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Original Article

The teacher-class relationship

A mixed-methods approach to validating a new scale

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Abstract: Teacher-student relationships have been shown to be highly relevant for student outcomes, but they are also important for teachers. Teachers have a basic need for relatedness with their students and recent empirical evidence underlines the relevance of teachers' relationships with the students of a class. However, a validated instrument which specifically addresses the relational phenomenon between a teacher and the entire group of students within a class – which we define as teacher-class relationship – is yet missing. Thus, the goal of the present research was to develop and validate an instrument which captures the teachers' self-reported quality of the teacher-class relationship (the TCR scale). To do so, we adopted a mixed methods approach: In Study 1 (qualitative, N = 56), we analyzed interviews to explore the cognitive validity of the TCR items, and in Study 2 (quantitative, N = 209), we tested the psychometric quality of the TCR scale and its external validity in terms of correlative links with related constructs. Study 1 results showed that seven out of the original 13 developed items were highly cognitively valid in that the teachers associated main aspects of relationship quality with these items and answered them by referring predominantly to the whole class instead of individual students. Study 2 results confirmed that these seven items formed a unidimensional scale with high internal consistency (Cronbach's α = .89). Furthermore, the TCR scale was significantly linked with teachers' class-specific teaching emotions and self-efficacy as well as with teachers' job-related burnout symptoms and emotional labor. We conclude that the TCR scale represents a reliable, valid and parsimonious instrument to measure the quality of teacher-class relationships. We hope that the existence of this scale fuels future research to further investigate teacher-class relationships and their connections with teachers' emotional and professional wellbeing.

Keywords: Teacher-student relationships, teacher wellbeing, cognitive validation interviews, scale validation

Die Lehrer-Klassen-Beziehung: Ein Mixed-Methods Ansatz zur Validierung einer neuen Skala

Zusammenfassung: Eine Vielzahl bestehender Forschungsbefunde unterstreicht die große Bedeutung von Lehrer-Schüler-Beziehungen für Schülerinnen und Schüler, aber auch für Lehrkräfte. Lehrkräfte haben ein Grundbedürfnis nach Verbundenheit mit ihren Schülerinnen und Schülern, und neuere empirische Befunde unterstreichen die Bedeutung der Beziehung von Lehrkräften mit ganzen Klassen. Allerdings fehlt bisher ein validiertes Instrument, das speziell die Beziehung zwischen einer Lehrkraft und der gesamten Gruppe von Schülerinnen und Schülern einer Klasse adressiert. Ziel der vorliegenden Untersuchung war es daher, ein Instrument zu entwickeln und zu validieren, welches die von den Lehrkräften bewertete Qualität der Lehrer-Klassen-Beziehung erfasst (die Teacher-Class-Relationship [TCR]-Skala). Zu diesem Zweck wurde ein Mixed-Methods Ansatz gewählt: In Studie 1 (qualitativ, N = 56) analysierten wir Interviews, um die kognitive Validität der neu entwickelten TCR-Items zu untersuchen, und in Studie 2 (quantitativ, N = 209) untersuchten wir die psychometrische Qualität der TCR-Skala und deren externe Validität hinsichtlich korrelativer Zusammenhänge mit verwandten Konstrukten. Die Ergebnisse von Studie 1 zeigten, dass sieben der ursprünglich 13 entwickelten Items eine hohe kognitive Validität aufwiesen, da die Lehrkräfte mit diesen die Hauptaspekte von Beziehungsqualität assoziierten und sich bei der Beantwortung der Items überwiegend auf die gesamte Klasse und nicht auf einzelne Schülerinnen oder Schüler bezogen. Die Ergebnisse von Studie 2 bestätigten, dass diese sieben Items eine eindimensionale Skala mit hoher interner Konsistenz (Cronbachs α = .89) bildeten. Darüber hinaus stand die TCR-Skala in einem signifikanten Zusammenhang mit den klassen- und unterrichtsspezifischen Emotionen und Lehrer-Selbstwirksamkeit sowie mit berufsbezogenem Burnout und Facetten emotionaler Arbeit. Wir schlussfolgern, dass die TCR-Skala ein zuverlässiges, valides und ökonomisches Instrument zur Erfassung der Qualität von Lehrer-Klassen-Beziehungen darstellt. Wir hoffen, dass das Vorhandensein dieser Skala weitere Forschung zur Lehrer-Klassen-Beziehung und deren Zusammenhänge mit dem emotionalen Wohlbefinden und der Professionalität von Lehrkräften anregt.

Schlüsselwörter: Lehrer-Schüler-Beziehung, Wohlbefinden von Lehrkräften, kognitive Interviews, Fragebogenvalidierung

"Basically, I think that a good relationship with a class you are teaching is very important – only then, learning happens."
Statement of a secondary school teacher.

Teacher-student relationships have been studied from multiple theoretical viewpoints, including attachment theory, self-determination theory, interpersonal theory, and theories explaining social-motivational processes (Sabol & Pianta, 2012; Skinner et al., 2008; Wentzel et al., 2010; Wubbels & Brekelmans, 2005). The last decade has brought forward cumulative evidence that teacher-student relationships have a substantial influence on key academic outcomes – specifically student motivation and performance in school (Hughes & Cao, 2018; Martin & Collie,

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2018; Nurmi, 2012; Quin, 2017; Roorda et al., 2017; Roorda et al., 2011). Recent research also takes the teacher into account, with results indicating that the quality of teacher-student relationships is essential for teachers' wellbeing and accomplishments (Aldrup et al., 2018b; Hagenauer et al., 2015; Hargreaves, 2000; Klassen et al., 2012; O'Connor, 2008). The present contribution focuses on teachers' perspectives and presents a newly developed self-report scale for the assessment of teacher relationships with their classes, from the teachers' point of view. In the first (qualitative) study, we applied cognitive validation interview techniques (e.g., Karabenick et al., 2007; Willis, 2015), and in the second (quantitative) study, we tested the psychometric quality of the newly developed scale. We propose that the findings will expand the scientific understanding of the phenomenon, and the existence of a validated scale with a clear-cut, concise definition of teacher-class relationships will help advance research on teacher wellbeing and accomplishments, but also instructional quality and general classroom functioning.

Assessing teacher-student relationships

The assessment of teacher-student relationships through self-report can be approached from different angles. First of all, instruments can use either students or teachers as the source of information. Second, instruments differ in that they either measure the relationship (a) between a single teacher and an individual student (i.e., they conceptualize the relationship as a dyadic phenomenon between two individuals), or (b) between the collective of teachers and students at a school (i.e., they conceptualize relationship quality as a collective, school-wide phenomenon) or (c) between a teacher and the entire group of students within one class (i.e., they conceptualize the relationship as phenomenon between an individual and a group). A prominent and widely used example for (a), reports about the relationship quality as a dyadic phenomenon from the teachers' perspective, is Pianta et al.'s Student-Teacher Relationship Scale (2001). Hannover et al. (this volume) propose a new instrument which also focuses on the dyadic interaction between teachers and students from the teacher perspective. Examples for reports about the dyadic relationship quality from the students' perspective are Koomen et al.'s Student Perception of Affective Relationship with Teacher Scale (2015) and Davis's Quality of the Student/Teacher Relationship Scale (2001). Examples for (b), judgments of the overall quality of relationships between teachers and students as reported from both perspectives, can be found in research on classroom climate and social support (e.g., Collie et al., 2012; Eder & Mayr, 2000; Hertel et al., 2014; Mang et al., 2018; Rauer & Schuck, 2003; Zullig et al., 2010). Examples for (c), reports from the students' perspective on the teacher's relationship with a group of students are Wubbels et al.'s Questionnaire on Teacher Interaction (Wubbels & Levy, 1993) and Saldern and Littig's Teachers' Care Subscale (Bieg et al., 2011). The large majority of these instruments is widely used and well established, and research considering teacher-student relationships is predominantly driven by such a dyadic conceptualization of relationships in the classroom.

