 'stable low'

Table 3 (*continued*)

Study	Study Characteristics	Country	Variables	Informant STR	Results
	- Number of teachers not available				group showed higher levels of internalizing problems at the end of primary education. - Both the STR and the early internalizing and externalizing problems were mediators in the association between maternal attachment and the internalizing and externalizing problems at fifth grade.
Verschueren et al. (2012)	Sampling type: Not available. Schools selected from a list from the Ministry of Education.	Belgium	-Mother-child attachment	Teachers (STRS)	- Positive associations between attachment security and STR.
	Design: Cross-sectional study.		-Peer acceptance		- Higher security of attachment is related to a more positive general self-concept.
	Sample:		-STR		- The STR positively predicts academic self-concept.
	− 113 students		-Self-concept		- Security of attachment has an indirect effect on academic self-concept through its effect on the STR.
	− 32 teachers				- No evidence was found for a buffering role of STR and peer acceptance for less securely attached children. Both interaction effects with mother–child attachment were non-significant.
Quaglia et al. (2013)	Sampling type: Not available	Italy	- STR	Teachers (STRS)	-Differences based on students' gender only in *closeness* and *dependency*, in favor of girls.
	Design: Cross-sectional study.		- Impact of teacher's gender		-For male teachers there were no significant differences in the STR with respect to the students' gender. In this group there was an inverse correlation between *conflict* and the student's *progress* and *effort*.
	Sample: − 310 students −52 teachers		- Student's progress and effort		-Among female teachers, greater levels *conflict* and lower levels of *closeness* and *dependency* with the children was observed. For female teachers student's *progress* and *effort* negatively correlated with *conflict*,

Table 3 (*continued*)

Study	Study Characteristics	Country	Variables	Informant STR	Results
					but positively with S-T closeness.
Vervoort et al. (2015)	Sampling type: Not available	The Netherlands	-STR	Teachers (STRS) and students (Child Appraisal of Relations with Teacher Scale - CARTS)	- Good fit of 3-factor model (closeness, conflict and dependency) to assess students' perceptions of STR.
	Design: Cross-sectional study.				- Closeness was negatively associated with conflict, and positively with dependency.
	Sample:				- Internal consistency coefficients were satisfactory for both the total sample and the subgroups (special and general education).
	— 82 students in special education (behavioral disorders).				- Satisfactory convergent validity. Feelings about the teacher positively correlated with closeness, and negatively with conflict (CARTS).
	— 145 students (general education)				- There was a correlation between feelings about school and conflict (STRS) in the total sample. In the sample from special education students, their feelings about school positively correlated with the dependency (STRS) they perceived.
	- Number of teachers not available				- Among the special education students, closeness (STRS) was associated positively with closeness, and negatively with conflict (CARTS). Conflict (STRS) positively correlated with conflict, and negatively with closeness (CARTS).
Koomen and Jellesma (2015)	Sampling type: Not available. Schools selected from rural and urban areas.	The Netherlands	-STR	Teachers (STRS) and students (Student Perception of Affective Relationship with Teacher Scale - SPARTS)	- Exploratory factor analysis and confirmatory factor analysis indicated a 3-factor structure. Two factors corresponded with the dimensions of closeness and conflict from the teachers' version of the STRS. No equivalent factor was obtained for the dimension of dependency. A new factor, negative

Table 3 (*continued*)

Study	Study Characteristics	Country	Variables	Informant STR	Results
					expectations, was identified.
	Design: Cross-sectional study.		-Children's adjustment and psychopathology.		- Satisfactory internal consistency for the three dimensions.
	Sample: − 586 students − 16 teachers				- Positive associations between conflict and closeness (SPARTS) with conflict and closeness (STRS). Conflict (SPARTS) was negatively associated with closeness (STRS). There were negative correlations between closeness (SPARTS) and conflict (STRS). Dependency (STRS) was not related to negative expectations (SPARTS).
Jellesma et al. (2015)	Sampling type: Not available. Schools from different regions in the country.	The Netherlands	- STR	Students (SPARTS)	- S-T closeness was negatively associated with internalizing problems. Negative expectations and conflict positively correlated with depression, anxiety, and somatic complaints.
			- Appraisals of interactions with teachers		- Positive appraisals of S-T interactions negatively correlated with depression. Students' negative appraisals of their teacher were directly associated with all the internalizing problems.
	Design: Cross-sectional study.		- Internalizing problems		- Positive effect of S-T closeness on the positive appraisal of S-T interactions, but negative effect on negative appraisal of teacher.
					- Positive effect of conflict and negative expectations on the negative appraisal of teacher, but negative effect on the positive appraisal of S-T interactions.
	Sample:				- Direct effect of negative appraisal of teacher on students' depression.
	− 500 students				- Direct effects of conflict and negative expectations on internalizing problems.
	− 27 teachers				- Negative appraisal of teacher and positive

Table 3 (*continued*)

Study	Study Characteristics	Country	Variables	Informant STR	Results
					appraisal of interactions mediated the association between STR and internalizing problems.
Thijs and Fleischmann (2015)	Sampling type: Not available. Schools from different regions in the country.	The Netherlands	- Achievement goal orientation	Students (SPARTS)	- There were no differences in S-T closeness depending on ethnic group. Moroccan children perceived more conflict in the STR than Dutch children. Turkish and Moroccan children reported more dependency than Dutch children.
	Design: Cross-sectional study.		- STR		- Positive association of peer acceptance with closeness, and negative association with conflict and dependency.
	Sample: — 803 students (Dutch, Moroccan, and Turkish)		- Emotional problems		- Only S-T closeness predicted student's mastery goals. S-T dependency had a positive effect on performance-avoidance. S-T conflict and dependency were negatively associated with performance-approach.
	— 44 teachers		- Peer acceptance		- The relationship between S-T dependency and performance-avoidance was significant when students reported high levels of conflict. The effect of STR on students' goal orientation was similar across all ethnic groups.
Mejia and Hoglund (2016)	Sampling type: Not available.	Canada	-Adjustment problems	Teachers (STRS)	- Negative correlation of S-T closeness with externalizing problems at W1, W2, and W3. Negative correlation of S-T closeness with internalizing problems at W1.
	Design: Longitudinal study with 3 waves of data (W1, W2, W3) from January to June		-STR		- Positive associations of conflict and dependency with internalizing and externalizing problems in all data waves.
	Sample:				- S-T closeness was negatively associated with internalizing problems at W2, and with externalizing problems at W1 and W2.
	— 461 students				

