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Teacher self-efficacy and enthusiasm: Relations to changes in student-perceived teaching quality at the beginning of secondary education☆

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ABSTRACT

Teaching quality is a key factor in student academic success, but few studies have investigated how teaching quality changes at the beginning of secondary education and how such changes are predicted by dimensions of teacher motivation. This study investigated the changes in class-level student perceptions of teaching quality over one school year at the beginning of secondary school and examined how teachers' self-efficacy and enthusiasm predicted such changes. Data from 1996 students (53.8% male; mean age: 11.09 years, $SD = 0.55$) and their homeroom teachers ($N = 105$), who were surveyed at the beginning of Grades 5 and 6, were analyzed. Results showed a significant decline in class-level student-perceived emotional support, classroom management, and instructional clarity. Teacher-reported self-efficacy was not significantly related to changes in teaching quality. Teacher-reported enthusiasm buffered the decline in students' class-level classroom management.

1. Introduction

The beginning of secondary education is a critical phase in adolescents' academic lives because the perceived quality of teaching typically declines (Midgley, Feldlaufer, & Eccles, 1989), which in turn is associated with a decline in students' academic motivation (Maulana, Opdenakker, Stroet, & Bosker, 2013). Studies have outlined that teachers' enthusiasm for teaching (Keller, Hoy, Goetz, & Frenzel, 2015) and their self-efficacy beliefs (Zee & Koomen, 2016) are highly relevant for students' perceptions of teaching quality. Only a limited number of studies, however, have investigated how teacher enthusiasm and self-efficacy are related to changes in student-perceived teaching quality (Holzberger, Philipp, & Kunter, 2013; Lazarides, Gaspard, & Dicke, 2019; Praetorius et al., 2017). In reference to expectancy-value models of achievement motivation (e.g., Eccles et al., 1983), teacher self-efficacy and teacher enthusiasm can be seen as two core elements of teacher motivation, with teacher self-efficacy referring to teachers' evaluations of their own teaching competence and teacher enthusiasm referring to the subjective value they place on teaching (Dresel & Lämmle, 2017). On a theoretical level, it has been described that enthusiasm for teaching enhances teachers' attention in class (Kunter & Holzberger, 2014) and increases positive affect in students through emotional transmission (Frenzel, Becker-Kurz, Pekrun, Goetz, & Lüdtke, 2018), resulting in high levels of student-perceived support and low levels of disturbances (Kunter et al., 2013). Teacher self-efficacy, in turn, enables teachers to aspire to more realistic instructional goals, to invest greater effort to reach these goals (Tschannen-Moran, Hoy, & Hoy, 1998), and thus to act confidently and competently even when facing difficult teaching situations, leading to high-quality instruction (Bandura, 1997; Zee & Koomen, 2016). In this study, we examined relations between teacher enthusiasm and self-efficacy and changes in class-level student-perceived emotional support, instructional clarity and classroom

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management at the beginning of secondary education. The study took place in Germany, where secondary education in most federal states starts quite early in Grade 5, and might thus be similar to middle school in the US. We focused on homeroom teachers in this study, who usually remain with their classes at the beginning of secondary school, and included in our analyses only those classrooms for which this was the case.

2. Student-perceived teaching quality

Teaching quality is a multidimensional construct that includes different quality dimensions (Praetorius, Grünkorn & Klieme, 2020; Klieme, Pauli, & Reusser, 2009; Pianta & Hamre, 2009; Van de Grift, Chun, Maulana, Lee, & Helms-Lorenz, 2017). In their conceptual framework for classroom interactions, for example, Pianta and Hamre (2009, p. 111) describe "emotional supports, classroom organization, instructional supports" as dimensions of teaching quality. Klieme et al. (2009) in their theoretical framework of generic dimensions of teaching quality identify the following three dimensions: classroom management, cognitive activation, and supportive climate. Van de Grift et al. (2017) define six dimensions: efficient classroom management, safe and stimulating educational climate, clear and structured instruction, intensive and activating teaching, teaching learning strategies, and differentiating instruction. Research has widely shown that these theoretically described dimensions of teaching quality can be empirically distinguished as well (Fauth, Decristan, Rieser, Klieme, & Büttner, 2014; Göllner, Wagner, Eccles, & Trautwein, 2018). Despite their differences, each of the theoretical frameworks on teaching quality identified supportive teaching and effective classroom management as overarching quality dimensions. In this study, therefore, we also focus on these two dimensions.

A supportive climate is characterized by two dimensions – an affective dimension that refers to emotionally supportive, warm, and caring relationships between teachers and their students (Pianta & Hamre, 2009), and a cognitive dimension that refers to positive and constructive teacher feedback, positive approaches to student errors (Brophy, 2000; Klieme et al., 2009), and clarity of instruction in terms of the teacher's ability to explain content clearly to the students (Stronge, Ward, & Grant, 2011). Clarity of instruction is thereby particularly important for students' academic motivation (Maulana, Opdenakker, & Bosker, 2016) and achievement (Hines, Cruickshank, & Kennedy, 1985). Emotionally supportive relationships between students and their teachers characterized by trust, respectful communication, and teacher fairness towards students, in turn, are highly relevant for students' intrinsic motivation and enjoyment of learning (Ruzek et al., 2016). In this study, we focused on both student-perceived instructional clarity and emotional support as indicators of a supportive classroom climate.

Classroom management is usually defined as actions taken by the teacher to establish order and engage students (Emmer & Stough, 2001), as well as an emphasis on classroom discipline (Brophy, 2000). Effective classroom management enables students to spend time on tasks and facilitates effective teaching and motivated learning (Korpershoek, Harms, de Boer, van Kuijk, & Doolaard, 2016). Research has accordingly shown positive effects of student-perceived classroom management on students' motivation (Kunter, Baumert, & Köller, 2007) and achievement (Fauth et al., 2014). In this study, we therefore focused on students' perceptions of their teachers' ability to prevent disturbances in class as an important facet of classroom management.