In contrast, we identified a conspicuous lack of research, and corresponding instruments, which conceptualizes relationships as an individual-group phenomenon from the teachers' perspective. We label this concept *teacher-class-relationship* and thus, address the relationship quality between a teacher and his or her class (i.e., the entire group of students) as reported by the teacher. We argue that teachers, specifically in the secondary school context, mostly interact with the whole class during teaching and the interaction with individual students is limited due to the large number of classes and students they teach. Given the importance of teacher-student relationships for secondary school students in conjunction with the decline of their quality (Eccles et al., 1993; Maulana et al., 2013), it seems important to investigate different perspectives on these relationships as to better understand and improve them. Prior theoretical models of teacher-student relationships also suggest that teachers build relationships with classes which are different from their relationships with the individual students (Wubbels et al., 2014), that teachers form mental representations of relationships on the individual and the classroom level (Spilt et al., 2011), and that the whole class can become an attachment object (Riley, 2011). There are scattered studies which used instruments that come conceptually close to this idea as they had teachers report about their relational behavior and/or relationship quality with the students of a class (Aldrup et al., 2018b; Baumert et al., 2009; Hagenauer et al., 2015; Klassen et al., 2012). These studies unanimously emphasize the importance of such teacher-reported teacher-class relationships. Also, there is empirical evidence that the class as point of reference plays an important role for teachers as it has been shown that teachers' emotional experience during teaching varies systematically between classes (Frenzel et al., 2015; Kunter et al., 2011). However, existing studies focusing on teachers' relationships with a class all used self-developed scales without documented validity. Specifically, evidence is lacking as to whether those instruments measure the mentally represented relationship quality between teachers and their class validly and reliably.

Overall, we concluded that a comprehensive and validated instrument that specifically addresses the teacher-class relationship would be a valuable contribution to the field. In creating and validating the instrument, our key goal was to assure that when teachers respond to our newly developed items, they indeed think about the entire class rather than about individual students. To this end, we selected a set of established items from existing instruments on teacher-student relationships and reformulated them to target the whole class. Next, we used cognitive interviewing techniques to validate the items. Cognitive validation implies asking participants to verbalize (a) how they comprehend an item, (b) which corresponding information they retrieve from memory when answering it, and (c) to explain why they select a certain response (e.g., Karabenick et al., 2007; Willis, 2015). By systematically prompting these steps of item response, items can be scrutinized for a sufficient match between participants' and researchers' conceptualization of the target constructs. For the present purpose, we used this method to verify that teachers, when answering the items of the new instrument, referred predominantly to the whole class and to our conceptualization of the teacher-class relationship.

Conceptualizing the teacher-class relationship

We define the construct of the teacher-class relationship as the relationship between a teacher and the whole class as relationship partner who both shape the interaction. In this definition, we apply the concept ‘relationship’ to describe the dynamic interplay between the interacting parties, their interaction patterns, and contextual influences (e.g., Pianta et al., 2003; Wubbels et al., 2014). Focusing on the teacher's side, we are interested in the teacher's mental representation of the interaction patterns with the class as an entity. Thus, we explore teachers' perceptions and interpretations of the interpersonal transactions with the class in terms of cognitive judgments about how well they connect and relate with the students of the class. In so doing, we also integrate the concept of ‘relatedness’ as proposed within self-determination theory (e.g., Connell & Wellborn, 1991; Furrer & Skinner, 2003), and suggest that teachers have a need for, and a sense of, relatedness or belonging with their classes.

Furthermore, in line with an attachment-theoretical perspective, we conceptualize positive teacher-class relationships not only as high on ‘closeness’, but also as low on ‘conflict’, with ‘closeness’ describing the degree of warmth and positive affect in the relationship, and ‘conflict’ describing the degree of negativity and lack of rapport between teacher and students (Koomen & Jellesma, 2015; Sabol & Pianta, 2012; Verschueren & Koomen, 2012). We choose to integrate these three themes in our definition of the teacher-class relationship as they are most predominant in the literature. Furthermore, these themes manifest conceptual proximity and overlap with other concepts used to measure teacher-student relationships, e.g., ‘closeness’ with affection / attunement, warmth / intimacy and communion (Hughes et al., 2008; Skinner et al., 2008; Wubbels et al., 2014), ‘conflict’ with dissatisfaction, alienation and negativity (Brinkworth et al., 2017; Murray & Greenberg, 2001; Murray & Zvoch, 2011), and ‘relatedness’ as being linked to several cognitive processes which shape motivation through interaction with significant others (Martin & Dowson, 2009).

We placed great emphasis on differentiating the teacher-class relationship from related, yet different concepts of teachers' experience, notably teacher social and interpersonal behaviors, teacher self-efficacy and teacher emotions. As such, we focus on teachers' mental representations of the quality of their relationship with the class, and exclude teacher behaviors such as academic help or instructional support (Hagenauer et al., 2015; Roorda et al., 2017). Thus, we set our concept apart from teachers' behavioral efforts to establish positive relationships with their students to fulfill their need of relatedness and from their interpersonal behavior in the classroom as part of their instructional strategies (Baumert et al., 2009; Klassen et al., 2012). Instead of focusing on teachers' interpersonal behavior, the teacher-class relationship explicitly encompasses teachers' interpretation of how the students of the class interact with them and shape the relationship.

We acknowledge that social relationships and emotions are conceptually intertwined as relationships are assumed to be a core source of emotions (Frijda & Mesquita, 1994; Schutz, 2014) and experiences of belonging, or lack thereof, evokes strong emotional responses (Baumeister & Leary, 1995). Furthermore, relationship building with students can be challenging for teachers as it requires them to mask and manage their emotions (Chang, 2009; Hargreaves, 2000). However, we make a clear distinction between the affective experiences during interactions and the cognitive evaluation of the relationship quality as stored in the mental representational model of the relationship. Mental representations of relationships consist of the generalized perceptions of and the stored information about the ongoing interpersonal relationship (e.g., Pianta et al., 2003; Ryan et al., 1994), and thus, are distinct from the emotional response during the actual interaction (Spilt et al., 2011).

In addition, we also differentiate the mental representation of the relationship quality from teachers' beliefs about their teaching efficacy to discern their perception of good relationships with students from their success at delivering high-quality instruction in terms of positively influencing student engagement, successful classroom management and effective instructional strategies. In sum, we consider teachers' supportive behaviors, their emotions and self-efficacy as conceptually distinct concepts which are important correlates of the teacher-class relationship, but not core components of the relationship quality.

This conceptualization of the teacher-class relationship guided our item selection from the list of existing items on teacher-student relationships. Additionally, in our cognitive interviews to validate the items, we based our judgment of whether there was a sufficient match between participants' and our scientific understanding of the teacher-class relationship on this conceptualization.