Table 3 (*continued*)

Study	Study Characteristics	Country	Variables	Informant STR	Results
	- Number of teachers not available				- Externalizing problems at W1 and W2 had a positive effect on later S-T conflict. Internalizing problems had no effect on conflict. - Internalizing problems at W1 and W2 had a direct effect on later S-T dependency (W2 and W3). Externalizing problems had no effect on S-T dependency.
McFarland et al. (2016)	Sampling type: Two-stage clustered sampling: 1) postcodes as primary sampling units, 2) children as secondary sampling units	Australia	-Self-concept	Teachers (STRS) and students (People in My Life – PIML)	- Boys perceived higher levels of conflict than girls. Girls showed more S-T closeness, better perception of the teacher, better self-concept, and greater enjoyment of school.
	Design: Results are based on wave 4 of a larger longitudinal study.		-Enjoyment of school		- There was a negative association of self-concept with S-T conflict, but a positive one with S-T closeness.
	Sample:		-STR		- Perception of the teacher and enjoyment of school were negative associated with S-T conflict, but positively with S-T closeness.
	− 3286 students				- For boys, S-T conflict, but not closeness, was a negative predictor of self-concept. Their perception of the teacher and enjoyment of school mediated the association between STR and self-concept.
	− 3286 teachers				- For girls, closeness and S-T conflict had a positive and negative effect on self-concept, respectively. Their perception of the teacher and enjoyment of school mediated the effect of STR on self-concept.
Caputi et al. (2017)	Sampling type: Not available.	Italy	- Verbal ability	Teachers (STRS)	- S-T closeness was associated with S-T conflict at W2.
	Design: Longitudinal with three waves of data (W1, W2, W3).		- Mother-child relationship		- Mother-child closeness at W1 was not associated with S-T closeness or conflict at W2. Mother-child conflict at W1 was associated with closeness and conflict at W2. Mother-

Table 3 (*continued*)

Study	Study Characteristics	Country	Variables	Informant STR	Results
					child conflict at W1 and S-T closeness and conflict at W2 were significantly associated with later academic achievement (W3).
	Sample: − 45 students		- STR		- Mother-child conflict (W1) and S-T closeness and conflict (W2) were predictors of academic achievement (W3)
	- Number of teachers not available		- Academic achievement		- S-T closeness did not mediate the relationship between mother-child conflict and later academic achievement. S-T conflict did mediate the link between mother-child conflict and later academic achievement.
Collins et al. (2017)	Sampling type:	USA	- Internalizing and externalizing problems	Teachers (STRS)	- Five conflict trajectory groups were detected: a) low' (low levels of conflict, slight non-linear changes until sixth grade), b) 'low increasing' (low levels of conflict with a non-linear increase in conflict until sixth grade, and a steep increase in fifth grade), c) 'moderate' (medium levels of S-T conflict in first grade, with slight variations in later years), d) 'moderate increasing' (moderate levels of S-T conflict and a non-linear increase in later years), and e) 'high peaking' (high levels of S-T conflict and a non-linear increase in later years, with a peak at third grade).
	Convenience sampling (only low-income boys and their families)		- STR		- The observed trajectory groups for closeness were: a) "decreasing low' (low levels of closeness in first grade, and a non-linear decrease in later years), b) 'low peaking' (low levels of closeness and non-linear changes in later years), c) 'high decreasing' (high levels of closeness that decreased in the following years), and d) 'high peaking' (high

Table 3 (*continued*)

Study	Study Characteristics	Country	Variables	Informant STR	Results
					levels of closeness that tended to increase in later years, and then a substantial drop in closeness in fifth grade).
	Design: Longitudinal study, with several assessment moments from 18 months to 11 years.		- Child attachment		- Membership to groups 'low increasing', 'moderate', 'moderate increasing', and 'high peaking' predicted externalizing behaviors at age 11. Closeness group membership did not predict such behaviors.
	Sample:		- Child temperament		- Membership to closeness groups 'low increasing' and 'moderate increasing' predicted internalizing problems in children at the age of 11.
	− 262 students		- Maternal depression		- There was a significant interaction between both early externalizing and internalizing problems and the 'moderate increasing' group.
	- Number of teachers not available				- No significant interactions were identified between the early internalizing and externalizing problems and the closeness group membership.
Geerlings et al. (2017)	Sampling type: Not available for any of the studies. A convenience sampling is assumed (participants' ethnic characteristics of).	The Netherlands	-Study 1: STR; ethnic attitudes; ethnic identification; peer acceptance; ethnic composition of the classroom	Students (SPARTS)	Study 1 - The S-T *closeness* had an effect on the *positive attitudes towards* stereotypes and in general towards *ethnic outgroups.* Study 2
	Design: Cross-sectional studies. Sample: Study 1 389 students Number of teachers not available		-Study 2:		- The S-T closeness was associated with a more favourable *ethnic attitude.* This effect maintained significantly regardless of the teacher's *multicultural norms.*
	-Study 2 334 students Number of teachers not available		STR; ethnic attitudes; parent-child relationships; multicultural norms; ethnic identification; peer acceptance; children's depressed affect; ethnic composition of the classroom -Study 3		Study 3