3. Changes in teaching quality

Previous research has shown that students' orientation towards learning (Anderman, Maehr, & Midgley, 1999) declines in early adolescence. Stage-environment fit theory (Eccles & Roeser, 2009) proposes that the decline in student academic motivation can be explained by changes in characteristics of instruction during the first years of middle school that are associated with a mismatch between classroom learning environments of traditional mid-level schools and adolescents' developmental needs. In early adolescence, students gradually detach from their parents, develop an increasing interest in close relationships to peers, and experience a stronger need for autonomy (Bandura, 1964; Erikson, 1959). Related to these developmental processes and tasks, students report lower academic effort and persistence (Pajares & Graham, 1999). During this period, students need supportive teacher-student relationships (Erikson, 1959; Wigfield & Wagner, 2005). However, empirical studies show that observer-rated teacher involvement decreases during the first year of secondary education (Maulana et al., 2013) and that students accordingly report a decrease in emotional support from their teacher throughout middle school (Reddy, Rhodes, & Mulhall, 2003). In addition to the changes in student-perceived emotional support, empirical work also shows a decrease in perceived learning support from the teacher (Praetorius et al., 2017) and a decline in student-perceived clarity of instruction during the first year of secondary education (Maulana et al., 2016). It might be assumed that such changes in perceived teaching quality are accompanied by higher levels of disruptions and disturbances and, thus, by a decrease in student-perceived classroom management. One possible explanation for the changes in teaching quality during the first years of middle school might be related to larger classrooms and a higher number of teachers teaching different subjects, which makes it more difficult to establish close teacher-student relationships (Eccles & Roeser, 2009).

4. Teacher enthusiasm and self-efficacy: Relations to teaching quality

Supportive teacher-student relationships and effective classroom management are strongly related to teacher enthusiasm and self-efficacy (Klassen & Tze, 2014; Kunter et al., 2013). *Teacher enthusiasm* has been defined as "the degree of enjoyment, excitement, and pleasure that teachers typically experience in their professional activities" (Kunter 2008, p. 470). Recent research (Kunter et al., 2008; Kunter, Frenzel, Nagy, Baumert, & Pekrun, 2011) has identified two components of teacher enthusiasm: enthusiasm for teaching and enthusiasm for the subject taught. Kunter et al. (2008) showed that particularly teacher enthusiasm for teaching was significantly associated with students' reports of monitoring, cognitive challenge, and social support in class. In our study, we therefore focused on teachers' enthusiasm for teaching. Longitudinal studies have shown that teachers' enthusiasm for teaching is positively associated with, for example, student-perceived learning support (Lazarides et al., 2019), emotional support (Kunter et al., 2008), and classroom management (Kunter et al., 2013) at the end of secondary school. Teacher enthusiasm for teaching has also been shown to be longitudinally related to student-perceived learning support in the first year of secondary school, but no such associations have been found for classroom management (Praetorius et al., 2017).

Teacher self-efficacy is defined as a judgment of one's own capability to bring about desired outcomes of student engagement and learning, even when students are difficult or unmotivated (Tschannen-Moran & Woolfolk Hoy, 2001). On a theoretical level, teacher self-efficacy has been described as an important prerequisite of teachers' goals, effort, and teaching performance (Tschannen-Moran et al., 1998). Results of meta-analyses (Klassen & Tze, 2014; Zee & Koomen, 2016) have shown positive relations between teacher self-efficacy and characteristics of teaching, with small effect sizes. Zee and Koomen (2016) showed in their meta-analysis, for example, that studies revealed consistently positive correlations between teachers' self-efficacy and proactive behavioral management strategies, whereas the relation to student-reported emotional support was somehow unresolved. Some studies, such as Mashburn, Hamre, Downer, and Pianta (2006) indicated significant and positive correlations between teachers' general self-efficacy beliefs and children's perceptions of the teacher-student

relationship. Fauth et al. (2019) similarly found in their recent study that elementary school teachers' general self-efficacy was significantly and positively associated with a student-reported supportive climate. However, longitudinal studies did not find such effects of teachers' general self-efficacy on students' perceived support in the first year of secondary school (Praetorius et al., 2017), but rather found positive effects of student-perceived teaching quality on subsequent teacher self-efficacy (Holzberger et al., 2013). Consequently, compared with teacher enthusiasm, teacher self-efficacy might yield rather weak effects on student-perceived teaching quality. One possible explanation might be that teacher self-efficacy is often assessed without referring to a specific class, and in relation to broad areas of the teaching profession (Fauth et al., 2019; Holzberger et al., 2013; Praetorius et al., 2017), whereas teacher enthusiasm is often assessed in reference to teaching tasks in a specific classroom (Fauth et al., 2019; Kunter et al., 2013; Lazarides et al., 2019; Praetorius et al., 2017). A limitation of current research that examines the role of teacher self-efficacy and enthusiasm and their role in changes to student-perceived teaching quality is that previous research has mostly focused on either teacher self-efficacy (Holzberger et al., 2013) or teacher enthusiasm (Lazarides et al., 2019). Studies that have taken into account simultaneous effects of teacher enthusiasm and self-efficacy are often cross-sectional (Fauth et al., 2019; Lazarides, Buchholz, & Rubach, 2018) or examine longitudinal effects of teacher enthusiasm and self-efficacy on student-perceived dimensions of teaching quality in separate models (Praetorius et al., 2017). Studies are therefore needed that consider both teacher enthusiasm and self-efficacy when examining the effects on student-perceived teaching quality to be able to disentangle their unique effects.

5. The present study

In our study, we focus on the effects of teacher-reported enthusiasm for teaching and self-efficacy in teaching on the change in student-perceived classroom management, emotional support, and instructional clarity in early adolescence. The contribution of our study to current research is twofold – first, we examine simultaneous effects of teacher enthusiasm and self-efficacy on changes in student-perceived teaching quality, which has rarely been done previously (Fauth et al., 2019). Our findings inform current research about the specific role that each of these concepts plays in perceived teaching quality. Second, we consider changes in student-perceived teaching quality during the first year of secondary education – a developmental stage in students' lives that is characterized by declines in perceived teacher support (Opdenakker, Maulana, & den Brok, 2012), as well as in perceived classroom management, and instructional clarity (Maulana et al., 2016). This study examines students' perceptions of teaching quality. There is a shortage of research in this field, as many studies have investigated the consequences of class-level student perceptions of teaching quality for students' motivational and cognitive outcomes (e.g., De Jong & Westerhof, 2001; Maulana et al., 2016) rather than their predictors (Dresel, Fasching, Steuer, Nitsche, & Dickhäuser, 2013; Praetorius et al., 2017). Referring to these research aims and current research gaps, this study addresses the following research questions:

(1) How do student-perceived class-level emotional support, classroom management, and instructional clarity change from 5th to 6th Grade?
(2) How are teacher enthusiasm and self-efficacy related to changes in student-perceived class-level emotional support, classroom management, and instructional clarity from 5th to 6th Grade?