The present research

The present research sought to explore whether and how the *teacher-class relationship* can be operationalized, and whether it can be validly measured with our newly developed set of self-report items (henceforth, TCR scale). To validate this new set of TCR items, we designed a mixed-methods, two-study approach to combine different validation procedures. In Study 1, we used qualitative cognitive validation techniques to explore to what extent the proposed items reflected the main theoretically assumed aspects of relationship quality, and to what degree they were suitable to capture the specific idea of the teacher-group perspective of our instrument. In Study 2, we applied quantitative validation techniques to explore the psychometric quality of our newly developed TCR scale. This combination of qualitative and quantitative data allowed us to gain deeper insights into teachers' understandings of the items and their response patterns. By applying cognitive validation interview techniques, we are able to detect possibly misleading items on a granular level and then use a subset of items in a questionnaire survey to draw conclusions on a more generalizable level. By integrating findings across the qualitative and the quantitative validation process, we are able to present a final teacher-class relationship scale which comprises the most suitable items to measure teacher-class relationships.

Study 1

The aim of this qualitative study was to verify that teachers have an intuitive understanding of the teacher-class relationship when answering the TCR items as interview questions. Therefore, in a first step, we identified the main topics which teachers associated with the TCR items using an inductive coding procedure. In a second step, we used a deductive coding procedure to select the most suitable items based on their code frequencies. We assessed the suitability of each item through the frequency of coded statements with regard to (a) the main aspects of relationship quality and (b) the representation of the class as a group.

Table 1. Instruments targeting teacher-student relationships or relational behaviors

Teachers' perspective		
Dyadic	Collective	Class
Ang (2005)[a]	Collie et al. (2012)[a]	Aldrup et al. (2018b)
Brinkworth et al. (2017)[a]	Hertel et al. (2014)	Baumert et al. (2009)
Hannover et al. (this volume)[a]	Mang et al. (2018)	Hagenauer et al. (2015)
Hughes et al. (1999)[a]		Klassen et al. (2012)
Hughes et al. (2008)[a]		Roza et al. (this contribution)[a]
Milatz et al. (2014)[a]		
Pianta (2001)[a]		
Skinner et al. (2008)[a]		
Students' perspective		
Dyadic	Collective	Class
Blankemeyer et al. (2002)[a]	Crosnoe et al. (2004)	Bieg et al. (2011)[a]
Brinkworth et al. (2017)[a]	Eder and Mayr (2000)[a]	Feldlaufer et al. (1988)[a]
Davis (2001)[a]	Gregory and Weinstein (2004)[a]	Mang et al. (2019)
Furrer and Skinner (2003)	Mang et al. (2018)	Trickett and Moos (1974)[a]
Hughes et al. (2008)[a]	Malecki and Demaray (2002)[a]	Wubbels and Levy (1993)[a]
Johnson et al. (1985)[a]	Murray and Greenberg (2001)[a]	
Koomen and Jellesma (2015)[a]	Rauer and Schuck (2003)[a]	
Murray and Zvoch (2011)[a]	Zullig et al. (2010)[a]	
Ryan et al. (1994)[a]		
Skinner et al. (2008)[a]		
Weinstein et al. (1982)[a]		

Note: [a] Validated scale (i.e., extended information about reliability and validity available).

Item selection and formulation process

We conducted a comprehensive literature review of the topic of teacher-student relationships and retrieved existing instruments and their items to establish a well-grounded baseline for item selection.

Search terms for our literature search were "teacher", "student", "child" and "relationship" in PsycInfo and PSYNDEX. We extracted all articles which reported instruments targeting teacher-student relationships and relational behaviors, conceptualized both as a dyadic and as a collective phenomenon, and assessed both from the students' and the teachers' perspective. Cross-references were checked for further instruments and, if necessary, authors were asked for the full number of items if only a partial representation was included. Overall, we identified 36 scales from different research perspectives, with scales comprising between 6 and 28 items (see Table 1 for details).

In line with our conceptualization of the teacher-class relationship detailed above, we applied the following guiding principles for item inclusion: the items should not explicitly describe any emotional experiences (e.g., "I get angry with this student"), nor self-efficacy beliefs (e.g., "This student makes me feel successful as a teacher"), or behavioral descriptions (e.g., "I often praise this student"). Next, as far as necessary, we translated the items into German and reformulated them to represent the teacher's perception of the whole class. In order to avoid for items to be overly suggestive, instead of asking for teachers' agreement with valanced statements (e.g., "My relationship with this class is good") we chose to formulate neutral questions ("How is your relationship with this class?"). These question-type items were to be answered either on a scale from "very bad" to "very good," or on a scale from "very little" to "very much" (see also Tschannen-Moran & Hoy, 2001, for a similar approach to assess teacher self-efficacy). The resulting initial set of items to assess the teacher-class relationship encompassed thirteen items, including five items concerning the theme of closeness (e.g., "Do you feel connected with this class?"), five items concerning the theme of conflict (e.g., "Do you clash with

Table 2. Teacher-Class Relationship scale (TCR scale)

Validated Items	7-Point Likert Scale
1_How is your relationship with this class? *[relationship]* [a] Wie ist Ihre Beziehung zu dieser Klasse?	"very bad" to "very good"
2_How is your rapport with this class? *[rapport]* [a] Wie ist Ihr Draht zu dieser Klasse?	"very bad" to "very good"
4_Do you feel connected to this class? *[connected]* [b] Fühlen Sie sich mit dieser Klasse verbunden?	"very little" to "very much"
6_Can you trust this class? *[trust]* [b] Können Sie dieser Klasse vertrauen?	"very little" to "very much"
9_Do you feel rejected by this class? *[rejected]* [c] Haben Sie das Gefühl, dass diese Klasse Sie ablehnt?	"very little" to "very much"
11_Do you wish you didn't have to teach this class? *[not teach]* [c] Wünschten Sie sich diese Klasse nicht unterrichten zu müssen?	"very little" to "very much"
12_Do you feel respected by this class? *[respected]* [b] Fühlen Sie sich von dieser Klasse respektiert?	"very little" to "very much"
Dropped Items	**7-Point Likert Scale**
3_How well do you deal with this class? *[deal with]* [a] Wie kommen Sie mit dieser Klasse zurecht?	"very bad" to "very good"
5_Do you get in trouble with this class? *[trouble]* [c] Geraten Sie mit dieser Klasse in Schwierigkeiten?	"very little" to "very much"
7_Do you clash with this class? *[clashing]* [c] Geraten Sie mit dieser Klasse aneinander?	"very little" to "very much"
8_Do you like this class? *[liking]* [b] Mögen Sie diese Klasse?	"very little" to "very much"
10_Can you rely on this class? *[rely on]* [b] Können Sie sich auf diese Klasse verlassen?	"very little" to "very much"
13_Does this class get on your nerves? *[nerves]* [c] Geht Ihnen diese Klasse auf die Nerven?	"very little" to "very much"

Note: [a] Items pertaining to the theme relatedness; [b] Items pertaining to the theme closeness; [c] Items pertaining to the theme conflict.

this class?"), and three items concerning the theme of relatedness (e.g., "How (good) is your rapport with this class?"). Table 2 shows all item formulations.