Table 3 (*continued*)

Study	Study Characteristics	Country	Variables	Informant STR	Results
	-Study 3 363 students				- Students experiencing a closer STR expressed more positive ethnic attitudes. This association was robust across age, gender, ethnic identification, and ethnic composition.
	Number of teachers not available		STR; ethnic attitudes; intergroup anxiety; intercultural openness; multicultural norms; ethnic identification		- S-T closeness was not associated with intergroup anxiety but it positively correlated with intercultural openness.
de Jong et al. (2018)	Sampling type:	The Netherlands	-STR	Teachers (STRS) and students (SPARTS)	- Associations between the teacher's and the students' report for closeness and conflict at M2.
	Not available.		-Behavioural problems		- Analysis of the Teacher-Student Relationship (SPARTS) and behavioural problems (teacher's perspective): a) significant stability of S-T conflict between M1 and M2; b) externalizing problems at M1 were positively associated with the S-T conflict at M2. No other statistically significant cross-lagged paths were found.
	Design: Panel longitudinal study. Measurements at the beginning (M1) and at the end of the of the school year (M2). Sample: 226 students 12 teachers				- Analysis of the Teacher-Student Relationship (STRS) and behavioural problems (student's perspective): a) significant stability of S-T conflict, closeness, and dependency between M1 and M2; b) externalizing behaviours at M1 were positively associated with conflict, and negatively with S-T closeness at M2; c) S-T dependency at M1 was positively associated with externalizing and internalizing problems at M2.
Zee and Roorda (2018)	Sampling type:	The Netherlands	-STR	Teachers (STRS)	-None of the three types of *internalizing symptoms* were significantly associated with S-T closeness. When teacher's gender and years of teaching experience were included, *shyness* turned into a significant and negative predictor of S-T *closeness*.
			-Shyness		

Table 3 (*continued*)

Study	Study Characteristics	Country	Variables	Informant STR	Results
	sample gathered in a region in The Netherlands. Random selection of schools in that area and subsequently of students in each classroom.				-Only *anxiety* was positively associated with S-T *conflict*. When teacher's gender and years of teaching experience were added, only *shyness* was a significant predictor of S-T *conflict*.
	Design: Cross-sectional study Sample: − 269 students − 35 teachers		-Anxiety -Emotional problems		-Only *anxiety* was positively associated with S-T dependency. Along with teacher's gender and years of teaching experience, it predicted S-T *dependency*.
Valle et al. (2019)	Sampling type:	Italy	-Internal Working Models (IWM) with respect to teachers.	Students (Separation Anxiety Test-School Version - SAT-SV)	- The avoidance IWMs were positively associated with the other-blame strategy, and negatively with putting into perspective. The self-reliance IWMs were directly associated with positive refocusing. The total security IWMs positively correlated with the strategy of positive refocusing.
	Not available.		-Mentalization		- The self-reliance IWMs correlated with the excessive negative mentalization.
	Design: Cross-sectional study		-Emotional regulation		- The self-reliance IWMs were predictors of excessive negative mentalization and of the positive refocusing strategy.
	Sample: 108 students				- The avoidance IWMs negatively predicted the regulation strategy of putting into perspective.
Koenen et al. (2019)	Sampling type: Not available.	Belgium	-STR -Teacher's mental representations of STR.	Teachers (STRS)	First experiment: - A *priming effect*, although slight, was observed among students with *close* and *conflictual* STR, compared with effects from photos of unknown students. No difference in the *priming effect* was observed between those students with *close* or *conflictual* STR and those with *distant* STR (control condition).
	Design: quasi-experimental priming study. Two experiments, each with two comparison conditions.		-Targets (experiment)		Second experiment:
	Sample:		-Answer: facial expressions for emotions		- Significant priming effect among students with conflictual STR, which showed

Table 3 (*continued*)

Study	Study Characteristics	Country	Variables	Informant STR	Results
	— 54 teachers		-Tolerance of students' misbehaviour		differences in the tolerance of misbehaviour. - No significant differences in the priming effect among students with either conflictual or distant STR.
	— 323 students				- No priming effect was found for the attributions of low control, limits setting, or relational investment.
Bosman et al. (2019)	Sampling type: Not available.	The Netherlands	-Behavioural adjustment	Teachers (Teacher Relationship Interview - TRI)	- Hyperactivity, conduct problems and emotional symptoms did not significantly predict the teacher's sensitivity of discipline, helplessness, and secure base.
	Data collected in rural and urban areas in the country.		-Mental representations of STR		- Students' hyperactivity positively predicted teacher's perspective taking and intentionality
	Design: Cross-sectional study				- Students' hyperactivity, emotional symptoms, and their ethnicity negatively predicted the teacher's positive affect.
	Sample: — 61 teachers — 61 students				- Hyperactivity and conduct problems predicted teacher's anger.
Evans et al. (2019)	Sampling type: Not available, but presumably a convenience sampling at teachers' training programs.	UK	- Problematic behaviour	Teachers (STRS)	-Significant effect of students' *problematic behaviour* on the teacher's *negative affect*. STR *conflict* representations mediated this effect completely.
	Design: Cross-sectional study.		- STR		-When STR *closeness* was added, the indirect effect of STR *conflict* on *negative affect* became weak.
	Sample: — 230 teachers - Number of teachers not available		- Teacher's affective response - Teacher's wellbeing - Attachment (compulsive caregiving)		-The indirect effect of students' *problematic behaviour* on the representations of STR *conflict* is independent of the teacher's *attachment*.
Pallini et al. (2019)	Sampling type:	Italy	- STR	Teachers (STRS)	- S-T closeness positively predicted emotion regulation, and negatively lability/ negativity. Conflict negatively predicted emotion regulation, but positively lability/ negativity.
	Not available.		- Attention problems		- Emotion regulation negatively predicted both attentive