Against the backdrop of these research questions, we tested the following hypotheses:

(1) Referring to previous work (Maulana et al., 2013; Reddy et al., 2003), we expected a decline in class-level student-perceived emotional support, classroom management, and instructional clarity from Grade 5 to 6.
(2) We assumed that teacher-reported enthusiasm (Hypothesis 2a) and teacher-reported self-efficacy (Hypothesis 2b) in Grade 5 would be positively related to changes in class-level student-perceived emotional support, classroom management, and instructional clarity from Grade 5 to 6. Consequently, we expected that higher levels of teacher-reported self-efficacy and enthusiasm would be associated with lower rates of decline in student-perceived teaching quality. We further expected that the effects of teacher enthusiasm would be more pronounced than the effects of teacher self-efficacy.

The hypothesized relations are depicted in Fig. 1 (schematic model). Fig. 1 depicts the hypothesized changes in student-perceived dimensions of teaching quality (Hypothesis 1) as well as the expected relations between teacher-rated enthusiasm (Hypothesis 2a) and self-efficacy (Hypothesis 2b) and student-perceived dimensions of teaching quality.

6. Method

6.1. Sample and procedure

In this study, we used data from the TRAIN study ("Tradition and innovation: Academic and psychosocial development in vocational track schools in the states of Baden-Württemberg and Saxony"; Jonkmann, Rose, & Trautwein, 2013), which is a longitudinal study with a sample of non-academic-track schools. As research has repeatedly demonstrated that the academic development of non-academic-track students is less favorable than for academic-track students, the main focus was to study their school achievement and motivational development during secondary education and examine contributing factors on the side of schools and teachers. To examine these research questions, a large-scale sample was drawn from two federal states including schools from diverse regions (i.e., schools from urban and rural areas) and different school backgrounds. A multistage data-weighting procedure was then applied to ensure that survey results were representative of the population of non-academic-track students in the two federal states. The resulting survey weights were then used for all of the longitudinal analyses conducted. The current study was based on a sample of fifth and sixth graders (n = 1,996, 53.8% male) from the longitudinal TRAIN study. We included 105 classes and their homeroom teachers who did not experience a change in homeroom teacher from Grade 5 to 6. Students were surveyed at the beginning of Grade 5 (Time 1) and Grade 6 (Time 2) and had a mean age of 11.09 years (SD = 0.55) at Time 1. The mean number of participating students per class was M = 19.01. The study focused on students from three different types of non-academic-track schools in two states in Germany: the *Hauptschule* track (i.e., the least academically demanding track; 34.0% of the sample in 43 classrooms) and the *Realschule* track (i.e., the intermediate track; 26.4% of the sample in 22 classrooms) in Baden-Württemberg, and the *Mittelschule* track (i.e., a combination of Hauptschule and Realschule; 39.6% of the sample in 40 classrooms) in Saxony. The student participation rate for Time 1 was 81.8% (83.3%/90.1%/74.9% for Hauptschule/Realschule/Mittelschule, respectively). Participation rates were similar at Time 2. The largest group of students (66.5%) reported that they were born in Germany, and 21.0% reported a migration background, i.e. at least one parent was not born in Germany. The ratio of students with immigrant backgrounds varied greatly between classrooms (min: 0% - max. 92.3%). Students' socioeconomic status was indicated by the highest value on the international socioeconomic index of occupational status in the family (ISEI; Ganzeboom, de Graaf, & Treiman, 1992), and was 44.95 on average (SD = 13.66; Range: 16–85).

Surveys were anonymized and filled out during regular classroom

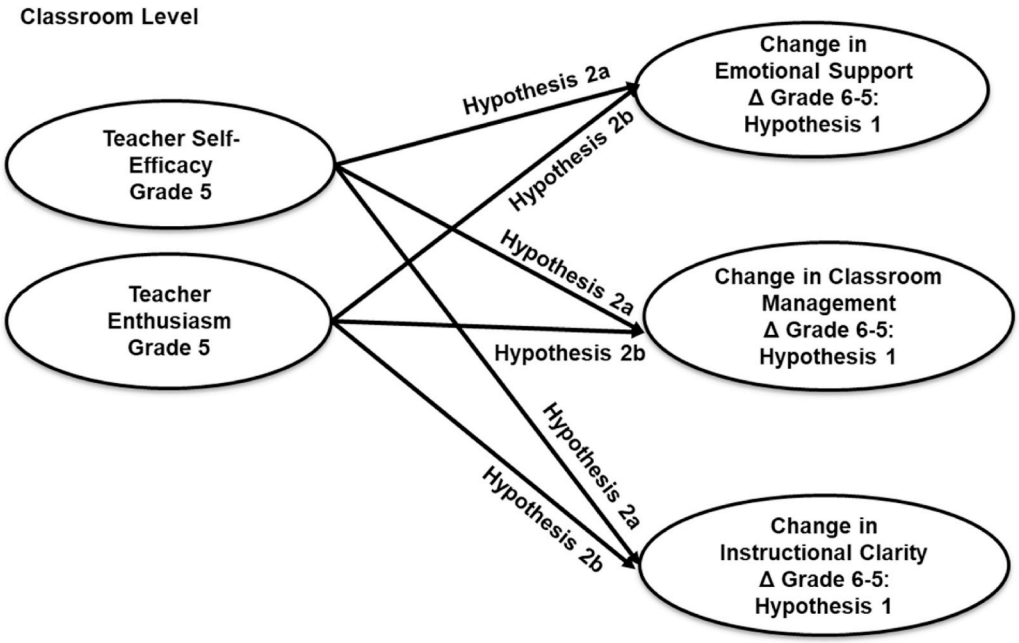

Fig. 1. Schematic model.

hours. Data were assessed four to six weeks after the beginning of the school year. Consequently, students had time to get to know their teachers. This design further allowed us to analyze the effects of teacher characteristics on student academic outcomes across the school year.