Method

Participants and interview procedure

Fifty-six teachers were interviewed by three students in the context of their final theses who were trained to use the standardized interview protocol. Three interviews were used for training purposes in the deductive coding phase and thus were excluded from the final sample comprising fifty-three interview partners (60 % female). The study sample was purposefully selected to incorporate teachers from all three different types of secondary schools in Bavaria, Germany (*n* = 15 low track [Mittelschule], *n* = 19 medium track [Realschule], and *n* = 19 high track [Gymnasium]). Teachers were recruited through convenience sampling via personal invitations of the interviewers. Interviews took place in the school setting of the teachers and were audio-recorded with the consent of the teacher. The recorded interviews were transcribed verbatim by the corresponding interviewers to ensure that specifics of the interviews were incorporated. Teachers were on average 42.0 years old (*SD* = 11.5) and had a teaching experience of on average 11.5 years (*SD* = 10.6). In the interviews, teachers were prompted to think of one specific class they were currently teaching (i.e., "Please answer the question for the class you teach in the second lesson of a regular Tuesday"). Teachers taught this class on average 7.1 hours per week (*SD* = 6.5) and 34.0 % were home-room teachers. This random selection criterion for the reference class resulted in a representative range of grade levels and school subjects typical for the three school types (*n* = 19 languages [e.g., German, English], *n* = 13 science subjects [e.g., Mathematics, Physics], and *n* = 19 other subjects [e.g., History, Religion]).

The interviews followed a fully structured interview protocol, centering around the 13 initial TCR items which were presented in a fixed order to all participants, alongside scripted prompts for each item's validation (see Table 2 for item presentation order). The prompts pertained to the four consecutive steps of the cognitive model of self-report item response which consists of item comprehension, information retrieval, judgement and response (e.g., Karabenick et al., 2007; Willis, 2015). Thus, teachers were prompted to verbalize their reflections according to these cognitive steps for each item. First, teachers were asked to describe their general understanding of the item ("What does this item mean in general?"). Next, teachers rated the item with regard to the specific class along a seven-point rating scale from 'very bad'/'very little' to 'very good'/'very much', and were prompted to describe their rating decisions. Two scripted probes revealed which information teachers retrieved to rate the item ("Can you explain your rating?", "Can you give an example?"). Then, teachers were asked to describe the circumstances under which they would rate the item differently ("How would it be if you had chosen a higher/lower rating?"). This last prompt was used to gain insights into teachers' overall judgement and implementation of the rating scale. The interview procedure was supported by PowerPoint slides which showed each of the thirteen items with the answer scale, one item per slide.

Coding procedure

To carry out the coding procedure, the interview transcripts were imported into the Software package Maxqda 12 (VERBI Software, 2017) and analyzed following the systematic procedure of qualitative content analysis (Mayring, 2014). First, categories were obtained by iterative inductive category formation (Kuckartz, 2016; Mayring, 2014) through scrutinizing the interview material for recurrent themes and discussing them with the group of interviewers. As a result, we obtained a coding scheme which comprised seven distinct and exhaustive categories with detailed definitions using key words and coding examples. We refer to these categories as 'thematic codes', because they represent the common themes that teachers associated with the TCR items. The same four students who conducted the interviews participated in this inductive phase of the coding.

Next, performing a deductive coding procedure, four new students were introduced to the interview material to code each half of the interviews with systematic pairwise overlaps across coders, so that code frequencies and interrater reliabilities could be computed. To establish a common coding procedure, each interview was portioned into three paragraphs per item, with each paragraph representing one step of the cognitive answering process (i.e., comprehension, information retrieval and judgment of the item). The coding rule was defined so that each thematic code could be coded as "present" only once per paragraph allowing for multiple thematic codes to be "present" within each paragraph, which resulted in a range of 0 to 159 = 3 (paragraphs per item) × 53 (interviews) possible codes per thematic code.

Above and beyond coding the paragraphs with the thematic codes, the paragraphs were coded a second time, classifying whether the paragraphs contained statements which referred to either the whole class, or to individual students. We referred to these two mutually exclusive codes as 'conceptual codes'. The idea behind the conceptual codes was to quantify, based on the teachers' statements, to what degree they mentally referred to the entire class rather than to individual students.

To calculate the interrater agreement of the different coder pairs, the degree of congruency of thematic and conceptual codes was examined. In line with the coding rule, agreement occurred when both coders coded the same paragraph with the same thematic or conceptual code. Therefore, Gwet's *AC1* was used to calculate the dichotomous ratings for each coder pair (Gwet, 2008a, 2008b). Interrater agreement of all pairs was very good ($.86 < AC1 < .89$).

Resulting coding scheme and analysis procedure

At the conclusion of the coding procedure, the coding scheme comprised the seven inductively developed thematic codes and the two conceptual codes. The thematic codes were 'togetherness', 'knowing each other', 'personal exchange', 'affect', 'teaching', 'discipline' and 'information from third parties.' As detailed above, for the conceptual codes, we differentiated between statements where teachers spoke about the 'class' as entity vs. individual 'students' of the class (see Table 3 for codes, key words and examples).

The three thematic codes 'togetherness', 'knowing each other' and 'personal exchange' clearly represented main aspects of the teacher-class relationships as they are inherently connected to the quality of the relationship, which is why we considered them to be core codes. Even though we excluded any explicit affective or emotional terminology in the items, teachers spoke a lot about their feelings when describing their teacher-class relationship, which is why we chose to consider this code labeled 'affect' also as core code. Further, we identified the three thematic codes 'teaching', 'discipline' and 'information from third parties' as more peripheral to the main aspects of teacher-class relationship as they reflected teachers' specific work context rather than the core phenomenon of teacher-class relationships.

To judge the cognitive validity of each TCR item, we obtained code frequencies of the thematic and conceptual

Table 3. Coding scheme

Code	Description / Keywords	Interview Quotes
Affect	Experiencing teaching / learning as a pleasure, Being frustrated / exhausted, experiencing tension or strain	*"that I like going to this class, that I like to prepare the lessons; that I'm not so tense";* *"it's simply the feeling I have when I'm going to a class and you notice it when you meet students"*
Togetherness	Relaxed atmosphere, being friendly, making jokes Being distant, getting through, doing the job	*"that we treat each other in an understanding way, that both sides respect each other"; "that I can make a joke sometimes";* *"that they realize that we are in the same boat, that we have the same goal which is to move them forward"*
Knowing each other	Process / time to learn more about the other party, development Joint activities, excursion / projects beyond teaching time	*"that I get to know them in other situations than the teaching context"; "that I know the students well (and that) they know me too."*
Personal exchange	Being in contact beyond the subject, private / personal interest	*"that you can talk to the students outside teaching time …or ask them 'what's going on?'";* *"that there is a basis of trust: the students feel like they can come to me with any concern"*
Teaching	Smooth teaching / working together, participation in lessons Grading / performance level Accomplishing tasks / homework, being prepared	*"we have a good learning atmosphere";* *"that's how students work with me, how they react to my instructions or to what I want to make clear"*
Discipline	Disruptions / conduct problems, enforce disciplinary measures Setting / following rules/ limits	*"they know what's important to me regarding performance or behavior in the classroom";* *"I would have to work on discipline a lot and would have to focus on it permanently"*
Information from third parties	Exchange / Contact with colleagues / parents	*"that collaboration with parents is smooth: like, when something happened at school, that the kids tell their parents; and the other way around, that parents let me know when something happened at home"*
Class [a]	they, we, the students, the lower / upper grade	*"everybody feels good"* *"I already had classes with whom it was easier"*
Students [a]	the girls / boys, several / some students, he / she, this student	*"for some of the students"* *"one or two forgetful students"*

Note: [a] Conceptual code indicating the point of reference of the statement.

