



Don't forget student-teacher dependency! A Meta-analysis on associations with students' school adjustment and the moderating role of student and teacher characteristics

Debora L. Roorda, Marjolein Zee & Helma M. Y. Koomen

To cite this article: Debora L. Roorda, Marjolein Zee & Helma M. Y. Koomen (2020): Don't forget student-teacher dependency! A Meta-analysis on associations with students' school adjustment and the moderating role of student and teacher characteristics, Attachment & Human Development, DOI: [10.1080/14616734.2020.1751987](https://doi.org/10.1080/14616734.2020.1751987)

To link to this article: <https://doi.org/10.1080/14616734.2020.1751987>



© 2020 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.



[View supplementary material](#)



Published online: 27 Apr 2020.



[Submit your article to this journal](#)



Article views: 965



[View related articles](#)



[View Crossmark data](#)

Don't forget student-teacher dependency! A Meta-analysis on associations with students' school adjustment and the moderating role of student and teacher characteristics

Debora L. Roorda, Marjolein Zee and Helma M. Y. Koomen

Research Institute of Child Development and Education, University of Amsterdam, Amsterdam, The Netherlands

ABSTRACT

A meta-analytic approach was used to examine associations between student-teacher dependency and students' school adjustment (engagement, achievement, externalizing behavior, internalizing behavior, and prosocial behavior). Furthermore, we investigated whether associations between dependency and school adjustment were moderated by student and teacher characteristics. In total, the meta-analysis included 28 studies ($N = 7849$ students) from preschool to upper elementary school. The results showed that the overall associations between dependency, on the one hand, and engagement, achievement, and prosocial behavior, on the other, were negative and small to medium, whereas associations with externalizing and internalizing behavior were positive and medium (externalizing behavior) or medium to large (internalizing behavior). As far as moderator analyses were significant, they were in line with the academic risk hypothesis (i.e., stronger associations for at-risk students).


KEYWORDS

Student-teacher dependency; engagement; achievement; externalizing behavior; internalizing behavior; prosocial behavior

Introduction

The affective quality of dyadic student-teacher relationships has repeatedly been found to affect students' school adjustment, such as their engagement in learning activities, academic achievement, and behavior problems (see Lei et al., 2016; Roorda et al., 2017 for meta-analytic overviews). However, whereas much information is available about how student-teacher closeness (i.e., warmth and open communication) and conflict (i.e., negativity and discordance) are associated with school adjustment, the role of student-teacher dependency, has remained largely unexplored. Dependency refers to the degree of age-inadequate overreliance on the teacher, possessiveness, and clingy behaviors of the child (Pianta, 2001). Although dependency was originally viewed as a relationship dimension that is mainly relevant for young children at the beginning of their school career, some studies found that dependency also predicted students' school adjustment in upper elementary school (Bosman et al., 2018; Henricsson & Rydell, 2006; Zee et al., 2013). Therefore, we used a meta-analytic approach to establish associations between this

CONTACT Debora L. Roorda  D.L.Roorda@uva.nl  Research Institute of Child Development and Education, University of Amsterdam, P.O. Box 15776, Amsterdam NL-1001 NG, The Netherlands

 Supplemental data for this article can be accessed [here](#).

© 2020 The Author(s). Published by Informa UK Limited, trading as Taylor & Francis Group.

This is an Open Access article distributed under the terms of the Creative Commons Attribution-NonCommercial-NoDerivatives License (<http://creativecommons.org/licenses/by-nc-nd/4.0/>), which permits non-commercial re-use, distribution, and reproduction in any medium, provided the original work is properly cited, and is not altered, transformed, or built upon in any way.

relationship dimension and different aspects of students' school adjustment across the school years. More specifically, we examined how student-teacher dependency was associated with students' engagement, achievement, externalizing, internalizing, and prosocial behavior in studies including students from preschool to upper elementary school (studies with older children measuring dependency were not found). Furthermore, we investigated whether the strength of associations between dependency and school adjustment was influenced by student and teacher characteristics (i.e., moderator analyses; cf., Hamre & Pianta, 2001; Roorda et al., 2011).

Student-teacher dependency and students' school adjustment

Research into the impact of affective student-teacher relationships on students' school adjustment has often been based on an extended attachment perspective (Pianta, 1999; Verschueren & Koomen, 2012). According to this perspective, students who share a positive relationship with their teacher will be able to use their teacher as a secure base from which they can explore the school environment and as a safe haven in which they can find refuge in times of stress. Whereas relationships low in closeness and/or high in conflict are likely to prevent students from using their teachers as both a secure base and safe haven, high levels of dependency may primarily hamper the secure *base* function (Verschueren & Koomen, 2012). More specifically, students' extreme overreliance on their teacher probably prevents them from autonomously exploring the classroom as a learning and social environment and, only to a lesser degree, using their teacher as a resource of comfort in times of stress. Furthermore, dependency may act as an obstacle for the fulfilment of students' basic need for autonomy (i.e., being able to make their own choices and to act independently from the teacher). According to self-determination theory (Deci et al., 1991), this need for autonomy is essential for students' engagement with school work and the broader school environment.