Table 3 (*continued*)

Study	Study Characteristics	Country	Variables	Informant STR	Results
	Design: Cross-sectional study. Sample: − 161 students − 7 teachers		- Emotion regulation		detachment and attention dysregulation. - Lability/negativity positively predicted attention dysregulation. - Only S-T closeness negatively predicted attentive detachment. - S-T closeness and conflict had an indirect effect on attention dysregulation via their effect on lability/negativity or on emotion regulation. - Emotion regulation mediated the link between STR and attention dysregulation and attentive detachment. - Lability/negativity only mediated the link between STR and attention dysregulation.
Magro et al. (2019)	Sampling type: Results from a larger study (non-randomized sample and participants from 10 different regions in the USA). For this article a randomized subsample was used. Design: Longitudinal study. Sample: − 1306 families - Number of teachers not available	USA	- Maternal sensitivity - STR - Externalizing behaviours	Teachers (STRS)	- The observed effect of maternal sensitivity on S-T closeness in early years waned throughout primary education. - The effect of maternal sensitivity on S-T conflict lasted from early years through sixth grade. - The association between maternal sensitivity and STR was partially mediated by externalizing problems.
Page et al. (2021)	Sampling type: Not available. A convenience sampling is assumed: a racially and economically diverse sample. Design: Cross-sectional study Sample:	USA	-Mental representations (MR) from parents, teachers, and peers -Teacher responsiveness	Students (Narrative Story-Stem Tasks - NSST) Parents	- MRs of exploratory behaviour were negatively associated with aggression and with MRs of teacher attachment. Furthermore, they were positively associated with MRs of parents' and teachers' caregiving. - MRs of peer aggression were inversely associated with MRs of parents' and teachers' caregiving - There was a positive correlation of MRs of parents caregiving with

Table 3 (*continued*)

Study	Study Characteristics	Country	Variables	Informant STR	Results
	− 39 students			(Perceived Teacher Responsiveness – PTR)	MRs of teachers' caregiving. - There was a positive correlation between teacher responsiveness and MRs of teacher attachment.
	- Number of teachers not available				- MRs of parent attachment did not predict MRs of teacher attachment. MRs of parents' caregiving predicted MRs of teachers' caregiving.
Lifshin et al. (2020)	Sampling type: Not available	Israel	- Teacher's attachment	Students (Children's Appraisal of Teacher as a Secure Base - CATSB)	- The use of the teacher as a secure base did not contribute to the variance in Children's socioemotional adjustment (sense of coherence, loneliness, and social dissatisfaction, liking or avoidance of school).
	Design: Longitudinal study. Measurements at the beginning (M1) and at the end of the year (M2)		- Children's attachment		- Children's attachment security was associated with the use of the teacher as a secure base (M1). - Children's and Teacher's attachment security had an effect on the socioemotional adjustment at M2.
	Sample:		- Use of secure base (teacher)		- The use of the teacher as a secure base was significantly associated with an increase in the sense of coherence and school liking. It was also associated with a decrease in the feelings of loneliness and in school avoidance (M1).
	− 539 students		- Socioemotional adjustment		- There were non-significant interactions between the use of the teacher as a secure base and the anxiety in the teacher's attachment on the socioeconomic adjustment.

Table 3 (*continued*)

Study	Study Characteristics	Country	Variables	Informant STR	Results
	− 58 teachers				- There were significant interactions between the use of the teacher as a secure base and the teacher's attachment avoidance that contributed to the perception of the teacher as a responsive caregiver and to the socioemotional adjustment.

Note: STR= Student Teacher Relationship; STRS = Student Teacher Relationship Scale; SPARTS = Student Perception of Affective Relationship with Teacher Scale; SAT-SV= Separation Anxiety Test - School Version; TRI = Teacher Relationship Interview; NSST= Narrative Story-Stem Task; CATSB= Children's Appraisal of Teacher as a Secure Base; IWM= Internal Working Model; W1, W2, W3 = waves of data in longitudinal studies; M1, M2, M3 = measurements in longitudinal studies.

3.1. Teacher-student relationship and other attachment constructs

As mentioned above, part of the aim of this review is to identify research from recent years that examines the teacher-student bond in relation to other attachment constructs. Specifically, within the articles included, eight were found that analysed the teacher-student relationship and its association with: children's attachment to parents, teacher's attachment style, children's mental representations, maternal sensitivity, and mentalization.

With regards to attachment to parents, the study by Collins et al. (2017), which evaluated children aged between five and eleven, found that the variation in externalizing behaviours observed at the end of this period was attributable to experiences with the teacher and also to characteristics of the family (attachment to the mother, her level of education, and maternal depression).

The findings of the longitudinal study by O'Connor et al. (2012) indicate that maternal attachment in the first years has an effect on levels of closeness and conflict in the teacher-student relationship, which, in turn, predicted externalizing and internalizing behaviour in subsequent years. Verschueren et al. (2012) observed a similar effect. They found that maternal attachment was a predictor of academic self-concept, through the effect it had on the quality of the teacher-student relationship. Children with a secure attachment to their mothers also experienced closer relationships with their teachers, and according to the findings of Lifshin et al. (2020), they were also more receptive to regarding their teachers as a secure base. The results of these studies support the idea that early attachments have an effect on children's subsequent development and that the teacher-student relationship is a mediator in some cases.

Verschueren et al. (2012) also observed that while maternal attachment displays direct associations with general self-concept in children, the teacher-student relationship is associated with academic self-concept. This indicates that both maternal attachment and the relationship with the teacher can have a divergent effect on various areas of children's functioning.

