



# The Teacher Classroom Climate Scale (TCCS): Development and Validation of a New Instrument for Use in Primary School

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Submitted: 22 Feb 2023; Accepted: 15 Mar 2023; Published: 20 Mar 2023

**Citation:** Sørli, M. A., Hukkelberg, S. S. (2023). The Teacher Classroom Climate Scale (TCCS): Development and Validation of a New Instrument for Use in Primary School. *J Edu Psyc Res*, 5(1), 622-631.

## Abstract

**Background:** A positive classroom climate is crucial for student well-being and academic success. There is a lack of validated teacher-rated instruments that assess classroom climate in primary school to ensure that the psycho-social and academic learning conditions in class are beneficial for all students.

**Objective:** The aim of this study was to develop and validate a teacher-rated instrument for use in primary school that addresses key aspects of the classroom climate. The instrument is called the Teacher Classroom Climate Scale (TCCS).

**Data:** Data consisted of a large population-based sample of teachers ( $n = 1,720$ ) from Norway who rated 14 items encompassing the classroom climate in their class. Data were collected as part of a longitudinal effectiveness study that was implemented in 65 ordinary and representative Norwegian primary schools (Grades 1-7).

**Methods:** The sample was divided into two randomized halves, and exploratory factor analysis was performed on the first half ( $n = 846$ ) whereas confirmatory factor analyses were performed on the second half ( $n = 874$ ) to verify the factor structure. In addition, we evaluated the convergent validity of the TCCS by inspecting correlations between classroom climate scale and students' academic achievements and problem behaviors.

**Results:** The results revealed a three-factor structure (social relations, learning conditions and task orientation). The analyses showed that two of the 14 items had low factor loadings, and were therefore omitted from the final version of the scale. The final scale showed good internal consistency. The TCCS correlated moderately both concurrently and predictively with academic level and academic differences in class, and with severe problem behavior in class.

**Conclusion:** The findings indicate that the TCCS may be a useful instrument to assess classroom climate in primary school. The need for further research on the TCCS is emphasized.

**Keywords:** Classroom Climate, Measurement, Primary School, Validity, Academic Achievements, Problem Behavior

## Introduction

Students surrounded by a positive classroom climate experience a good tone, respectful attitudes and behaviors that support learning [1]. Empirical findings show that classroom climate is important for student's psycho-social functioning and academic achievements [2-11]. Specifically, a positive climate associates with enhanced engagement and motivation to learn, higher attendance records, deep learning, lower dropout rates, and less exclusion and school failure [12-14]. Furthermore, a positive classroom climate predicts lower rates of externalizing and internalizing problem behaviors, better academic and social competence, and higher psycho-social wellbeing and safety [15-18]. Consequently, the efforts from teachers and students to create a positive classroom climate may be crucial for students' avenues in the school system.

Over the past 40 years, numerous questionnaires have been developed to assess perceptions of students and teachers regarding the classroom environment. Only a few of these measurements are designed and validated for use in primary school [19]. With one exception, no classroom climate measures are validated within the Scandinavian school context. That is, the Classroom Assessment Scoring System – Secondary version (CLASS-S) has been validated in Norway and Finland, but this instrument is based on observational measures of secondary school classrooms [20-22].

In this paper, we want to contribute to the field by presenting a new teacher-rated assessment tool, the Teacher Classroom Climate Scale (TCCS). The TCCS is developed for use in primary schools and is grounded on extensive literature about the classroom climate [5, 6, 8, 11, 23-25]. It addresses relations within

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students and between students and teachers, the students' task orientation, and the academic learning conditions in class, which are all considered important aspects of the classroom climate. Furthermore, the TCCS takes the perspective of teachers, as we believe they have an important role in e.g., classroom management and serve as a secure base for students [26]. Thus, they have a unique position to modify and influence on the classroom climate.

### Conceptualization of Classroom Climate

Classroom climate has been defined as the intellectual, social, emotional, and physical environments in which students learn, and captures several dimensions including interpersonal relationships, pedagogical, disciplinary, and curriculum practices [1, 11, 27]. The construct is rooted in socio-ecological theory, which posits that human development occurs within a set of interrelated social contexts (e.g., family, school) where proximal and daily processes over time influence on individuals' experiences, cognitions, emotions, and behaviors [11, 28].