Based on the aforementioned theories and empirical studies conducted in individualistic countries and among older students (Bosman et al., 2018; Henricsson & Rydell, 2006; Zee et al., 2013), student-teacher dependency is usually considered to have a negative impact on students' school adjustment. However, there are also a few studies that suggest that dependency may have a more positive meaning for certain groups of students, for example, in collectivistic cultures and for younger children (i.e., preschoolers and kindergartners; Garner et al., 2014; Gregoriadis, Grammatikopoulos, Tsigilis, & Verschueren, 2020, ; Sette et al., 2013). If this would be the case, it might be less important or even undesirable to intervene in student-teacher relationships high on dependency. As our knowledge base about dependency is less strong than for closeness and conflict, a meta-analysis summarizing existing studies thus seems to be needed.

In the present study, we chose a broad approach and included both students' academic adjustment (see Roorda et al., 2017, 2011) and their behavioral adjustment (see Lei et al., 2016). Concerning academic adjustment, we distinguished between engagement (engaged behaviors such as effort and persistence, and engaged emotions, such as enthusiasm versus boredom; Skinner et al., 2009) and achievement (students' actual performances on school tasks, usually measured with grades, test scores, or teacher ratings). With regard to behavioral adjustment, a distinction was made between externalizing behavior (undercontrolled and outwardly directed behaviors, such as hyperactivity

and aggression), internalizing behavior (overcontrolled and inwardly directed behaviors, such as anxiety and withdrawn behaviors), and prosocial behavior (voluntary behaviors intended to benefit others, such as helping and sharing; Eisenberg et al., 2006; Merrell, 1999). Although dependency most likely also impacts other aspects of students' school adjustment, such as their motivation (e.g., Bosman et al., 2018), self-concept, and executive functions, these aspects were not included in the present meta-analyses because they were not, or hardly, examined in previous studies.

Moderating role of student and teacher characteristics

Previous studies suggest that associations between student-teacher dependency and students' school adjustment may be stronger for some students than for others (e.g., Hamre & Pianta, 2001). According to the academic risk hypothesis (Hamre & Pianta, 2001), student-teacher relationships will be more important for the school adjustment of students who are at-risk for maladjustment because they have more to gain or to lose. Examples of at-risk students are students with an ethnic minority status, students with learning difficulties, and students with behavioral difficulties (Hamre & Pianta, 2001; Roorda et al., 2011). Students from higher grades and boys could also be considered at-risk for school maladjustment, as they tend to be less engaged with school (e.g., Marks, 2000; McDermott et al., 2001) and tend to share less positive relationships with their teachers (e.g., Koomen & Jellesma, 2015; McGrath & van Bergen, 2015). Although previous meta-analyses (Roorda et al., 2011; Lei et al., 2016) provide support for the academic risk hypothesis with regard to student-teacher closeness and conflict, it is not yet known whether this hypothesis also applies to student-teacher dependency. As these previous meta-analyses also indicated that the applicability of the academic risk hypothesis depended on the specific relationship dimensions and aspects of school adjustment under investigation, it would be interesting to examine the moderating role of student characteristics for dependency as well. Although students' behavior problems and learning problems might probably impact associations between dependency and school adjustment (e.g., Roorda et al., 2011), individual studies did not provide enough information to examine them as moderator variables. Instead, we examined the risk status of the sample (i.e., whether the author indicated that part of the sample or the entire sample had a risk status due to, for example, the inclusion of students from special education, low SES, ethnic minority status etc.). Other student characteristics that were examined as moderator variables were students' age (indicated by grade level), gender and ethnicity because they have been found to be important in previous meta-analyses on student-teacher relationships (Roorda et al., 2011; Lei et al., 2016).

The impact of teacher characteristics on the associations between student-teacher relationships and school adjustment has so far only been examined in meta-analytic studies (Cornelius-White, 2007; Roorda et al., 2011). These meta-analyses indicated that some associations between student-teacher relationships and school adjustment were affected by teacher characteristics. However, the specific impact of teacher characteristics seems to be somewhat contradictory and may depend on the specific relationship dimensions and aspects of school adjustment under examination. In the present meta-analysis, we investigated whether teacher characteristics influence the associations between dependency and students' school adjustment. Based on previous meta-analyses (Cornelius-White, 2007;

Roorda et al., 2011), teachers' gender, ethnicity, and teaching experience seemed to be the most relevant teacher characteristics to investigate.

The present study

In the present study, we used a meta-analytic approach to investigate associations between student-teacher dependency and students' engagement, achievement, externalizing behavior, internalizing behavior, and prosocial behavior. We expected to find negative associations between dependency and students' engagement, achievement, and prosocial behavior and positive associations between dependency and externalizing and internalizing behavior (e.g., Bosman et al., 2018; Hamre & Pianta, 2001; Henricsson & Rydell, 2006).

Furthermore, we examined whether associations between dependency and students' school adjustment were moderated by student and teacher characteristics. We hypothesized that associations between dependency and school adjustment would be stronger for boys, ethnic minority students, students from higher grades, and risk samples (Hamre & Pianta, 2001). The moderating role of teacher characteristics was examined without formulating specific hypotheses.