Table 4. Code frequencies of thematic and conceptual codes across the TCR items

Code	Relationship	Deal with	Rapport	Connected	Trouble	Trust	Clashing	Liking	Rejected	Rely on	Not teach	Respected	Nerves
Core Codes													
Affect	53	45	37	45	32	19	29	57	56	22	58	39	42
Knowing each other	54	39	62	55	40	28	21	51	62	26	33	50	20
Personal exchange	32	20	23	51	24	26	17	28	13	30	25	13	4
Togetherness	27	8	35	30	9	6	1	11	16	4	1	6	5
Peripheral Codes													
Teaching	44	74	37	29	64	41	49	39	33	41	37	33	47
Discipline	46	68	17	16	54	63	67	31	32	61	41	54	56
Information	3	8	8	10	12	6	4	7	7	4	7	4	2
Conceptual Codes													
Class	110	106	113	126	87	113	109	103	129	120	126	119	111
Students	49	53	46	33	72	46	50	56	30	39	33	40	48
Ratio Core: Peri	**2.09**	0.98	**2.53**	**3.31**	0.73	0.94	0.64	**2.60**	**1.43**	0.80	**1.51**	**1.18**	0.78
Ratio Class: Students	**2.24**	2.00	**2.46**	**3.82**	1.21	**2.46**	**2.18**	1.84	**4.30**	**3.08**	**3.82**	**2.98**	2.31

Note: Thematic codes: More than one code per item possible; Conceptual codes: Only one code per item possible (mutually exclusive); possible range of each code per item = [0; 153]; Items with a ratio of (Core: Peri) **> 1** and a ratio of (Class: Students) **> 2** were retained.

codes across all interviews. To evaluate whether each item incorporated the main aspects of the relationship quality sufficiently, the ratio of core codes versus peripheral codes was calculated. To evaluate whether each item was sufficiently associated with the representation of the class as a group, the ratio of the conceptual codes 'class' versus 'students' was calculated.

Results

The code frequencies for each of the 13 TCR items are shown in Table 4. Notably, teachers talked a lot about themes that we considered peripheral, resulting in an average ratio of core codes versus peripheral codes of 1.15:1 in favor of core codes. The average ratio of conceptual codes in terms of class versus students was 2.47 (class): 1 (student), showing that teachers talked considerably more about the whole class than about individual students.

We chose to consider an item as cognitively valid when it reached a ratio of thematic codes of at least 1:1 (i.e., equal numbers of core and peripheral codes) and a ratio of conceptual codes of above 2 (class):1 (students). By this, we considered items as poor in cognitive validity if they triggered a relatively high number of statements coded as peripheral, and / or a relatively high number of statements referring to individual students. Applying this code-ratio rationale, the items "deal with" and "trouble" were invalid regarding the thematic and the conceptual ratio, and the items "nerves", "rely on", "clashing" and "trust" were invalid regarding their thematic ratio, but valid based on the conceptual ratio; the item "liking" was invalid regarding its conceptual ratio, but valid based on its thematic ratio.

Discussion

The key aim of the qualitative study was to explore the cognitive validity of our 13 newly developed items to assess teacher-class relationships. In addition, by having teachers elaborate their thoughts about their teacher-class relationship, we also obtained important insights on how teachers conceptualized the phenomenon 'relationship with a class', and what they considered important aspects of a high-quality relationship. In this respect, we found that a good teacher-class relationship was typically described as knowing each other well, achieving social togetherness, and sharing personal concerns. Additionally, teachers' mental representation of a good relationship with a class was associated with a general positive feeling while thinking of and interacting with the class.

Generally, teachers intuitively understood the meaning of the items, could easily retrieve examples, and were able to differentiate the gradations of the scale. As we strove to specifically measure teachers' mental representation of their relationship with an entire class, we used a code-ratio rationale to ensure a clear delineation of the teacher-class relationship from concepts which we excluded from our definition and to ensure a high prevalence of class-statements. As a result, six of our initial TCR items were particularly suitable and valid in assessing the teacher-class relationship as teachers clearly associated those items with close, caring, friendly and considerate interactions with the class as entity or the lack of those quality interactions. These were the items pertaining to judgments about relatedness, rapport, and connectedness with the class, feeling respected by the class, and two inverted items that tapped the lack of quality in the relationships, namely feeling rejected by the class, and wishing one would not have to teach the class.

Furthermore, we decided to keep the item "trust" as 49 % of the teachers had already spontaneously spoken of the idea of trust before this particular item was actually mentioned in the interview, and within the existing literature, trust has also repeatedly been named as an important ingredient of different kinds of relationships within the school context (Bryk & Schneider, 2002; Goddard et al., 2001; Schulte-Pelkum et al., 2014; Tschannen-Moran & Hoy, 2000). In sum, we proceeded to the quantitative study with seven items emerging from the qualitative cognitive validation study.

Study 2

Study 2 had two goals. The first was to analyze the TCR scale with regard to its internal validity (scale homogeneity and internal consistency), and to potentially exclude items in the case of poor item functioning. Our second goal was to provide evidence of the final scale's external validity by exploring links between the TCR score and other constructs relevant for teachers, including teacher ratings of their teaching emotions, burnout, teaching self-efficacy, and emotional labor. We expected that each of these constructs would be clearly empirically separable from the teacher-class relationship as conceptualized in our scale. In other words, we expected scale mean correlations with those established scales being low enough to warrant conceptual separation and to document the discriminant validity of our new scale. Regarding construct validity, we expected, nevertheless, that the TCR scores would be systematically positively correlated with teaching enjoyment, and negatively correlated with teaching anxiety, anger, burnout more generally, and positively linked with teaching self-efficacy, due to underlying reciprocal functional links between relationship quality and teachers' competence beliefs, their wellbeing, and emotional experiences (Aldrup et al., 2018b; Davis, 2006; Hagenauer et al., 2015; Hamre & Pianta, 2006; Taxer et al., 2019). As for emotional labor, our correlational analysis was largely explorative as we know of no prior studies that have addressed the links between emotional labor and teacher-student relationships. However, in Study 1, teachers had described that they could express their emotions more authentically when their relationship with a class was good, suggesting a link between these two constructs.

Method

Sample

In total, $N = 209$ secondary school teachers (72.2 % female) participated in this study. Teachers were recruited by informing school leaders about the purpose of the study using personal contacts and snowball technique. The sample comprised teachers from all three types of the German secondary school system (n = 37 low track [Mittelschule], n = 50 medium track [Realschule], n = 92 high track [Gymnasium]), and additionally including teachers from upper vocational schools (n = 13 [Berufsschule]). Participants were on average 42.5 years old (SD = 11.2) and had on average 13.0 years (SD = 10.7) of teaching experience. They taught their class on average 6.7 hours (SD = 6.1) a week and taught a variety of subjects (36.8 % languages [e.g., German, English]), 28.2 % sciences [e.g., Mathematics, Physics]), and 31.1 % other subjects [e.g., History, Religion]).