The homeroom teachers of each class participated in the data assessment (N = 101; 78.2% female). In Germany, students usually spend the entire day with the same class. Each class is assigned to a homeroom teacher who teaches at least one subject and who bears special responsibility for all class-related issues (Aldrup, Klusmann, Lüdtke, Göllner, & Trautwein, 2018). In our sample, most teachers reported teaching one (20.8%), two (18.8%) or three subjects (33.7%) to their class as a homeroom teacher. Subjects that teachers reported teaching were German (52.5%), mathematics (48.5%), English (35.6%), social sciences (35.6%), arts/sports/music (assessed as one subject domain: 33.7%), natural sciences (24.8%), philosophy/ethics (9.9%), geography (5.9%), biology (4%; same for history), ICT (5%), economics (3%), and other languages (2%). Homeroom teachers in Germany typically retain their class for several years. The homeroom teachers' years of experience ranged from 0 to 38 years (M = 19.45, SD = 11.25). On average, the homeroom teachers in this study spent 11.07 lessons each week with their class (SD = 5.11). The data collection of this study received ethical approval from the Ministry of Education and Cultural Affairs of the state of Baden-Württemberg and Saxony. At that time, the ministry took sole responsibility for reviewing research ethics/privacy issues in all state-wide research studies that took place in schools.

7. Measures[1]

Teacher-reported enthusiasm. Teacher's enthusiasm for teaching was assessed via teacher report at Time 1. Teachers were asked to rate their enthusiasm for teaching the class that participated in the data assessment ("How much do you enjoy teaching? Please refer to teaching in the target class"). The scale comprised six items (e.g., "Teaching brings me joy") on a four-point Likert-type scale (1 = *not true at all* to 4 = *very true*). The internal consistency of the scale was good (α = .88). The validity of this scale was demonstrated by a number of studies (e.g., Lazarides et al., 2018, 2019), indicating, for example, a high predictive validity for teaching quality.

Teacher-reported self-efficacy. Teachers' general self-efficacy in teaching was assessed via teacher report at Time 1. The section of the questionnaire dealing with self-efficacy started by prompting teachers to answer in reference to the class that participated in the data assessment ("In the following, we will ask you a number of questions about your perceptions of teaching in the target class"). The scale that assessed teacher self-efficacy was comprised of ten items (e.g., "I know that I can motivate my students to participate in innovative projects") on a four-point Likert-type scale (1 = *not true at all* to 4 = *very true*). We used the established teacher self-efficacy scale by Schwarzer, Schmitz, and Daytner (1999), which is based on Bandura (1997). The scale has been validated with diverse national and international teacher samples (Holzberger et al., 2013; Praetorius et al., 2017; Schmitz & Schwarzer, 2000). The internal consistency of the scale in our sample was good (α = .84).

Student-reported emotional support. The presence of a supportive climate was assessed using student reports at Times 1 and 2. We used a six-item scale. The four-point Likert scale (1 = *completely disagree* to 4 = *completely agree*) tapped teachers' active social and emotional support (e.g., 'Our homeroom teacher is someone we can rely on'). The scale was developed based on the 'social orientation' scale from the COACTIV-Study (Baumert et al., 2008). Previous publications provide information about the validity of the scale, with particular consideration of its predictive validity for students' academic outcomes (e.g., Aldrup et al., 2018). The internal consistency of the scale was good in our sample at each time point (Grade 5 α = .87; Grade 6 α = .91).

Student-reported classroom management. Classroom management was assessed using student reports at Times 1 and 2. The scale was measured by six items assessing the lack of disciplinary problems (e.g., 'With our homeroom teacher, instruction is rarely disturbed'). The four-point Likert-type scale (1 = *completely disagree* to 4 = *completely agree*) was developed based on the 'prevention of disruption' scale from the COACTIV-Study (Baumert et al., 2008). Previous publications provide information about the validity of the scale particularly regarding its predictive validity for students' academic outcomes (e.g., Aldrup et al., 2018). Internal consistency was satisfactory at both points in time (α = .78 at Grade 5 and α = .84 at Grade 6).

Student-reported instructional clarity. Instructional clarity was assessed using student reports at Times 1 and 2. The scale was measured

[1] Complete item wordings are reported in Appendix A.

by three items addressing the clarity of teacher explanations (e.g., 'Our teacher explains even difficult things in an understandable manner'). The four-point Likert-type scale (1 = *completely disagree* to 4 = *completely agree*) was originally used in the COACTIV-Study (Baumert et al., 2008). The internal consistency of the scale in our sample was good at each time point (Grade 5 α = .80; Grade 6 α = .84).

Covariates. *School type* was controlled for using one dummy variable indicating the more academic tracks (Realschule track = intermediate track; Mittelschule track = combination of Hauptschule and Realschule) as compared to the Hauptschule track (the least academically demanding track). *Average achievement* was measured using students' achievement on standardized tests in mathematics and language arts covering standard content from the federal states' curricula in these subjects. Language achievement addressed students' reading comprehension (for a more detailed description, see also Dumont, Trautwein, Nagy, & Nagengast, 2014). Mathematics achievement was assessed for arithmetic rules, the metric system, or linear equations (see also Aldrup et al., 2018). All items had an open-ended, closed-ended, or multiple-choice format. Unidimensionality, measurement invariance across different subpopulations (school type, gender), and partial measurement invariance across measurement points were assured (Jonkmann et al., 2013). Students' responses on the math and German language achievement tests were separately scaled using a 2-PL model in Mplus (Muthén & Muthén, 1998–2019). Weighted likelihood estimates were used as personal parameters and revealed good reliability (α = .70 for both achievement domains; see Aldrup et al., 2018). The final achievement scores in mathematics and language arts were correlated ($r = 0.54$, $p < .001$). To assess student achievement at the class level, we aggregated students' individual scores at the classroom level.