Materials and methods

Literature search

The PsychInfo and Educational Resources Information Center (ERIC) databases were used for the literature search (cf., Roorda et al., 2017, 2011). "Dependency" was used as keyword in combination with "AND teacher*" to limit our search to papers about dependency in the relationship with the teacher only. The literature search took place in March 2018 and yielded a total of 3,292 hits. The literature search was not limited to a specific starting point and was up to date to the end of March 2018. The first author read titles, and if necessary abstracts and full texts, to determine whether studies were relevant to include in the analyses. After this first selection 132 papers were retained.

Further selection and participants

The following inclusion and exclusion criteria were used to make a further selection: (a) Studies had to report an association between student-teacher Dependency and one or more aspects of school adjustment (i.e., Engagement, Achievement, Externalizing Behavior, Internalizing Behavior, Prosocial Behavior), (b) As the present meta-analysis focused on students' school adjustment, parent reports were not included (one entire study and seven correlations within studies were excluded for this reason), (c) Studies had to measure Dependency at the same time or before students' school adjustment, because Dependency was considered as the predictor variable in this meta-analysis, (d) Studies with students from preschool, primary school, and/or secondary school could be included, (e) Studies had to be reported in English, and (f) Studies had to be published in peer-reviewed journals (cf., Roorda et al., 2017; Lei et al., 2016; Nurmi, 2012). Furthermore, each sample could only be included once in each analysis, as inclusion of multiple effect sizes

based on the same sample in the same analysis would violate the assumption of units of analysis (Lipsey & Wilson, 2001). In case of overlapping samples in different papers, we selected the most relevant article based on the amount of information provided, the number of reported associations with students' school adjustment, whether these associations were measured longitudinally, and sample size. The first author performed the selection of papers and asked the other authors for advice in case of doubts.

Some of the selected articles also reported multiple effect sizes for the same association. That is, some studies used more than one concept (e.g., conduct problems *and* attention problems) or informant (e.g., teacher *and* student reports) to measure a specific aspect of students' school adjustment. In such cases, all relevant effect sizes were averaged into one effect size per study. In addition, some studies measured Dependency and/or students' school adjustment at several occasions. In those instances, only the longitudinal associations were included. If both dependency and school adjustment were measured at multiple occasions, all adjacent longitudinal associations were aggregated to form one effect size per study. If either dependency or school adjustment was measured only once and the other variable multiple times, we selected the two adjacent occasions that were still longitudinal.

After this selection procedure, a sample of 28 studies (k) remained, published between 1991 and 2018. In total, 7849 students (N) were included (range 55–1256 students per study) from preschool, kindergarten, and/or primary school. Studies were conducted in the USA ($k = 11$), Canada ($k = 3$), the Netherlands ($k = 4$), Belgium ($k = 3$), Germany ($k = 1$), Sweden ($k = 1$), Norway ($k = 1$), Italy ($k = 2$), and China ($k = 2$). Fourteen studies examined associations with school adjustment longitudinally.

Variables

Dependency

In all included studies, teachers reported about the degree of Dependency in the student-teacher relationship. In most of the studies ($k = 27$), teachers completed the Student Teacher Relationship Scale (STRS; Pianta, 2001) or a translated and often adapted version of this questionnaire. In one study, teacher filled out the Teacher Attachment Q-Set (Waters, 1987), which originally inspired the development of the STRS.

Effect sizes

Pearson's correlation coefficient r was used as effect size. Most studies ($k = 26$) actually reported correlation coefficients or at least partial correlations ($k = 2$). For two studies, however, only results of multiple regression analyses (included as regression coefficients in the analyses) were available. It should be noted that partial correlations and regression coefficients may represent an underestimation of the actual correlations.

Moderator variables

Four student characteristics were coded: average grade level (mean of the grades represented in the sample; $-1 =$ preschool, $0 =$ kindergarten, $1 =$ grade 1, $2 =$ grade 2, $3 =$ grade 3, $4 =$ grade 4, $5 =$ grade 5, $6 =$ grade 6); student gender (percentage of girls); student ethnicity (percentage of Caucasian students); and problem sample ($0 =$ no specific risk reported, 0.5 partly consisting of at-risk students, $1 =$ completely consisting of at-risk

students). Furthermore, three teacher characteristics were distinguished: teacher gender (percentage of females); teacher ethnicity (percentage of Caucasian teachers); and teaching experience (in years).

Analyses

Analyses were conducted with SPSS, using SPSS macros published by Lipsey and Wilson (2001). First, we examined the overall associations between Dependency and each of the five indicators of students' school adjustment (i.e., Engagement, Achievement, Externalizing Behavior, Internalizing Behavior, and Prosocial Behavior). To calculate an overall effect size, an aggregate of the effect sizes of the individual studies is calculated. During this calculation, the sample sizes of the individual studies are also taken into account, as each effect size is weighted by its inverse variance ($N - 3$). The resulting overall effect sizes can be interpreted as Pearson's correlation (r) coefficients, with correlations below .10 being considered as small, between .10 and .25 as small to medium, around .25 as medium, between .25 and .40 as medium to large, and above .40 as large (Lipsey & Wilson, 2001, p. 147). To check whether associations hold over time, we also calculated overall effect sizes for the longitudinal studies only.¹ Furthermore, to make sure that associations were not solely due to same informant bias (cf., Roorda et al., 2011), we calculated separate overall effect sizes for the studies in which another informant reported about students' school adjustment than the teacher who reported about dependency.