In contrast, the study by Lifshin et al. (2020) evaluated the effect of the security of the child's attachment as well as the teacher's responsiveness and style of attachment on school adjustment, at the start and end of the academic year. At the start of the year, only maternal attachment had an impact on school adjustment and the teacher's attachment style appeared to have no influence on children's perceptions of the teacher's responsiveness. However, at the end of the year, both the security of the attachment with the mother and the teacher's attachment style contributed to the student's adjustment and impacted on the children's perception of teachers' responsiveness.

These authors also reported that anxious attachment to the teacher had an effect on children's school avoidance levels. In addition, teachers with high avoidance scores were perceived as less available by their students, and these students in turn displayed less school liking and greater feelings of loneliness. The effect of the teacher's attachment style on school adjustment remained significant, even after controlling for children's perception of their availability. In other words, perceived availability did not in itself explain the effect of the teacher's attachment on school adjustment. In contrast, the study by Evans et al. (2019) analysed whether a pattern of compulsive care attachment in teachers had an effect on the type of affective responses they gave to students with behavioural problems. The findings indicated that this pattern of attachment appeared not to have an impact. Conflict in the teacher-student relationship, in contrast, was a variable that did mediate teachers' affective responses in the face of problematic behaviour by their students.

Another attachment construct considered is mental representations. The study by Page et al. (2021) did not find that representations of attachment with parents were predictors of representations of attachment towards teachers. Representations of parental care did, however, significantly predict representations of care by teachers. Both in turn were associated with the children's mental representations of exploration and aggression with peers. In other words, children with higher scores for exploratory behaviours (such as autonomy or independence), displayed lower scores for aggression with their peers and obtained higher scores in mental representations of care by their parents and teachers.

On the same lines, the study by Valle et al. (2019) provides evidence that suggests that students' mental representations of their

relationships with teachers have an impact on their metallization capacity and the use of emotional regulation strategies. Children with avoidant type mental representations displayed more difficulty representing their own mental states and emotions and those of others. In contrast, children who displayed greater security in representations of their teacher also manifested a positive image of their own capacity to manage difficult situations and to mentalize the states of their classmates appropriately.

Finally, maternal sensitivity has also been explored and appears to be related to the quality of children's relationship with their teachers. Specifically, in the study by Magro et al. (2019) sensitive maternal care was related to closeness between teacher and student, although this association was reduced with the passage of time. In contrast, the association between teacher-student conflict and maternal sensitivity was maintained over time, although this lasting effect was partially mediated by the children's externalizing problems. Therefore, low sensitivity maternal care tends to be associated with externalizing problems in childhood, which has important implications for how children interact with their teachers.

3.2. Teacher-student relationship and other outcomes

The variables associated with child development studied in recent years in relation to the teacher-student bond were identified. The studies included analyse externalizing and internalizing behaviour in the school setting (n = 10), shyness (n = 2), school liking (n = 3), peer relationship (n = 6), academic performance (n = 4), self-concept (n = 2), and emotional regulation (n = 2), teacher affective responses (n = 1), ethnic group relevance (n = 4), attention problems (n = 1).

To begin with, the results of ten studies suggest that the quality of the relationship is significantly associated with children's behavioural problems. The longitudinal studies by O'Connor et al. (2012) and Collins et al. (2017) find that relationships with teachers that are primarily high in conflict or low in closeness are significantly related to behavioural problems observed in later moments.

Similarly, externalizing behaviour (disruption and aggression) at the start of the school year was associated with more conflict and less teacher-student closeness at the end of the school year (de Jong et al., 2018; Mejia & Hoglund, 2016). Furthermore, both studies suggest that it is children's externalizing behaviour that has an effect on the quality of the relationship with the teacher and not the other way. In fact, Bosman et al. (2019) suggest that certain behavioural problems generate divergent responses in teachers. Specifically, when faced with hyperactive behaviour, teachers appear to provide more security, warmth, and sensitivity to children, while in the case of other behavioural problems they feel more irritated, frustrated, and negative.

With regards to internalizing behaviour (inhibition, anxiety, depression), this seems to have an effect on levels of conflict between teachers and their students (Jellesma et al., 2015). This type of behaviour is also negatively associated with closeness between teacher and student (Mejia & Hoglund, 2016), and positively with dependent relationships (Arbeau et al., 2010).

However, the study by Jellesma et al. (2015) states that students who negatively rate the relationship with their teachers have a greater risk of experiencing higher levels of depression, anxiety, and somatization. In contrast, Zee and Roorda (2018) identified positive associations between students' high dependence on the teacher and anxious behaviour. Mejia and Hoglund (2016) found in their study that the anxiety, shyness, and emotional problems displayed at the start of the year had an influence on higher levels of dependence towards the teacher, both at that time and in subsequent months. In a similar but inverted way, de Jong et al. (2018) suggest that dependence seems to be a predictor of internalizing problems, and of the risk of difficulties with school adjustment.

Other aspects relating to children's adjustment to the school setting are also tackled in the articles reviewed. For example, Arbeau et al. (2010) found that the level of conflict and dependence on the teacher was associated with school avoidance behaviours, asocial behaviour in children, and peer exclusion. Similarly, observed in their study that low responsiveness by the teacher was associated with high levels of feelings of loneliness and school avoidance in children. In contrast, students who regarded their teachers as more responsive, experienced more school liking and a greater sensation that their experiences at school were meaningful and interesting.

The quality of the teacher-student relationship also seems to be associated with peer acceptance. Specifically, Thijs and Fleischmann (2015) found that students with a close perceived relationship with their teacher also tended to perceive themselves to be more accepted by their classmates. For their part, Geerlings et al. (2017) found that students had more positive attitudes towards their classmates when their relationship with their teacher was closer. This was especially so with children from ethnic minorities.