8. Statistical analyses

To test the change in student-perceived emotional support, classroom management, and instructional clarity, and to examine how these changes were predicted by teacher enthusiasm and self-efficacy, we applied a multilevel latent change model (LCM) approach (LCM; McArdle, 2009; Steyer, Eid, & Schwenkmezger, 1997). We used a latent-manifest approach (Marsh et al., 2009) in which multiple manifest indicators were included to measure student-level and classroom-level latent constructs. Because we were interested in effects on the classroom level, we modelled the change in the variables only at the level of the classroom. At the student level, all latent constructs were allowed to correlate. The Mplus program version 8.0 was used for all analyses (Muthén & Muthén, 1998–2019).

In our study, a substantial amount of variance in student-perceived teaching quality was explained by students' classroom membership (emotional support Grade 5: $ICC_1 = .21$, $ICC_2 = 0.83$; Δ Grade 5–6: $ICC_1 = .16$ and $ICC_2 = .79$; classroom management Grade 5: $ICC_1 = .24$, $ICC_2 = .86$; Δ Grade 5–6: $ICC_1 = .14$, $ICC_2 = .75$; instructional clarity: $ICC_1 = .12$, $ICC_2 = .71$; Δ Grade 5–6: $ICC_1 = .16$ and $ICC_2 = .79$).

We tested measurement invariance across time (McArdle, 2009) and tested for strong measurement invariance; that is, item loadings and intercepts were held equal across time points (Byrne, 1989). To test measurement invariance, an unconditional multilevel LCM was estimated for each of the latent constructs separately, and measurement invariance restrictions were included sequentially. Difference testing was conducted in line with Chen (2007). The measurement invariance testing showed strong measurement invariance across time for student-perceived emotional support, classroom management, and instructional clarity at both time points, indicating that constructs measured at both time points were comparable. Additionally, measurement invariance tests supported the invariance of factor loadings across levels. The single steps of the measurement invariance testing are reported in Appendix B. Time invariance restrictions were kept in our multilevel latent change model.

To test Hypothesis 1 regarding the changes in the latent classroom variables, we tested an unconditional multilevel latent change model including measurement invariance restrictions. Following the latent change modeling approach, we included the three student-perceived teaching quality dimensions at Times 1 and 2 and added a set of fixed values (=1) for specific parameters to create change variables for each variable (McArdle, 2009). To test Hypothesis 2, we extended this multilevel LCM and added teacher-reported self-efficacy and enthusiasm as predictors of changes in the three latent classroom variables. In this model, we controlled for school type and average achievement in class. We allowed teacher enthusiasm and self-efficacy to correlate with the initial levels of student-perceived dimensions of teaching quality, because research has demonstrated cross-sectional relations between teacher enthusiasm, self-efficacy, and students' perceptions of teaching quality (Fauth et al., 2019; Kunter et al., 2013).

Data collected from large samples tend to show significant effects even when these effects are small or negligible (Nickerson, 2000). We therefore supplemented the significance tests by reporting standardized regression effects as measures of effect size. Goodness of model fit was evaluated using the following criteria (Tanaka, 1993): the Yuan-Bentler scaled χ^2 (YB χ^2, mean-adjusted test-statistic robust to non-normality), Tucker and Lewis index (TLI), comparative fit index (CFI), and root mean square of approximation (RMSEA) with the associated confidence intervals (CIs). Additionally, standardized root mean residual (SRMR) values were reported. TLI and CFI values greater than 0.95 (Hu & Bentler, 1999) and RMSEA values lower than 0.06 and $SRMR_{within/between} \leq 0.08$ (Hu & Bentler, 1999) were accepted as indicators of a good model fit.

Analyses of the proportion and mechanism of missing data showed that the highest percentage of missing values per item were for student-reported emotional support at 20.8% in Grade 5 (item 8[2]) and 15.7% in Grade 6 (item3[3]), for student-reported classroom management 19.7% (item 7[4]) in Grade 5 and 16.5% (item 1[5]) in Grade 6, and for student-reported instructional clarity, 30.6% in Grade 5 (item3[6]) and 23.1% in Grade 6 (item 2[7]). Including all student-reported items that were involved in this study at each time point, Little's MCAR test (Little, 1988) showed that data were missing completely at random for Grade 6 emotional support, $\chi^2(N = 1996) = 128.70$, $df = 110$, $p = .11$, as well as for classroom management, $\chi^2(N = 1996) = 76.68$, $df = 70$, $p = .27$, and instructional clarity, $\chi^2(N = 1996) = 9.17$, $df = 9$, $p = .42$. Missing data were subsequently handled using full information maximum likelihood (FIML) estimation (Arbuckle, 1996).

9. Results

9.1. Correlations

Latent intercorrelations of the study variables including strong measurement invariance for the student-perceived teaching quality variables at the classroom level are reported in Table 1. Results show that teacher self-efficacy in Grade 5 was not significantly associated with student-perceived emotional support in Grade 5 ($r = .17$, $p = .11$) and Grade 6 ($r = .10$, $p = .55$) or with student-perceived class-level

[2] Item wording was: "Our homeroom teacher is interested in our life outside school."

[3] Item wording was: "Our homeroom teacher tries to understand our situation."

[4] Item wording was: "With our homeroom teacher we can work without disturbances."

[5] Item wording was: "With our homeroom teacher instruction is rarely disrupted."

[6] Item wording was: "Our homeroom teacher is able to explain things in an understandable manner."

[7] Item wording was: "Our homeroom teacher is always able to express him-/herself clearly."

Table 1
Means, standard deviations of the study variables, and intercorrelations at the classroom level.