Second, we investigated moderator effects of the student and teacher characteristics described above. The moderator analyses are comparable to regular regression analysis, in which the weighted effect sizes of the individual studies are the dependent variable and student and teacher characteristics the independent variables (included as main effects in the analyses). Most of the studies in our dataset did not report about all moderator variables and including more than one moderator at the same time would, hence, lead to a decrease in power. Therefore, we estimated the effects of the moderators in separate models. As for regular regression analysis, SPSS reports both standardized (β) and unstandardized (b) regression coefficients, and significance tests of the regression coefficients (see Table 3). It is important to notice that the direction of regression coefficients should be interpreted differently for positive and negative effect sizes. If the overall effect size is positive (for the associations with Externalizing Behavior and Internalizing Behavior; see Table 2), a positive regression coefficient means that effect sizes are *stronger* for studies that score higher on the moderator variable; a negative regression coefficient means that effect sizes are *weaker* for studies that score higher on the moderator variable. If the overall effect size is negative (for associations with Engagement, Achievement, Prosocial Behavior), a positive regression coefficient means that effect sizes are *weaker* (i.e., closer to zero) for studies that score higher on the moderator variable, whereas a negative regression coefficient means that effect sizes are *stronger* (i.e., further away from zero) for studies that score higher on the moderator variable.

In the present study, fixed effects models were reported. Although random effects models allow generalizations beyond the particular studies included in the meta-analysis, they also have less statistical power to detect significant effects than fixed effects models.

As moderator variables were hardly examined in previous research, we decided to use fixed effect models to maximize the power to find significant effects, rather than trying to make inferences to possible other studies not included in our analyses.

Results

Effect sizes, student characteristics, and teacher characteristics of the individual studies are presented in Tables S1 and S2 (supplementary materials). These tables also display information about the design (cross-sectional versus longitudinal) and the informant for each individual study. Descriptives for the moderator variables can be found in Table 1.

Overall effect sizes

The overall effect sizes for the associations between Dependency and Engagement, Dependency and Achievement, and Dependency and Prosocial Behavior were negative and small to medium ($r_s = -.13, -.12, \text{ and } -.17$, respectively, see Table 2). The overall effect size for the association between Dependency and Externalizing Behavior was positive and medium ($r = .27$) and the overall effect size for Dependency and Internalizing Behavior was positive and medium to large ($r = .32$).

In studies with a longitudinal design, the overall effect sizes remained the same for Dependency and Engagement and Dependency and Externalizing behavior ($r = -.13, p < .001, k = 7$; $r = .28, p < .001, k = 8$, respectively), whereas they were smaller but still significant for Dependency and Achievement and Dependency and Prosocial Behavior ($r = -.07, p = .004, k = 4$; $r = -.14, p = .001, k = 3$, respectively). For Dependency and Internalizing Behavior, the overall effect size was even a bit stronger when looking at

Table 1. Descriptive statistics for moderator variables.

		engagement	achievement	externalizing	internalizing	prosocial
Categorical moderator variable						
		<i>k</i>	<i>k</i>	<i>k</i>	<i>k</i>	<i>k</i>
Problem sample	no risk	6	5	12	10	6
	partly at-risk	0	2	2	1	0
	full risk	3	1	5	5	1
Continuous moderator variables						
		<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Average grade level		0.88 (1.71)	1.03 (2.44)	0.50 (2.04)	0.61 (1.91)	-0.17 (0.75)
Student gender (% girls)		45.27 (11.43)	47.40 (3.22)	46.40 (11.67)	43.68 (14.43)	41.97 (18.61)
Student ethnicity (% Caucasian)		58.04 (29.87)	63.08 (22.93)	59.99 (28.65)	64.94 (23.66)	73.78 (13.71)
Teacher gender (% female)		97.50 (4.18)	88.30 (10.52)	91.58 (12.37)	94.47 (9.91)	95.00 (11.18)
Teacher ethnicity (% Caucasian)		86.33 (17.43)	96.15 (5.44)	70.75 (41.26)	84.90 (25.03)	100.00 (-)
Teaching experience (in years)		12.17 (6.02)	11.80 (2.12)	14.50 (3.19)	12.51 (4.39)	15.16 (1.68)

Table 2. Overall effect sizes.

	effect size (<i>SE</i>)	95% confidence interval	<i>k</i>	<i>N</i>
<i>r</i> engagement	-.13 (.02)	-.17 -- -.09	9	2510
<i>r</i> achievement	-.12 (.02)	-.15 -- -.09	8	3808
<i>r</i> externalizing behavior	.27 (.01)	.25 -- .30	19	5313
<i>r</i> internalizing behavior	.32 (.02)	.28 -- .35	16	3482
<i>r</i> prosocial behavior	-.17 (.03)	-.23 -- -.11	7	1167