Measures

In addition to the seven TCR items, the questionnaire included a range of widely used scales which address teachers' experiences with regards to teaching a specific class in particular (asking the teachers to answer the questions for the class they teach on a regular Tuesday in the second lesson), and with regard to their job in general. The class-specific constructs encompassed teachers' *emotions* and teachers' *self-efficacy*. Teachers' experiences of *enjoyment*, *anger* and *anxiety* during teaching a specific class, were measured by Frenzel et al.'s Teacher Emotions Scales (TES; Frenzel et al., 2016). The TES comprises four items for each emotion which are answered on a 5-point Likert Scale (from "strongly disagree" to "strongly agree"). Sample items are "I enjoy teaching these students" for *enjoyment* (α = .93), "Teaching these students frustrates me" for *anger* (α = .87), and "I feel tense and nervous teaching these students" for *anxiety* (α = .81). Teachers' *efficacy* beliefs were assessed by Tschannen-Moran and Hoy's teacher self-efficacy scale (2001), using a short, class-specific version of the Ohio State teacher efficacy scale (OSTES; Tschannen-Moran & Hoy, 2001) which comprises three subscales: *efficacy for classroom management* (4 items, e.g., "How much can you do to control disruptive behavior in this classroom?"; α = .86), *student engagement* (4 items, e.g., "How much can you do to motivate students who show low interest in school?"; α = .80), and *instructional strategies* (3 items, e.g., "How well can you respond to difficult questions from these students?"; α = .78). The OSTES items are answered on a 7-point Likert scale ranging from "very little / very bad" to "very much / very good".

The job-related constructs encompassed teachers' self-reported *burnout* and *emotional labor*. Teachers' self-reported *burnout* symptoms as assessed by the German translation of the Maslach Burnout Inventory encompassed *emotional exhaustion*, *lack of accomplishment* and *depersonalization* (Enzmann & Kleiber, 1989). The items were answered on a 7-point Likert Scale (from "never" to daily"). The subscale *emotional exhaustion* comprised nine items, e.g., "I feel used up at the end of a school work day" (α = .86), the subscale *lack of accomplishment* comprised eight items, e.g., "I feel very energetic (reversed)" (α = .81), and the subscale *depersonalization* comprised five items, e.g., "I feel I treat some students as if they are impersonal objects" (α = .67). Teachers' *emotional labor* was assessed by the revised version of the Emotional Labor Scale, encompassing three items for each dimension of *deep acting*, *hiding feelings*, and *faking emotions* (ELS; Lee & Brotheridge, 2011). The items were answered on a 5-point-Likert Scale (from "never" to "always") and sample items are "I make an effort to actually feel the emotions that I need to display to others" for *deep acting* (α = .82), "I hide my true feelings about a situation" for *hiding feelings* (α = .78), and "I pretend to have emotions that I don't really have" for *faking emotions* (α = .67). Scale means, standard deviations, and Cronbach's alphas of all of these scales are shown in Table 7 and Table 8.

Results

Item analysis

To explore the underlying theoretical structure of our TCR items, we followed Watkin's best practice recommendations (2018). We evaluated means, standard deviations, skewness and kurtosis values, and item difficulty for each of the TCR items. As shown in Table 5, mean ratings of the items with positive connotation (pertaining to the theme closeness and relatedness) were relatively high (> 5 on the 7-point scale), and mean ratings of items with negative connotation (pertaining to the theme conflict) were relatively low (< 3). However, standard deviations were sufficiently large to preclude ceiling or floor effects ($.81 \leq SD \leq 1.29$). The skewness and kurtosis values of some items were also relatively high (> 2 and > 6 for "not teach" and "rejected"), and the item difficulty of the positive connotated items was rather easy ($73 < ID < 87$, considering the classical item theory difficulty index ranging from 0 to 100; Lord, 1952), whereas negatively connotated items were difficult to answer ($ID < 10$). Thus, the response patterns indicated an overall trend of teachers to evaluate their teacher-class relationships very positively.

Internal validity

Investigating the underlying scale structure, we ran factor analyses based on the Pearson Correlation Matrix and on the Polychoric Correlation Matrix, due to the violation of normality by the items' distribution (Curran et al., 1996). Additionally, we computed a parallel analysis for each correlation matrix. All calculations were done using R and the "psych" package (R Core Team, 2021).

First, we ensured that our data was appropriate for an exploratory factor analysis: Bartlett's test confirmed the factorability of the correlation matrix (χ^2 (21) = 665.305, $p < .001$) and the Kaiser-Meyer-Olkin (*KMO*) measure indicated good sampling adequacy (*KMO* = .838). Accordingly, we ran a common factor analysis with the estimation method MINRES, also known as OLS (see e.g., Norris & Lecavalier, 2010), based on both the Pearson and the Poly-

Table 5. Item parameters of the TCR items

Item	*N*	*M*	*SD*	Skewness	Kurtosis	Item Difficulty
Relationship	201	5.99	.93	−1.30	2.82	79.8
Rapport	204	5.92	1.06	−1.57	3.66	81.9
Connected	205	5.72	1.24	−1.07	0.78	74.3
Trust	204	5.43	1.29	−1.04	1.14	73.8
Respected	205	6.20	1.03	−1.98	5.69	86.6
Rejected	204	1.46	.81	2.37	6.94	9.1
Not teach	205	1.44	1.21	3.19	9.91	7.3

choric Correlation Matrix. The one-factor solution accounted for 55.8 % (52.1 %) of the total variance and factor loadings ranged between .54 and .88 according to the Pearson Correlation Matrix, and between .59 and .76 according to the Polychoric Correlation Matrix (see Table 6). Using both matrices, two parallel analyses (Horn, 1965) were conducted, which both confirmed that the number of underlying factors was one.

Second, we computed the reliability of the total scale and the corrected item-total correlations (item discrimination) to ensure sufficient homogeneity and internal validity. Internal consistency of the final scale was high (Cronbach's $\alpha = .89$) and corrected item-total correlations of all seven items were good ($.50 \leq r_{corr} \leq .81$), justifying the retention of all items, especially the item “trust” as it demonstrated high factor loadings (.63 / .59) and corrected item-total correlation (.60).

Third, we ran a confirmatory factor analysis using the lavaan package in R, and the tested one factor model ($c^2(14) = 50.547$, $p = .000$) demonstrated good fit indices ($CFI = .95$, $TLI = .93$, $SRMR = .04$) with only the $RMSEA = .115$ being slightly out of the recommended boundaries for adequate model fit (Hu & Bentler, 1999). Exploration of model modification indices revealed that allowing three error correlations among the items would yet substantially improve the model fit ($c^2(11) = 26.104$, $p = .00$; $CFI = .98$, $TLI = .96$, $SRMR = .03$; $RMSEA = .08$). The correlated errors occurred between the two relatedness items, and between the item “respected” and the two conflict items. The two relatedness items share the same semantic structure which well explains their shared uniqueness above their substantial meaning in terms of relationship quality. Further, the shared uniqueness of ‘feeling respected’ with ‘not wanting to teach the class’ and ‘feeling rejected by the class’ likely reflects the emphasis teachers put on respectful behavior as prerequisite for good relationship quality.

External validity

Having decided that we would retain all seven items in our scale, we next built a mean index and correlated it with the scale means of the validation constructs included in this study. Results are shown in Tables 7 (class-specific scales) and 8 (job-related scales).