	M	*SD*	2	3	4	5	6	7	8	9	10
1) Teacher self-efficacy (T)	3.00	0.41	.59***	.17	.10	.08	.03	.21	.09	-.06	.08
2) Teacher enthusiasm (T)	3.44	0.47		.27*	.32**	.15	.25	.21	.10	.24*	-.18
3) Emotional support Grade 5 (S)	3.30	0.61			.73***	.61***	.63***	.48**	.70***	.10	-.10
4) Emotional support Grade 6 (S)	3.07	0.76				.63**	.83***	.49**	.89***	.21	-.21
5) Classroom manag Grade 5 (S)	2.57	0.62					.79***	.48**	.61***	.20	-.12
6) Classroom manag Grade 6 (S)	2.49	0.67						.59***	.78***	.21	-.18
7) Instructional clarity Grade 5 (S)	3.16	0.78							.45*	.14	.02
8) Instructional clarity Grade 6 (S)	3.08	0.80								.13	-.15
9) School type ('Hauptschule')	–	–									-.83***
10) Average achievement	0.62	0.93									

Note. *$p < .05$; **$p < .01$; ***$p < .001$. (S) Student-reported. (T) Teacher-reported. Classroom manag = Student-perceived classroom management.

classroom management (Grade 5: $r = .08$, $p = .57$; Grade 6: $r = .03$, $p = .86$) and instructional clarity (Grade 5: $r = .21$, $p = .14$; Grade 6: $r = .09$, $p = .51$). Teacher enthusiasm in Grade 5 was significantly and positively associated with student-perceived class-level emotional support (Grade 5: $r = .27$, $p = .03$; Grade 6: $r = .32$, $p = .007$). Teacher enthusiasm in Grade 5 was not significantly associated with student-perceived class-level classroom management (Grade 5: $r = .15$, $p = .25$; Grade 6: $r = .25$, $p = .07$) or with instructional clarity (Grade 5: $r = .21$, $p = .12$; Grade 6: $r = .23$, $p = .06$). Teacher self-efficacy and enthusiasm were significantly and positively correlated ($r = .59$, $p < .001$).

9.2. Teacher enthusiasm, self-efficacy, and changes in student-perceived teaching quality

In the first step, we modelled an unconditional latent change model to assess the changes in student-perceived emotional support, classroom management, and instructional clarity at the classroom level. In line with Hypothesis 1, student-perceived emotional support, student-perceived classroom management, and student-perceived instructional clarity decreased significantly from Grade 5 to Grade 6, with the strongest rates of decline in student-perceived emotional support and classroom management (emotional support: $M = -0.22$, $SE = 0.03$, $p < .001$; classroom management: $M = -0.10$, $SE = 0.02$, $p < .001$; instructional clarity: $M = -0.08$, $SE = 0.03$, $p = .026$). The model showed a good fit to the empirical data: $\chi^2 = 1850.736$, $df = 834$, CFI = 0.94, TLI = 0.94, RMSEA = 0.03, $SRMR_{within} = 0.04$, $SRMR_{between} = 0.06$. The latent difference scores and the respective levels of significance are reported in Table 2.

In the next step, our model included teacher-reported enthusiasm for teaching and self-efficacy and the covariates (school type, class-level achievement) as predictors of changes in student-perceived classroom-level emotional support, instructional clarity, and classroom management.[8,9] The model showed a good fit to the empirical data: $\chi^2 = 2908.96$, $df = 1481$, CFI = 0.93, TLI = 0.93, RMSEA = 0.02, $SRMR_{within} = 0.04$, $SRMR_{between} = 0.08$. The standardized coefficients are reported in Table 3 and are depicted in Fig. 2.

Table 2
Means and standard errors.

Latent Variable Range		*M*	*SE*	*Var*
Emotional support 1-4	Initial level	3.34	0.03	0.06***
	Change	−0.22***	0.03	0.07***
Classroom management 1-4	Initial level	2.43	0.03	0.06***
	Change	−0.10***	0.02	0.05***
Instructional clarity 1-4	Initial level	2.98	0.03	0.05***
	Change	−0.07*	0.03	0.11***

Note. ***$p < .001$. Latent means and standard errors were derived from unconditional change models. Measurement invariance restrictions were retained in these models.

In line with Hypothesis 2a, teacher-reported enthusiasm in Grade 5 was significantly and positively associated with the average change in class-level student-perceived classroom management ($\beta = .18$, SE = 0.06, $p = .007$). Thus, high levels of teacher-reported enthusiasm for teaching attenuated the decline in classroom management. Hypothesis 2b was not confirmed because teacher-reported self-efficacy in Grade 5 was not significantly related to the change in class-level student-perceived emotional support ($\beta = -.18$, SE = 0.19, $p = .36$), classroom management ($\beta = -.22$, SE = 0.16, $p = .19$) or instructional clarity ($\beta = -.18$, SE = 0.25, $p = .48$).

10. Discussion

The aim of this study was to examine the effects of teacher-reported enthusiasm and self-efficacy on changes in student-perceived emotional support, classroom management, and instructional clarity during the first year of secondary school. We identified a significant decrease in student-perceived emotional support, classroom management, and instructional clarity over the school year. Even when controlling for class-level achievement and school type, teacher-reported enthusiasm for teaching in Grade 5 buffered the decline in student-perceived classroom management. Teacher-reported self-efficacy, however, was not substantially related to changes in student-perceived emotional support, classroom management or instructional clarity. In the following sections, we discuss our findings in line with our hypotheses and also outline possible implications for educational research and teaching practice.

10.1. Change in student-perceived teaching quality

In line with our expectations (Hypothesis 1), the findings of this study showed a significant decrease in student-perceived emotional support, classroom management, and instructional clarity in the first year of secondary education. Previous findings had already shown that teacher involvement as rated by observers (Maulana et al., 2013),

[8] We also tested models that included both teacher enthusiasm and self-efficacy separately and we also tested models that included both aspects and each component of teaching quality separately. These models are reported in Appendix C.

[9] In additional analyses, we included the average ratio of students' immigrant background as a covariate in our analyses. The effects of teacher self-efficacy and teacher enthusiasm on the level or change of perceived teaching quality from Grade 5 to Grade 6 were similar in terms of strengths and statistical significance. Thus, we did not include these results in the manuscript. The coefficients are reported in Appendix D.

Table 3
Standardized coefficients from the between-level part of the MLCM.