Note. All correlations are significant at $p < .001$.

longitudinal studies only ($r = .35, p < .001, k = 9$). Furthermore, in studies with a different informant for students' school adjustment than for dependency, the overall effect sizes were somewhat smaller than in the total sample but still significant ($r = -.10, p < .001, k = 6; r = -.08, p < .001, k = 6; r = .21, p < .001, k = 4; r = .22, p = .001, k = 3$, for Dependency and Engagement, Achievement, Externalizing Behavior, and Internalizing Behavior respectively). For Prosocial Behavior, the informant was always the same as the teacher who reported about Dependency.

Non-significant correlations between sample size and the effect sizes for Engagement, Achievement, Externalizing Behavior, and Internalizing Behavior ($r_s = -.03 - .44, p_s > .05$) and the inspection of scatterplots suggested there was no indication of publication bias for these associations (c.f., Roorda et al., 2011). A significant correlation for Prosocial Behavior ($r = .96, p = .001$), however, indicated that the association between Dependency and Prosocial Behavior might be prone to publication bias. Therefore, the findings for Prosocial Behavior need to be interpreted with caution.

Effects of moderator variables

For the association between Dependency and Engagement, only Teacher Gender was a significant moderator: Associations between Dependency and Engagement were stronger in samples with *less* female teachers (see Table 3). Regarding the association between Dependency and Achievement, Student Ethnicity and Teacher Gender were significant moderators: Associations were stronger in samples with *less* Caucasian students, and with *more* female teachers.

For Dependency in relation to Externalizing Behavior, only Student Ethnicity was a significant moderator variable: Associations were stronger in samples with *less* Caucasian students. With respect to the association between Dependency and Internalizing Behavior, Average Grade Level and Teacher Ethnicity were significant moderators: Associations were stronger in samples from *higher* grades and in samples with *more* Caucasian teachers. Finally, the effect size for Dependency and Prosocial Behavior was not influenced by any of the moderator variables (see Table 3).

Discussion

The present meta-analysis focused on associations between student-teacher dependency and students' school adjustment (i.e., engagement, achievement, externalizing, internalizing, and prosocial behaviors). Furthermore, we investigated whether associations between dependency and students' school adjustment were moderated by student and teacher characteristics.

Associations between dependency and school adjustment

Overall, our results suggested that student-teacher dependency is significantly related to different aspects of students' school adjustment. Moreover, associations seemed to hold over time (i.e., were also significant when looking at longitudinal studies only) and were not solely due to same informant bias (i.e., were also significant for studies in which school adjustment was measured by another informant than dependency). As such, the present

Table 3. Effects of moderator variables on associations between dependency and school adjustment.

	<i>r</i> engagement			<i>r</i> achievement				
	<i>b</i> (SE)	95% CI	β	<i>k</i>	<i>b</i> (SE)	95% CI	β	<i>k</i>
<i>Student characteristics</i>								
Average grade level	.01 (.01)	-.01 -.03	.34	8	.01 (.01)	-.01 -.02	.23	8
Student gender (% girls)	.01 (.00)	-.00 -.01	.50	9	.01 (.01)	-.01 -.04	.20	8
Student ethnicity (% Caucasian)	.00 (.00)	-.00 -.00	.23	7	.01 (.00)**	.002 -.009	.77	5
Problem sample (1 = full risk)	-.03 (.06)	-.16 -.09	-.12	9	.08 (.07)	-.05 -.21	.23	8
<i>Teacher characteristics</i>								
Teacher gender (% female)	.02 (.01)*	.00 -.04	.94	6	-.01 (.00)*	-.02 -- -.0002	-.61	4
Teacher ethnicity (% Caucasian)	-.00 (.00)	-.01 -.00	-.59	3	-	-	-	-
Teaching experience (in years)	.01 (.01)	-.00 -.02	.63	5	-	-	-	-
<i>r</i> externalizing								
<i>r</i> internalizing								
<i>r</i> prosocial								
	<i>b</i> (SE)	95% CI	β	<i>k</i>	<i>b</i> (SE)	95% CI	β	<i>k</i>
<i>Student characteristics</i>								
Average grade level	.01 (.01)	-.00 -.03	.27	18	.05 (.01)**	.03 -.07	.62	14
Student gender	.00 (.00)	-.00 -.00	.10	19	.00 (.00)	-.00 -.00	.01	16
Student ethnicity	-.00 (.00)*	-.003 -- -.0001	-.31	15	.00 (.00)	-.00 -.00	.22	11
Problem sample	.02 (.03)	-.04 -.09	.10	19	-.00 (.04)	-.08 -.07	-.01	16
<i>Teacher characteristics</i>								
Teacher gender	-.00 (.00)	-.01 -.00	-.22	13	-.00 (.00)	-.00 -.00	-.02	12
Teacher ethnicity	-.00 (.00)	-.00 -.00	-.06	6	.003 (.001)*	.001 -.006	.65	5
Teaching experience	.00 (.01)	-.02 -.02	-.00	9	.01 (.01)	-.00 -.02	.17	9