Correlations of the teacher-class relationship with teachers' class-specific emotions were high, specifically for enjoyment ($r = .80$) but also for anger and anxiety ($r = -.67 / -.68$). Additionally, a systematic link between the TCR score and teachers' beliefs about their efficacy for student engagement, classroom management and instructional strategies was found, with moderate positive correlations of similar size between the teacher-class relationship and all three subscales of the teacher self-efficacy scale ($r = .57 / .66 / .53$).

Table 6. Factor loadings of the TCR items

Item	*Pearson* [a]	*Polychoric* [b]
Relationship	.88	.75
Rapport	.82	.74
Connected	.80	.71
Trust	.63	.59
Respected	.82	.76
Rejected – reversed	.54	.74
Not teach – reversed	.68	.76

Note: [a] Factor analysis based on the Pearson Correlation Matrix; [b] Factor analysis based on the Polychoric Correlation Matrix.

In addition, our analyses also revealed moderate correlations between the TCR score and teacher variables on the job-level: the teacher-class relationship was negatively connected to all three burnout symptoms (emotional exhaustion: $r = -.24$; depersonalization: $r = -.41$; lack of accomplishment: $r = -.45$). Finally, the two facets of surface acting, faking and hiding emotions, were negatively related to the TCR score ($r = -.23 / -.36$), whereas deep acting was positively related to the TCR score ($r = .23$). All reported correlations were significant at a $p < .01$ level.

Discussion

The results of the quantitative validation indicated that the final TCR scale measuring the teacher-class relationship fulfilled the essential quality criteria of measurement. The internal validity of the TCR scale revealed that the seven items measured the underlying construct highly reliably, reflecting a largely 1-dimensional construct structure. It is worth noting, though, that we found that some items shared fractions of variance above and beyond their shared meaning of teacher-student-relationship quality. Future potential users of the TCR scale adopting a latent variable framework may want to consider those correlated uniquenesses for most solid results (see Study 2 results for details, p. 11).

The results regarding the external validity of the scale showed that the teacher-class relationship construct was significantly connected with a range of concepts addressing the teachers' experiences during teaching. All correlations underlined the expected direction of a high-quality teacher-class relationship being associated with positive aspects of teaching and teachers' wellbeing: High ratings of the relationship quality with a class were correlated with less negative emotions and more enjoyment while teaching that class, as well as with a greater sense of self-efficacy in terms of motivating the class's engagement, managing

Table 7. Correlations of the TCR scale and class-level variables

Variable – class level	1	2	3	4	5	6	7
1. Teacher-class relationship	--	.80	−.67	−.68	.57	.66	.53
2. Teaching Enjoyment		--	−.74	−.69	.57	.58	.48
3. Teaching Anger			--	.68	−.41	−.54	−.39
4. Teaching Anxiety				--	−.45	−.64	−.60
5. SE for Student Engagement					--	.52	.46
6. SE for Classroom management						--	.62
7. SE for Instructional Strategies							--
Cronbach's Alpha α	.89	.93	.87	.81	.80	.86	.78
Mean	6.05	4.02	2.13	1.53	4.73	5.80	5.82
SD	.85	.87	.92	.69	.99	.93	.81

Note: All reported correlations are significant at the $p < .01$ level; SE: Self-efficacy.

classroom behavior and responding to instructional challenges. Similarly, a good teacher-class relationship was negatively related to all three facets of burnout, while those correlations were generally lower as burnout was measured with respect to teaching most generally, which speaks to the specificity of our new instrument and against the fact that any observed correlations were mere artifacts of a common method bias. Notably, the link with the TCR score was comparably low for emotional exhaustion, and considerably higher for depersonalization and lack of accomplishment. Additionally, the teacher-class relationship was significantly related to the degree of how much teachers would hide, fake or enact emotions during the workday.

Regarding the discriminant validity of our TCR scale, the correlations with teachers' self-reported burnout, their self-efficacy and emotional labor were small to medium-sized, indicating that the TCR score was clearly separable from those constructs. Notably, the correlations with teachers' emotional experiences were rather high, which did surprise us as we excluded any items from the TCR scale which would explicitly address discrete emotional experiences. Overall, given that both the teacher-class relationship and the teaching emotions were measured with high reliability, and that a common method bias likely inflated the observed correlations as all constructs were measured through teacher self-report (Podsakoff et al., 2003), we argue that these correlations were still small enough to warrant conceptual separation between these discrete teaching emotions and the relationship quality with the class. On a substantial level, those high correlations do speak to the fact that teachers' emotional experiences when teaching a specific class seem to be quite closely connected with their mental representation of the relationship quality with that class. This supports notions brought forward in the context of self-determination theory where the concept of 'relatedness' was described as an "emotional and personal bond" with others (Ryan & Powelson, 1991, p. 53), and by "frequent, affectively pleasant interaction (...) in the context of a temporally stable and enduring framework of affective concern for each other's welfare" (Baumeister & Leary, 1995, p. 497). While those ideas have so far been proposed only for dyadic interactions (i.e., relationships between two individuals), the present research shows that these ideas apply to an individual–group relationship context, such as teacher-class relationships.

Overall, we conclude that we have been successful in differentiating the teacher-class relationship as measured with our new scale from teachers' emotions and their self-efficacy. However, we also constructed our new scale as to differentiate teachers' representations of their relationship with a class from teachers' social and interpersonal behaviors, but the current study did not provide any explicit evidence of the discriminant validity of our new TCR scale regarding teacher behaviors such as academic support. Thus, future research should explore the links between TCR scores and teachers' social support, for example as assessed in the COACTIV study (Aldrup et al., 2018a) or with the Engaged Teachers Scale (ETS, Klassen et al., 2013), and teachers' provision of warmth and comfort (CLASS-S, Hafen et al., 2014).

General Discussion

Teacher-student relationships are not only important for students, but also for teachers and their wellbeing. While prior research has brought forward a large number of instruments addressing the phenomenon of teacher-student relationships from various angles, a validated instrument to measure teacher-class relationships from the perspec-

Table 8. Correlations of the TCR scale and job-level variables

Variable – job level	1	2	3	4	5	6	7
1. Teacher-class relationship	--	−.24	−.41	−.45	.23	−.23	−.36
2. Emotional Exhaustion		--	.45	.38	n.s.	.25	.35
3. Depersonalization			--	.43	−.22	.45	.39
4. Lack of Accomplishment				--	−.29	.34	.41
5. EL: Deep Acting					--	n.s.	n.s.
6. EL: Faking Emotions						--	.62
7. EL: Hiding Feelings							--
Cronbach's α	.89	.86	.67	.81	.82	.78	.67
Mean	6.05	1.79	1.06	1.69	3.46	1.87	2.34
SD	.85	.96	.88	.84	.97	.72	.68

Note: All reported correlations are significant at the $p < .01$ level; EL: Emotional labor; n.s.: Not significant.

tive of the teacher, while considering the entire class as interaction partner, has been missing. We implemented a two-fold validation procedure to scrutinize the validity and reliability of our newly developed set of items, combining qualitative and quantitative validation methods to identify the most suitable items with regard to their cognitive validity and the psychometric quality.