Predictor	Support: Level Grade 5			Support: Change			Management: Level Grade 5			Management: Change			Clarity: Level Grade 5			Clarity: Change		
	β	*SE*	*p*	β	*SE*	*p*	β	*SE*	*p*	β	*SE*	*p*	β	*SE*	*p*	β	*SE*	*p*
Self-efficacy (T)	.07	.14	.64	-.16	.16	.31	.09	.15	.53	-.25	.17	.15	.21	.17	.22	-.13	.17	.45
Enthusiasm (T)	.18	.15	.24	.24	.14	.08	-.07	.16	.65	**.39**	**.13**	**.003**	.01	.16	.98	.15	.16	.35
Non-academic	-.04	.20	.84	-.11	.15	.48	.33	.17	.06	-.29	.22	.19	**.45**	**.19**	**.017**	**-.40**	**.19**	**.037**
Achievement	-.06	.19	.73	-.22	.14	.12	.23	.18	.20	-.24	.20	.22	**.44**	**.20**	**.023**	**-.42**	**.18**	**.025**

Note. Support = Emotional support. Management = Classroom management. Clarity = Instructional clarity.

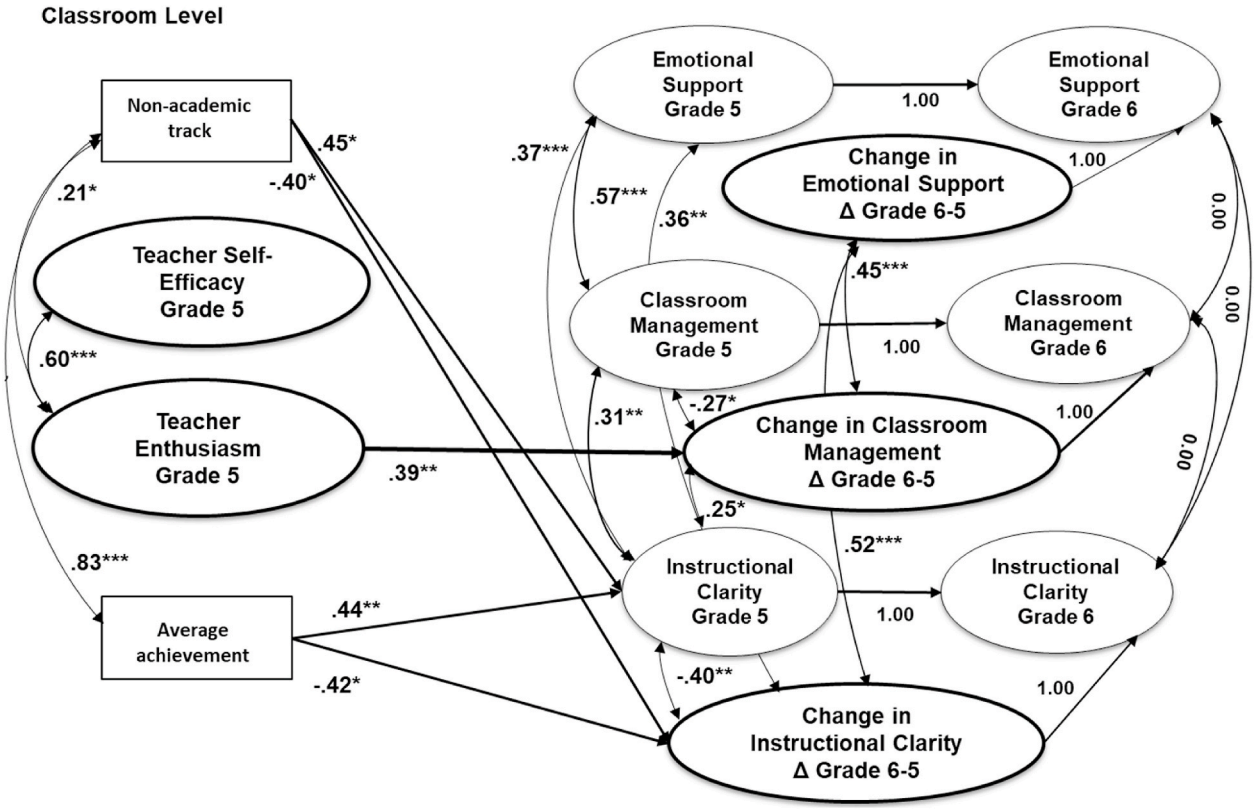

Fig. 2. Structural paths for the relations between teacher-reported teacher self-efficacy and enthusiasm and student-perceived teaching quality. Only statistically significant ($p < .05$) standardized coefficients are displayed. All coefficients of the model are reported in Table 3. Invariance restrictions were retained.

instructional clarity as rated by students (Maulana et al., 2016), and emotional support as rated by teachers decline during middle school (Reddy et al., 2003). We focused on similar theoretical constructs and their changes in this study. Maulana et al. (2013), for example, assessed observer-rated teacher involvement defined as teachers' behavior related to the expression of enjoyment, caring, appreciation, and time dedication when interacting with students. In our study, we included students' perceptions of emotional support, considering student-perceived teachers' care, trustworthiness, and interest in their students' lives. Our findings extend prior research by showing that multiple dimensions of teaching quality, as perceived by students, decline at the beginning of secondary education. One possible explanation for these declines is provided by stage-environment fit theory (Eccles & Roeser, 2009), which proposes that a mismatch between adolescents' developmental needs and the characteristics of their learning environments causes declines in the perceived quality of instruction, particularly in the quality of their relationships to their teachers. Following these theoretical assumptions, the mismatch between students' developmental needs and the opportunities afforded by their classroom learning environments is particularly strong in the first years of secondary education due to a greater emphasis on competition and achievement gains and lower student-teacher relationship quality.