Note. * $p < .05$, ** $p < .01$; Both standardized (β) and unstandardized (*b*, SE = standard error) regression coefficients are reported.; 95% CI = 95% confidence interval.

meta-analysis provides further support for the important role that student-teacher dependency may play in students' school adjustment. For future studies it might thus be wise to include dependency more often when examining associations between student-teacher relationships and students' school adjustment. Although the original version of the STRS has not always yielded a reliable measure of dependency (e.g., Oades-Sese & Li, 2011), which has been suggested as one of the main reasons for lack of research on this dimension, the Dutch adaptation of the STRS may help to measure dependency in a reliable way (e.g., Koomen et al., 2012). Furthermore, our findings suggest that dependency is indeed a negative relationship dimension, indicating the need for a stronger focus on this dimension in interventions targeting student-teacher relationships. As most studies in the present meta-analysis were conducted in Western countries with a more individualistic orientation, however, more research is needed to see whether these findings also apply to non-Western and/or more collectivistic samples (see Gregoriadis et al., this issue).

Interestingly, dependency appeared to be more closely related to some aspects of students' school adjustment than to others. That is, associations were stronger for externalizing and internalizing behavior than for engagement and achievement. As academic achievement also largely depends on stable child and family characteristics (e.g., IQ and SES; Jensen, 1969; Pianta et al., 2008), this is in line with what could be expected for achievement. For engagement, however, this finding was rather unexpected and may perhaps indicate that dependency is less strongly related to engagement than student-teacher closeness and conflict (see Roorda et al., 2011). Still, as our meta-analysis only included nine studies with engagement, more research is needed here.

Contrary to suggestions made in previous research (e.g., Mejia & Hoglund, 2016), dependency was substantially associated with externalizing behavior (medium effect size). As the association with internalizing behavior was significant as well (and medium to large), student-teacher relationships high in dependency seem to be a risk factor for increasing both students' externalizing and internalizing behaviors. As internalizing behavior and dependency, and to a lesser extent also externalizing behavior and dependency, appear to reinforce each other over time (Roorda et al., 2014), this may be a particularly unfavorable path. A teacher training, such as the Interpersonal Skills Training (Roorda et al., 2013), may help teachers to respond less dominantly to students' dependent behaviors and, hence, stimulate students to display more assertiveness and independence during interactions with them.

Differences in strengths of associations

Student characteristics, more specifically student ethnicity and average grade level appeared to be significant moderators for the associations between dependency and students' achievement, externalizing behavior, and internalizing behavior. In line with the academic risk hypothesis (Hamre & Pianta, 2001), associations were stronger in samples with more ethnic minority students (for achievement and externalizing behavior) and in samples with students from higher grades (for internalizing behavior). For these aspects of school adjustment, high levels of dependency thus seem to be an additional risk factor for a healthy development of students who are already at risk for maladjustment. Therefore, teachers should be careful not to reinforce dependency in these students

but should stimulate them to explore the learning and social environment and to be confident in their capacity to do this (cf., Roorda et al., 2013).

Finally, teacher characteristics also had some impact on the strength of associations. Interestingly, associations between dependency and engagement seemed to be stronger for male teachers, whereas associations with achievement appeared to be stronger for female teachers. As the impact of teacher characteristics was rather inconsistent in other meta-analyses as well (Cornelius-White, 2007; Roorda et al., 2011), more research is needed to find out how these characteristics impact associations between student-teacher relationships and students' school adjustment. It might even be more informative, however, to investigate the impact of student-teacher gender match and ethnic match (cf., Ewing & Taylor, 2009; Hamre & Pianta, 2001). Unfortunately, this was not possible in the present meta-analysis, as this information was usually not reported in empirical studies.

Limitations

Some limitations need to be considered when interpreting the results of this meta-analysis. First, most included studies used a cross-sectional design. Based on the extended attachment theory (Pianta, 1999; Verschueren & Koomen, 2012), we viewed dependency as predictor of students' academic and behavioral adjustment. However, previous studies frequently showed that student behaviors could be predictors of student-teacher dependency as well (e.g., Mejia & Hoglund, 2016; Nurmi, 2012). More longitudinal studies are therefore needed to get a better view on how dependency and students' academic and behavioral adjustment impact each other over time.

Second, for some aspects of school adjustment only a few studies were available, which limits the power to find significant results. For other aspects of school adjustment, such as students' motivation, self-concept, and executive functions, there were not enough studies available to include them in the meta-analysis. To get a better view on how student-teacher dependency relates to students' school adjustment, more studies including this relationship dimension are needed. These studies could then also examine whether some aspects of school adjustment, such as self-concept and executive functions, act as explaining mechanisms in the association between dependency and other aspects of students' school adjustment, such as externalizing behavior and achievement (i.e., mediator analyses; c.f., Doumen et al., 2011; Roorda et al., 2017).