By comparison, Caputi et al. (2017) analysed attitudes towards academic achievement and its connection with the quality of the teacher-student relationship. They found that the level of conflict and closeness towards the teacher during the second year of primary school had a major effect on academic achievement observed two years later. This study also concluded that teacher-student conflict (but not closeness) during the second year of primary school partially mediated the connection between mother-child conflict and academic achievement. The results suggest that there is continuity between a conflictive mother-child relationship and a teacher-child relationship with similar characteristics, where both have an impact on children's academic achievement sometime later.

Similarly, Thijs and Fleischmann (2015) found that achieving goals was associated with closeness, but not conflict or dependence on the teacher. In other words, when the relationship with the teacher was warm and trusting, students were more open to learning and to improving their skills. When children experienced anxiety over the teacher's availability, they expressed more concern for demonstrating that they could perform as well as their classmates. In contrast, the study by Quaglia et al. (2013) found that anger and tension in the relationship with the teacher were associated with effort in school activities and to making progress in class. In other words, the three dimensions of the relationship with the teacher and the degree to which children experienced them might be relevant when they motivate themselves towards a goal or make progress with a topic.

As well as variables associated with adjustment to the educational setting, the articles reviewed also explored other students outcomes. For example, the study by Arbeau et al. (2010) observed that closeness with the teacher protected shy children from having poor academic results, while dependency on the teacher seemed to aggravate this outcome. Zee and Roorda (2018) found different results, as their study indicated that children with high levels of shyness seem to be less inclined to have close relationships with their

teachers and also that the teachers tend to report less conflict with children, they perceive to be shy.

Moreover, McFarland et al. (2016) note that a relationship with the teacher characterized by tension and hostility has a negative impact on the child's self-concept and they conclude that girls and boys evaluate themselves more highly when they have a good perception of their relationship with their teacher and enjoy school.

Emotional regulation was also explored in two studies. Valle et al. (2019) found that children with emotional security in their relationship with their teacher are better at regulating their emotions in stressful situations, using adaptive strategies such as refocusing their attention, distracting themselves and then continuing with their activities. Children with avoidant mental representations, in contrast, used less effective emotional regulation strategies and displayed difficulties accepting their own emotions and negative thoughts. This coincides with the findings of Pallini et al. (2019), who observed that students were more liable to manage and modulate their own emotions when they experienced emotional warmth with the teacher. When the relationship was conflictive, the children tended to express more emotional lability and less awareness of their emotions.

3.3. Longitudinal studies of the teacher-student relationship

Of the studies included, three examined relationships between teachers and students at a minimum of two stages in primary education (Collins et al., 2017; Mejia & Hoglund, 2016; O'Connor et al., 2012). Both Collins et al. (2017) and O'Connor et al. (2012) analysed children's levels of closeness and conflict with different teachers to understand their cumulative experience during primary education. Both studies identified types of trajectory that the relationships followed in this time period. Specifically, Collins et al. (2017) observed that the patterns of closeness identified displayed a wide variation with a substantial decrease in the fifth year. Conflict, however, displayed a moderate increase, especially during the third year. This study and that by Mejia and Hoglund (2016) indicate that with the passage of time, relationships between students and teachers undergo an increase in conflict, while closeness tends to diminish.

For their part, O'Connor et al. (2012) observed different results. They found that the trajectories of high closeness and low conflict, on which most of the children were located, were relatively constant over time. The remaining percentage of students who, during primary school, experienced significant increases in conflict and reductions in closeness, also displayed major changes in externalizing and internalizing behaviour types.

3.4. Teacher-student assessment

The instruments and measurements used in the studies to assess the teacher-student relationship from the focus of attachment theory were identified.

Regarding the use of instruments, it should be noted that 20 articles evaluate the quality of the teacher-student relationship from the perspective of the teacher. Ten of them analyse the students' perspective and just six include both perspectives.

All of the articles that consider both perspectives use the Teacher Relationship Scale (STRS) to evaluate the teacher's perspective. This measures the quality of the relationship in terms of the level of closeness, conflict, and dependence in the relationship. To measure the students, one article used the People in My Life (PIML) scale (McFarland et al., 2016), one used the Child Appraisal of Relationship with Teacher Scale (CARTS) (Vervoort et al., 2015), and four used the Student Perception of Relationship with Teacher Scale (SPARTS) (de Jong et al., 2018; Jellesma et al., 2015; Koomen & Jellesma, 2015; Thijs & Fleischmann, 2015). Both CARTS and SPARTS examine similar dimensions to the scale used with the teachers (STRS), specifically closeness and conflict scales. However, the dependence subscale is only evaluated in CARTS, as SPARTS measures a different dimension which it calls negative expectations of the relationship (see Table 2).

With regards to congruence between the evaluation by teachers and students, McFarland et al. (2016) found moderate positive associations between the closeness described by the teachers and students' perceived attachment towards the teacher. Similarly, they found negative and moderate associations between conflict and attachment to the teacher.

For their part, Vervoort et al. (2015) found associations in the expected directions using CARTS and STRS to measure the quality of the relationship. The closeness and conflict identified by the students were positively associated with the closeness and conflict perceived by the teacher. Also, the closeness indicated by the teachers was negatively associated with the conflict perceived by the children. Nonetheless, the dependence scale in CARTS was not associated with the corresponding scale in STRS.

Similar results were observed by the studies that used SPARTS as a measurement instrument to evaluate the outlook of the students. Moderate associations were found between the closeness perceived by the students and by the teacher (de Jong et al., 2018; Jellesma et al., 2015; Koomen & Jellesma, 2015; Thijs & Fleischmann, 2015). Also, negative associations were found between the closeness evaluated by the student and the conflict perceived by the teacher (de Jong et al., 2018; Jellesma et al., 2015). In turn, the conflict experienced by students was negatively associated with the level of closeness indicated by the teacher, although this correlation was small in magnitude (Thijs & Fleischmann, 2015). With regards to congruence in the perception of conflict, the students' description was congruent with that by the teacher (de Jong et al., 2018; Jellesma et al., 2015; Koomen & Jellesma, 2015). The students' dependence as perceived by the teacher was positively associated with conflict and negatively associated with the closeness evaluated by the student (de Jong et al., 2018).