10.2. Teacher-reported enthusiasm, self-efficacy, and student-perceived teaching quality

This study contributed to previous work by showing that teacher enthusiasm for teaching is an important resource in the first year of secondary school, as it might help prevent declines in class-level perceived classroom management. Confirming our assumptions (Hypothesis 2a), teacher enthusiasm at the beginning of Grade 5 had a positive effect on changes in student-perceived classroom management from Grade 5 to Grade 6, but was not associated with the initial level of student-perceived classroom management at Grade 5. A possible explanation for these findings is that at the beginning of secondary school in Grade 5, students do not yet know their teachers and thus might not yet be strongly affected by their teachers' characteristics. However, over the course of the school year, teachers' initial enthusiasm might buffer the decline in student-perceived classroom management because students get to know their teachers better and can form close relationships to enthusiastic teachers, resulting in fewer disruptions (Keller et al., 2015; Kunter et al., 2013). Another explanation is related

to psychological processes on the teachers' side - classroom disturbances typically increase during the first year of secondary education (Maulana et al., 2016), and enthusiastic teachers might have the resources to deal more effectively with problematic student behaviors possibly because they are more concentrated on student behaviors and teaching in class (Kunter & Holzberger, 2014). Our findings suggest adopting a dynamic classroom perspective in which enthusiastic teachers are able to prevent disruptions effectively throughout the year.

In this study, we did not identify effects of teacher enthusiasm on changes in student-perceived support. These findings contrast with previous research showing significant associations between teacher enthusiasm for teaching and a student-perceived supportive climate in primary school (Fauth et al., 2019) and at the end of secondary school (Kunter et al., 2013). However, previous research has mostly involved cross-sectional studies when investigating the relations between teacher enthusiasm and perceived support, and this study focused on longitudinal relations. Besides the study's longitudinal design, another explanation for our findings might be that our study focused on a different age group. In early adolescence, socialization agents other than teachers might be important for perceived support, which has also been suggested by previous empirical work (Lazarides et al., 2019; Praetorius et al., 2017). However, because the effect of teacher enthusiasm on changes in student-perceived emotional support across the school year were marginally significant, future studies with larger samples might detect interrelations between teacher enthusiasm and changes in emotional support as perceived by students.

We did not find significant relations between teacher self-efficacy in teaching and changes in student-perceived teaching quality (Hypothesis 2b). One possible explanation for this finding might be that teacher enthusiasm is easier for students to observe than teacher self-efficacy, and might therefore be of greater importance for their relationships to the teacher as well as for minimizing disruptive behaviors in class. Kunter and Holzberger (2014), for example, suggested that teacher enthusiasm enables teachers to be more attentive to students' needs and to focus more on students' behaviors in class. Another explanation might be that teacher self-efficacy is more important for teachers' evaluations of teaching quality than for students' evaluations of teaching quality. However, to investigate such explanations in detail, more longitudinal research is needed that takes into account the simultaneous effects of teacher enthusiasm and self-efficacy on students' perceptions of teaching quality.

10.3. Limitations

Despite its contribution to current research, our study has several limitations that need to be discussed. First, teacher self-efficacy was not assessed in relation to a specific school subject or class in this study, which needs further discussion because previous research (Klassen, Tze, Betts, & Gordon, 2011; Tschannen-Moran & Woolfolk Hoy, 2001) has shown that self-efficacy measures are most predictive of future behaviors when measured in relation to a specific context. However, this study focused on homeroom teachers who teach their students several school subjects and know their classrooms very well. Consequently, assessing teacher self-efficacy, enthusiasm or teaching quality in relation to a specific subject would not capture the great variety of interactions between homeroom teachers and their students in this study. In the German school system, homeroom teachers have a particularly close connection with their students (Aldrup et al., 2018), because the teachers spend a substantial amount of time with them in class. To achieve a greater generalizability of results, it might be relevant to test whether the results are replicable in samples with teachers only teaching particular subjects.

A second limitation might be that the indicators of student-perceived teaching quality were highly correlated in Grade 6, raising questions about the validity of the measures. It is, however, well known from prior studies that student-perceived teaching quality dimensions are highly correlated, but that it is important to treat them as separate scales because different teaching quality dimensions predict different academic outcomes (Decristan & Klieme, 2015; Wagner et al., 2016). Accordingly, student-perceived teaching quality measures were predicted differently by teachers' enthusiasm and self-efficacy in this study, which emphasizes further that it is highly relevant to include the teaching quality dimensions as separate indicators despite their high proportion of shared variance. The same applies to teacher self-efficacy and teacher enthusiasm for teaching, which were also moderately strongly correlated, but only teacher enthusiasm predicted student-perceived teaching quality.

Third, our sample was limited in several respects – for example, we used data from non-academic-track schools only and thus did not include data from the *Gymnasium*, which is the highest track in Germany. In the Gymnasium, students typically report higher classroom management and lower support compared to non-academic-track schools (Klusmann, Kunter, Trautwein, Lüdtke, & Baumert, 2008). Another limitation was that our sample only comprised $n = 100$ classrooms on the classroom level. Our models converged in all steps of the analyses, and although we included a series of restrictions to our model by including measurement invariance and fixed parameters in the latent change model, the model estimation terminated normally in each step of our analysis. Consequently, we can assume that our models show accurate results. However, future studies are needed to replicate our findings with larger samples on the classroom level.

Lastly, we limited our scope to examining the effects of teacher enthusiasm and self-efficacy on different dimensions of student-perceived teaching quality and did not consider reciprocal relations between these variables. Previous longitudinal research showed such effects, affirming the need to take into account that students' perceptions of teaching quality might influence teachers' enthusiasm (Praetorius et al., 2017) and self-efficacy (Holzberger et al., 2013). Future studies should therefore examine reciprocal interrelations.

10.4. Conclusions

The findings of this study extend previous research by highlighting the role that teacher enthusiasm and self-efficacy play in changes to student-perceived teaching quality during the first year of secondary school. We were able to show that teacher enthusiasm for teaching is an important resource during this critical developmental stage of students' academic lives, because it impedes the decline in class-level student-perceived classroom management. The implications need to be discussed with caution, as we did not examine directional links between teacher enthusiasm, self-efficacy, and perceived teaching quality and because we focused on a specific sample of students. However, one possible implication might be that it is important to discuss the role of teacher enthusiasm and self-efficacy already in teacher education and provide teaching students with courses that allow them to reflect on their strengths and weaknesses, career motivations, and passions in teaching (Richardson, Karabenick, & Watt, 2014). Furthermore, future studies should examine the reciprocal links between teacher enthusiasm and teaching quality in class, as teacher enthusiasm might not only affect but also be affected by the disciplinary climate in classrooms (Kunter et al., 2011).

Author statement

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Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.learninstruc.2020.101435.

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