Based on the cognitive validation interviews, we deleted items if they elicited too many associations with phenomena that were not at the core of the phenomenon of teacher-class relationships, such as classroom management or successful instruction. Additionally, we made sure that the items used for the final TCR scale distinctly addressed teachers' mental representations of the relationship with the entire class rather than individual students within the class. As a result, the remaining items clearly represent teachers' mental representations of the quality of the relationship between a teacher and his or her class as a whole. The follow-up quantitative psychometric analyses confirmed that the final set of seven items represent a reliable, valid and parsimonious instrument to measure teachers' self-reported quality of the teacher-class relationship.

Above and beyond the internal validation of the newly developed TCR scale, this research also highlighted insights into the nature and importance of the teacher-class relationship. Below, we will summarize and discuss the interrelations between teachers' judgments of relationship quality and their teaching experience regarding a specific class and regarding their job more generally, which we gained from synthesizing across our qualitative and quantitative findings. Overall, the teachers' statements in the interviews from Study 1 meaningfully complemented our quantitative correlational findings from Study 2, and together, the two studies enrich our conceptual understanding of this relational phenomenon.

First of all, we observed close links between the teacher-class relationship and teachers' emotional experience during teaching and their self-efficacy in teaching the corresponding class. Consistent with findings from previous studies (Hagenauer et al., 2015; Klassen et al., 2012; Taxer et al., 2019), teachers reported more enjoyment, and less anger and anxiety when teaching a class with which they had a positive relationship. Having good relationships with students is clearly rewarding for teachers (Hargreaves, 2000), contributes to their need fulfillment of relatedness in the workplace (Klassen et al., 2012), and thus, elicits positive emotions. Correspondingly, in the interviews, teachers referred to their ‘good feeling’ when describing the quality of their relationship with a class. In other words, teachers also seemed to use their emotions as social information to judge the quality of their relationships (Taxer et al., 2019; van Kleef et al., 2016). The idea that teachers experience fewer negative emotions when teacher-class relationships are good speaks to the fact that they appraise students' behavior in this class as more consistent with their goals (Chang & Davis, 2009; Frenzel et al., 2020). This could be due to several reasons, in particular that students show less disruptive, disengaged behavior given good teacher-class relationships, or that teachers feel more able to cope with these behaviors.

Teachers in our study also felt more successful in teaching a class with which they had a good teacher-class relationship: The three dimensions of teacher efficacy were positively correlated with the TCR score and, in the interviews, teachers spoke about their impression that the better their relationship with a class, the more confident they were that they could manage it. Thus, a good teacher-class relationship might foster teachers' beliefs in their efficacy, or conversely, teachers with greater feelings of self-efficacy are more able to form relationships with their students (Mashburn et al., 2006; O'Connor, 2010).

Teachers' judgments of their relationship with a class were further negatively associated with their burnout symptom ratings, and this also reflected in teachers' interview statements. In the interviews, the teachers described that high-quality relationships can be a resource against depersonalization and conversely, that bad teacher-class relationship can be a source of exhaustion. These links between the teacher-class relationship and teachers' burnout symptoms are in line with findings from prior studies (Aldrup et al., 2018b; Klassen et al., 2012; Taxer et al., 2019), and underline the significance of the teacher-class relationship for teachers' wellbeing.

As a result of increased negative emotions – potentially emerging from poor teacher-class relationships – teachers have to engage in emotional labor (Chang, 2009; Chang & Davis, 2009). In line with this, our data showed that emotional labor was linked to the teacher-class relationship; specifically, teachers who rated their teacher-class relationship as being less favorable reported to suppress and hide their felt emotions more often than teachers with a good teacher-class relationship. Correspondingly, in the interviews, teachers described that they could express their emotions more authentically when their relationship with a class was good.

Finally, a strikingly dominant observation from the interviews was that many teachers argued that having a good teacher-class relationship was an inherent part of their job and an essential prerequisite of successful teaching and learning. Additionally, in both the face-to-face interviews and in the anonymous paper-pencil survey, teachers rated the quality of their relationship with a class to be very high, suggesting that teachers strive to connect with the classes they teach as part of their professional role (Butler, 2012; O'Connor, 2008). Thus, the teacher-class relationship might be just as important for teachers as individual teacher-student relationships (Spilt et al., 2011). Developing a good teacher-class relationship seems to be engrained in teachers' identity and to be tightly linked with their teaching practices and their wellbeing (see also van der Want et al., 2015; Zembylas, 2003).

Limitations and future directions

One potential limitation of the present research is that we used convenience samples of teachers in both studies, thus limiting the generalizability of the results and introducing a potential positive bias in the sample. Well-regulated teachers rating the items very positively may have been overrepresented in the samples, as highly burdened teachers with potentially poor teacher-class relationships might have been reluctant to spend additional time outside school to participate in this type of research. Even though we placed great emphasis on avoiding suggestive item wordings by using a question format for our items instead of suggestive statements, the full rating scale was rarely used by participants. Thus, the TCR scale could be refined further by adapting the items' rating anchors so that the scale score optimally differentiates at the high end of the scale.

It is worth mentioning that it was not within the scope of our study to determine the degree to which teachers' TCR scores related to their ratings of the dyadic relationships with each of the students in the class. Our interview data suggests that teachers' perception of individual students is relevant for their judgment of the relationship quality with a class, while it seems that some individual students “stick out” in teachers' minds. Thus, future research is needed to investigate how dyadic relationships should be weighed to best match the teachers' mental representation of relationship quality with the entire class.

Additionally, it is important to bear in mind that all data reported is correlational in nature and therefore no causal direction can be deduced. Both our interview data and the correlations suggest that there is a complex interaction between teachers' emotional and relational experiences in the classroom, connected to their wellbeing and burnout symptoms, as indicated by previous research (Spilt et al., 2011; Taxer et al., 2019). Longitudinal research would be necessary to disentangle these likely reciprocal relationships with emotion-related constructs and possible bidirectional associations between teachers' self-efficacy and the quality of their relationship with the class.

Despite these limitations, the findings of the present research show that the construct teacher-class relationship can be meaningfully operationalized as a relational phenomenon that addresses the relationship between teacher and class. Teachers answered our newly developed TCR scale consistently and connected the teacher-class relationship with several indicators of their emotional and professional wellbeing. The TCR scale offers researchers a new validated scale that has a clear-cut, concise definition of the idea of a teacher-class relationship which targets an important aspect of teachers' lives through an efficient, valid and reliable 7-item self-report instrument. While the key focus of our research was on the validation process for the new scale, the research also brought about substantial findings about the nature of teacher-class relationships through the combination of qualitative and quantitative methods. These findings again underline the relevance of teacher-student relationships for teachers (Klassen et al., 2012; Spilt et al., 2011; Taxer et al., 2019), and align with earlier research using non-validated sets of items assessing teacher-perceived relationship quality with the class (Aldrup et al., 2018b; Hagenauer et al., 2015). The results show that the relational processes in the classroom go beyond the development of individual, dyadic teacher-student relationships and involve the class as a kind of relational partner. The emergence of the teacher-class relationship construct might inspire future research to disentangle the intriguing, yet unexplored interactions between teachers' relationships with individual students and their relationship with the group of students (assuming that the group is more than the sum of its parts). Furthermore, we hope that the existence of the TCR scale fuels research which further investigates the functional and causal mechanisms involved in teachers' relational experiences, their wellbeing, and classroom functioning more generally, including important student outcomes such as motivation and performance.

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