In the study by Jellesma et al. (2015) the negative expectations dimension was not associated with any of the dimensions reported by the teacher. Nonetheless, de Jong et al. (2018) did identify positive (albeit moderate) associations with the conflict and dependency described by the teachers. In turn, Koomen and Jellesma (2015) described moderate associations between children's negative expectations and the closeness perceived by the teacher.

4. Discussion and conclusions

The principal aim of the present systematic review is to update and synthesize scientific output over the last ten years regarding the quality of the teacher-student relationship, specifically with regards to the teacher as an attachment figure, the association of this relationship to other attachment constructs and other developmental variables, and also to identify the instruments used to assess the relationship between students and their teachers.

4.1. Teacher-student relationships and other attachment constructs

The articles included in this review explore the connection between parent-child attachment and the teacher-student relationship. The results of the studies by Verschueren et al. (2012) and by O'Connor et al. (2012) add evidence to the idea that children construct new relationships based on previous attachment experiences (Beckh & Becker-Stoll, 2016; Heatly & Votruba-Drzal, 2017; Yang & Lamb, 2014). These findings in samples of primary-school children suggest that this effect of the early bonding experiences is not only limited to the formation of relationships in the early years education stage.

The results also suggest that the creation of the teacher-student relationship seems to form divergent mental representations (Schuengel, 2012). A child's relationship with his or her teacher might not only be the reflection of early care experiences, as Magro et al. (2019) note when they observe in their study that the association between maternal sensitivity and the teacher-student relationship reduced with the passage of time. Therefore, as a result of the constant interaction in the classroom it is possible that the children will construct mental schemes that are related but are independent.

This also appears to be corroborated by the results of (Page et al., 2021) who did not observe associations between mental representations of attachment towards parents and teachers, but did in the case of mental representations of care. This could mean that children's expectations of care from an adult are conditioned by their previous experiences of care from parents, but when forming and consolidating new bonds with teachers, the children not only apply the previous models, but also form new mental schemes with significant care figures. Or, as Ahnert et al. (2006) note, it is also possible that children represent specific adaptations to the care environments where the interactions with this caregiver in particular occur. Nonetheless, it would be of interest to expand research in this field using more sophisticated designs that make possible more precise approaches in order to understand what happens when the teacher changes from one year to the next.

Moreover, the studies included also examined some characteristics of the teacher that might have an impact on the formation of an emotional relationship with students. The level of availability towards the needs of the children and the teacher's attachment style were associated with school adjustment and problematic behaviour. These findings are similar to the model proposed for parents and children where characteristics of the caregiver such as sensitivity and mentalization affect aspects of development like attachment style and emotional regulation (Beckh & Becker-Stoll, 2016; Posada et al., 2016). It is possible to speculate that in the case of the teachers, their individual characteristics are also associated not only with the quality of the relationship they form with their students, but also with aspects that correspond with the setting where their interactions occur, like for example, school participation and academic performance (Curby et al., 2013; Roorda et al., 2011) and learning processes (Commodari, 2013). Therefore, it would be advisable to carry out studies that consider in greater depth the characteristics of the teacher that might play an important role in the quality of interactions with their students.

4.2. Other outcomes and the teacher-student relationship

Analysis of empirical evidence from the last decade clearly indicates that in the primary education stage, the teacher continues to perform a fundamental role, as a variety of authors have noted (Hughes, 2012; R. Pianta et al., 2016; Pianta, 2015; Schuengel, 2012). These results follow the same line as those described by Lei et al. (2016) in a meta-analysis that included studies with samples from kindergarten to high school and which analysed the connection between the teacher-student relationship and externalizing behaviour. Their data show that the direct association between the negative aspects of the relationship and externalizing behaviour was greater among children in the last years of primary education. Internalizing behaviour was also found to be associated with aspects of the relationship such as high levels of conflict, low closeness, and dependence towards the teacher, something that has been corroborated by other studies (Mohamed, 2017; Yüksek Usta & Yilmaz, 2018).

Faced with these behavioural problems, which represent a risk for the children's adjustment, not just in the educational setting, but also in their developmental trajectory in general (delinquency, antisocial behaviour) (Sabol & Pianta, 2012), the relationship with the teacher seems to be a protective factor that can mitigate or increase problems with internalizing and externalizing behaviour, as Lei et al. (2016) note. Some authors conclude that the negative aspects of the relationship (conflict, negativity, and anger) are more associated with externalizing behaviour than the positive aspects (de Jong et al., 2018; Mejia & Hoglund, 2016).

This suggests that a negative relationship with the teacher can have a greater connection with children's adjustment and so it is important to develop relationships with low conflict or negativity. However, other authors indicate that for areas such as school engagement and performance, the positive aspects of the relationship (closeness, warmth, etc.) play an equally important role. Roorda et al. (2011) found high associations between the positive aspects of the relationship and students' school performance and engagement; this connection was more emphasized in secondary-school students. Consequently, it is possible to think that the positive or negative aspects of the teacher-student relationship have a differing effect on different areas of child development and that this impact also varies depending on the students' educational period.

The relationship with the teacher is a protective factor (Pianta, 2015) that favours classroom relationships (Thijs & Fleischmann,

2015), promotes peer acceptance (Geerlings et al., 2017), is a predictor of early school leaving (de Witte et al., 2013), and even protects children who have adverse experiences of care (Buyse et al., 2011). In addition, the teacher-student relationship is also a robust predictor of externalizing and internalizing behaviour (de Jong et al., 2018; O'Connor et al., 2012) and of students' academic performance (McGrath & van Bergen, 2015).