Third, our meta-analysis only included teacher reports about dependency. As agreement between teachers' and students' relationship perceptions seems to be only mediocre at best (Koomen & Jellesma, 2015), it would be wise to also include student reports in future research.

Conclusion

To summarize, our findings confirmed the idea of the extended attachment theory (Verschueren & Koomen, 2012) that dependency is an important relationship dimension, which may negatively impact several aspects of students' school adjustment. In contrast to what originally has been argued, dependency was not only a relevant relationship

dimension for young children but also for older students at the end of primary education. Student-teacher dependency appeared to be most strongly linked to students' internalizing and externalizing behaviors, however, associations with students' engagement, academic achievement, and prosocial behavior were also revealed. Therefore, teachers and other school practitioners need to be made aware that high levels of student-teacher dependency might be just as harmful for students' school adjustment as low levels of closeness and high levels of conflict. This seems to be especially true for students who are at risk for maladjustment due to their ethnic minority status or for students in higher grades. Therefore, teachers and students alike may benefit from getting help with developing more healthy, less dependent relationships. Initiatives to develop interventions targeted on diminishing age-inappropriate dependency in the relationship may thus appear to be a profitable route to explore.

Note

1. As Pearson's correlation coefficients were chosen as effect size in the present study, longitudinal associations were not controlled for previous levels of the dependent variable. "Longitudinal" thus merely refers to correlations whereby student-teacher dependency was measured at an earlier moment in time than students' school functioning.

Disclosure statement

No potential conflict of interest was reported by the author(s).

References

- Bosman, R. J., Roorda, D. L., van der Veen, I., & Koomen, H. M. Y. (2018). Teacher-student relationship quality for kindergarten to sixth grade and students' school adjustment: A person-centered approach. *Journal of School Psychology, 68*, 177–194. <https://doi.org/10.1016/j.jsp.2018.03.006>
- Cornelius-White, J. (2007). Learner-centered teacher-student relationships are effective: A meta-analysis. *Review of Educational Research, 77*(1), 113–143. <https://doi.org/10.3102/003465430298563>
- Deci, E. L., Vallerand, R. J., Pelletier, L. G., & Ryan, R. M. (1991). Motivation and education: The self-determination perspective. *Educational Psychologist, 26*(3–4), 325–346. <https://doi.org/10.1080/00461520.1991.9653137>
- Doumen, S., Buyse, E., Colpin, H., & Verschueren, K. (2011). Teacher-child conflict and aggressive behaviour in first grade: The intervening role of children's self-esteem. *Infant and Child Development, 20*(6), 449–465. <https://doi.org/10.1002/icd.725>
- Eisenberg, N., Fabes, R. A., & Spinrad, T. (2006). Prosocial development. In W. Damon & N. Eisenberg (Eds.), *Handbook of child psychology, Vol. 3* (pp. 646–718). Wiley.
- Ewing, A. R., & Taylor, A. R. (2009). The role of child gender and ethnicity in teacher-child relationship quality and children's behavioral adjustment in preschool. *Early Childhood Research Quarterly, 24* (1), 92–105. <https://doi.org/10.1016/j.ecresq.2008.09.002>
- Garner, P. W., Mahatmya, D., Moses, L. K., & Bolt, E. N. (2014). Associations of preschool type and teacher-child relational quality with young children's social-emotional competence. *Early Education and Development, 25*(3), 399–420. <https://doi.org/10.1080/10409289.2013.801706>
- Gregoriadis, A., Grammatikopoulos, V., Tsigilis, N., & Verschueren, K. (2020). Teachers' and children's perceptions about their relationships: Examining the construct of dependency in the Greek sociocultural context. *Attachment & Human Development*.