4.3. Measurement instruments used

With regards to the measurement used to evaluate the teacher-student relationship, the Teacher Relationship Scale (STRS) continues to be the most frequently used measurement instrument in the studies. This is probably because it is a scale that has shown sufficient validity and internal consistency and, at the same time, because it is an instrument derived conceptually from the parent-child attachment construct, which makes it possible to assess practically the teacher's perception of the children's sensation of security, and the extent in which this enables them to explore their environment (Sabol & Pianta, 2012).

Another instrument used to evaluate the teacher's perception is the Teacher Relationship Interview which condenses teachers' mental representations. There has been less research into this aspect, but it is relevant because, as happens in parent-child relationships (Waters & Roisman, 2019), teachers' mental representations might be associated with the type of care and the form in which they interact and relate with their students. And on the other hand, because it is likely that making teachers aware of their feelings, beliefs, and attitudes through reflection, is an effective area of intervention for improving their capacity to respond to their students (Spilt et al., 2012) and reduce negativity in their relationships with them (Bosman et al., 2019).

In the articles reviewed, we identified the use of more instruments that are available and that measure this relationship from the students' perspective. These instruments, which are proposed on the basis of attachment theory, study various dimensions of the relationship such as closeness, conflict, dependence, negative expectations, perceived level of support in moments of stress, mental representations, and security in the internal working models regarding the teacher. In a review of the subject in 2012, Sabol & Pianta raised the need to standardize measurements and instruments to allow a greater consensus in the measurements and constructs used to analyse the teacher-student relationship from both perspectives. While the evaluation of this bond continues to be analysed from a variety of theoretical focuses, this approach has partly been answered in the design of instruments like the Child Appraisal of Relationship with Teacher Scale (CARTS) or the Student Perception of Relationship with Teacher Scale (SPARTS). These scales evaluate the relationship from the viewpoint of the other member of the dyad, based on the dimensions of closeness and conflict in the Teacher Relationship Scale (STRS). Standardizing measurement instruments is a first step in this direction, as it makes it possible to approach the phenomenon with more precision and establish commonalities between assessors.

When analysing the associations between the two perspectives evaluated using STRS, CARTS, and SPARTS, it is apparent that congruence between the reports of teachers and students was moderate or low for closeness and conflict. These results make sense if we consider that students and teachers alike, have their own views of the relationship and that the magnitude of the correlations could reflect differences in how the interactive classroom experience is organized (Hughes, 2011). These findings contrast with those of Li et al. (2012) who, when evaluating the social support provided by the teacher, did not find any congruence between the student's perspective and that of the teacher.

Research into other dimensions such as the child's attachment towards the teacher through the People in My Life scale, also reflects a certain degree of congruence with the teacher's report measured using STRS (McFarland et al., 2016). Although these results should be interpreted with caution given that the instrument does not evaluate dyadic relationships with a specific teacher, the findings suggest that the construction of the child's attachment towards a teacher, might not just be the result of the child's own mental representations but also a consequence of the impact of the teacher-student relationship on the student (Ridenour et al., 2006).

Nevertheless, although the instruments identified make it possible to study the relationship between a teacher and his or her students in the light of dimensions that repeatedly display consistency, it is still necessary to identify the occasional behaviour and patterns of interaction that promote greater or lesser security in the relationship (Verschueren & Koomen, 2012). Although the results support the idea of the teacher as a secure base for the children, it is still not clear whether at the behavioural level there are differences between the early years and primary stages. Or if, as with the parents, the use of the secure base with teachers changes from the search for closeness to the search for availability (Kerns & Brumariu, 2016, pp. 349–365) and how this operates in the educational context where the teacher's attention is constantly divided. Making progress in this area will make it possible to pursue in greater depth an understanding of the particular relational components of each educational stage (Sabol & Pianta, 2012) and how this is framed in processes that involve the characteristics of the student, the teacher, and the classroom setting (Hughes, 2012).

4.4. Limitations and implications

This systematic review does have some limitations. Firstly, the quality of the methodological design of the studies included was not subjected to evaluation, and so there could be some biases in the results presented. In addition, the searches were done following specific criteria (three databases, years from 2010 to 2020, empirical studies, etc.), and so it is possible that some articles were missed. Nonetheless, given that the search was not limited to specific developmental variables associated with the teacher-student relationship, it is possible to think that the studies included provide a general approximation to current trends in this field of research. On the other hand, no meta-analysis of the studies included was performed. While this would have made it possible to integrate the results with more precision, it would have been necessary to reduce considerably the variables included in order to do so. Consequently, it would not have been possible to provide an overview of research in this field, both in relation to attachment constructs, and other childhood development variables.

Given that most of the studies used different designs, it is not possible to establish causal relationships between the teacher-student relationship and all of the variables included. However, although there are few longitudinal studies, their results support the evidence obtained from other studies and meta-analyses regarding the predictive role of the teacher-student relationship on variables associated with children's adjustment.

In short, the evidence obtained by the studies included in the present systematic review provide evidence to support the idea that the quality of the emotional relationship with adult caregiver is key for the development of children. In primary education teachers continue to be reference figures for students and they not only promote learning processes but also other aspects of the development of the children. As we know about the protective role of the relationship with the teacher, we should consider that improving the quality of this relationship is vital in educational interventions, especially those aimed at benefitting students with academic or social risks.

Author statement

LG-R, CI, ChR: Conceptualization, Methodology, Writing - original draft, Writing - review and editing; LG-R: Formal analysis and Investigation.

Declaration of competing interest

None.

Data availability

No data was used for the research described in the article.

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