- Hamre, B. K., & Pianta, R. C. (2001). Early teacher-child relationships and the trajectory of children's school outcomes through eighth grade. *Child Development, 72*(2), 625–638. <https://doi.org/10.1111/1467-8624.00301>
- Henricsson, L., & Rydell, A.-M. (2006). Children with behaviour problems: The influence of social competence and social relations on problem stability, school achievement and peer acceptance across the first six years of school. *Infant and Child Development, 15*(4), 347–366. <https://doi.org/10.1002/icd.448>
- Jensen, A. R. (1969). How much can we boost IQ and scholastic achievement? *Harvard Educational Review, 39*(1), 1–123. <https://doi.org/10.17763/haer.39.1.I3u15956627424k7>
- Koomen, H. M. Y., & Jellesma, F. C. (2015). Can closeness, conflict, and dependency be used to characterize students' perceptions of the affective relationship with their teacher? Testing a new child measure in middle childhood. *British Journal of Educational Psychology, 85*(4), 479–497. <https://doi.org/10.1111/bjep.12094>
- Koomen, H. M. Y., Verschueren, K., van Schooten, E., Jak, S., & Pianta, R. C. (2012). Validating the student-teacher relationship scale: Testing factor structure and measurement invariance across child gender and age in a Dutch sample. *Journal of School Psychology, 50*(2), 215–234. <https://doi.org/10.1016/j.jsp.2011.09.001>
- Lei, H., Cui, Y., & Chiu, M. M. (2016). Affective Teacher—Student relationships and students' externalizing behavior problems: A meta-analysis. *Frontiers in Psychology, 7*, 1–12. <https://doi.org/10.3389/fpsyg.2016.01311>
- Lipsey, M. W., & Wilson, D. B. (2001). *Practical meta-analysis*. Thousand Oaks, CA: Sage Publications.
- Marks, H. M. (2000). Student engagement in instructional activity: Patterns in the elementary, middle, and high school years. *American Educational Research Journal, 37*, 153–184. <https://doi.org/10.3102/00028312037001153>
- McDermott, P. A., Mordell, M., & Stoltzfus, J. C. (2001). The organization of student performance in American schools: Discipline, motivation, verbal learning, nonverbal learning.. *Journal of Educational Psychology, 93*(1), 65–76. <https://doi.org/10.1037/0022-0663.93.1.65>
- McGrath, K. F., & van Bergen, P. (2015). Who, when, why and to what end? Students at risk of negative student-teacher relationships and their outcomes. *Educational Research Review, 14*, 1–17. <https://doi.org/10.1016/j.edurev.2014.12.001>
- Mejia, T. M., & Hoglund, W. L. G. (2016). Do children's adjustment problems contribute to teacher-child relationship quality? Support for a child-driven model. *Early Childhood Research Quarterly, 34*, 13–26. <https://doi.org/10.1016/j.ecresq.2015.08.003>
- Merrell, K. W. (1999). *Behavioral, social, and emotional assessment of children and adolescents*. Erlbaum.
- Nurmi, J.-E. (2012). Students' characteristics and teacher-child relationships in instruction: A meta-analysis. *Educational Research Review, 7*(3), 177–197. <https://doi.org/10.1016/j.edurev.2012.03.001>
- Oades-Sese, G. V., & Li, Y. (2011). Attachment relationships as predictors of language skills for at-risk bilingual preschool children. *Psychology in the Schools, 48*(7), 707–722. <https://doi.org/10.1002/pits.20583>
- Pianta, R. C. (1999). *Enhancing relationships between children and teachers*. American Psychological Association.
- Pianta, R. C. (2001). *Student-teacher relationship scale: Professional manual*. Psychological Assessment Resources.
- Pianta, R. C., Belsky, J., Vandergrift, N., Houts, R., & Morrison, F. J. (2008). Classroom effects on children's achievement trajectories in elementary school. *American Educational Research Journal, 45*(2), 365–397. <https://doi.org/10.3102/0002831207308230>
- Roorda, D. L., Jak, S., Zee, M., Oort, F. J., & Koomen, H. M. Y. (2017). Affective Teacher-student relationships and students' engagement and achievement: A meta-analytic update and test of the mediating role of engagement. *School Psychology Review, 46*(3), 239–261. <https://doi.org/10.17105/SPR-2017-0035.V46-3>
- Roorda, D. L., Koomen, H. M. Y., Spilt, J. L., & Oort, F. J. (2011). The influence of affective teacher-student relationships on students' school engagement and achievement. *Review of Educational Research, 81*(4), 493–529. <https://doi.org/10.3102/0034654311421793>

- Roorda, D. L., Koomen, H. M. Y., Thijs, J. T., & Oort, F. J. (2013). Changing interactions between teachers and socially inhibited kindergarten children: An interpersonal approach. *Journal of Applied Developmental Psychology, 34*(4), 173–184. <https://doi.org/10.1016/j.appdev.2013.03.002>
- Roorda, D. L., Verschueren, K., Vancraeyveldt, C., van Craeyevelt, S., & Colpin, H. (2014). Teacher–child relationships and behavioral adjustment: Transactional links for preschool boys at risk. *Journal of School Psychology, 52*(5), 495–510. <https://doi.org/10.1016/j.jsp.2014.06.004>
- Sette, S., Spinrad, T. L., & Baumgartner, E. (2013). Links among Italian preschoolers' socioemotional competence, teacher–child relationship quality, and peer acceptance. *Early Education and Development, 24*(6), 851–864. <https://doi.org/10.1080/10409289.2013.744684>
- Skinner, E. A., Kindermann, T. A., & Furrer, C. J. (2009). A motivational perspective on engagement and disaffection: Conceptualization and assessment of children's behavioral and emotional participation in academic activities in the classroom. *Educational and Psychological Measurement, 69*(3), 493–525. <https://doi.org/10.1177/0013164408323233>
- Verschueren, K., & Koomen, H. M. Y. (2012). Teacher–child relationships from an attachment perspective. *Attachment & Human Development, 14*(3), 205–211. <https://doi.org/10.1080/14616734.2012.672260>
- Waters, E. (1987). *Attachment behavior q-set, revision, 3.0*. SUNY Stony Brook.
- Zee, M., Koomen, H. M. Y., & van der Veen, I. (2013). Student–teacher relationship quality and academic adjustment in upper elementary school: The role of student personality. *Journal of School Psychology, 51*(4), 517–533. <https://doi.org/10.1016/j.jsp.2013.05.003>