Despite that classroom climate is generally seen as a multidimensional construct, no common definition or operationalization exists [11, 29-32]. For example, Trickett and Moos describe the psycho-social nature of the classroom environment as a dynamic system that includes order and organization, task characteristics, teaching practices, and rule clarity [33]. In later years, there has been a strong focus on including not only the instructional part (teacher behavior) of the classroom climate, but also the social and emotional aspects [6, 34-36]. Pianta and Hamre suggested that classroom climate should capture instructional support, emotional support, and classroom organization, while Klieme, Pauli, & Reusser suggested that cognitive activation, teacher support, and classroom management should be basic dimensions [6, 37]. Several other more or less overlapping key dimensions have been suggested, including social system organization, staff morale, communication of expectations, competition, safety, fit between student and classroom demands, power and control structures, and instructional methods [38]. Overall, this illustrates the complexity of the construct, and the challenge related to defining the construct.

In a recent systematic review and meta-analysis of the research on classroom climate and children's academic and psychological wellbeing that was published between 2000 and 2016, Wang et al. conclude that the three most significant classroom climate dimensions across studies are instructional support, socioemotional support, and classroom organization and management [11]. Instructional support reflects the pedagogical and curricular elements of the classroom climate, i.e., features of the teachers' instruction that enhance student learning, such as use of achievement feedback, use of methods to promote critical thinking, and communication of high academic expectations for students. Socioemotional support refers to a climate that supports the students' emotional wellbeing in the classroom, such as teachers showing warmth (responsive and respectful to students' social and emotional needs), interest in students' life outside school, safety, connectedness, positive or harmonic interactions between students as well as between teachers and students. Classroom organization and management include the establishment of

functional daily routines in the classroom to prevent disruption and aggression, such as effective reinforcement of pro-social and expected student behavior, and correction of rule-breaking behavior. The combination of effective instructions, positive social interactions, and evidence-based behavior management is hypothesized to create an optimal classroom climate. Findings suggest that in such an environment, the students are more likely to develop their social and academic skills to their potential, and adapt to the school's rules, norms and behavioral expectations [11].

### Classroom Climate and Student Outcomes

A large body of literature has examined the relation between classroom climate and student outcomes. Across nine meta-analyses, the effect sizes are found to be significant in the range from small to moderate. However, the size of the effects depends on the bandwidth of the climate construct and the specific student outcomes that are examined [3, 5, 8, 11, 23, 25, 39, 40].

In line with prior meta-analyses, the latest one concludes that overall classroom climate is positively and significantly associated with students' academic achievement ( $r = .12, p < .001$ ), motivation and engagement ( $r = .25, p < .001$ ) and social competence ( $r = .18, p < .001$ ) [11]. Furthermore, classroom climate is negatively associated with externalizing problem behavior ( $r = -.18, p < .001$ ) and socio-emotional distress in terms of internalizing problem behavior ( $r = -.14, p < .001$ ). Moreover, Wang and colleagues found that the link between classroom climate and youth outcomes did not vary by different dimensions of the classroom climate concept being measured (i.e., instructional, socio-emotional, organizational), except for that socio-emotional distress was more strongly related to the socio-emotional support dimension than to instructional support and classroom organization and management [11]. Overall, even though the effect sizes were in the lower range, classroom climate appears as an important and significant factor for students' learning and well-being.

Moderator analyses have revealed that neither grade level, socio-economic status, racial composition, nor study design (cross-sectional, longitudinal) moderate the link between classroom climate dimensions and student outcomes (except for "motivation and engagement"). However, the association between classroom climate and student outcomes did depend on whether the rater was a student, teacher, or an external observer [11]. Student reports were significantly associated with all student outcomes, while teacher reports were associated with students' externalizing problem behavior and academic achievement. Observer ratings associated with social competence and academic achievement. It should, however, be noted that teacher ratings of the classroom climate generally are more positive than student ratings, and that the effects of classroom climate are stronger on attitudinal outcomes than on specific behaviors or achievements [30].

Taken together, the findings suggest that: a) the classroom climate should be measured as a multi-dimensional construct, b) multiple factors in the classroom are related to student's psycho-social functioning, and academic performance, c) students

who experience positive social relationships in the classroom are less likely to show socio-emotional distress and problem behavior and, d) different raters may contribute with different perspectives on the classroom climate.

### Development of a New Teacher-Rated Classroom Climate Scale

Although previous literature underpins the importance of classroom climate, there is no agreed-upon definition about how classroom climate should be operationalized and measured, which makes it difficult to give a precise definition of what it is, and moreover, to generalize results across studies. In addition, most studies derive from secondary students and the American context. Thus, a scale for use in primary schools in Scandinavia is much warranted.

The Teacher Classroom Climate Scale (TCCS) assesses teacher perceptions of the psychosocial and academic learning environment in class. The TCCS is developed for use in primary school (Grades 1-7) by the first author. Different from other measures, the TCCS is short (14 items) and it assesses teacher perceptions rather than actual behavior with regard to instructional support, socioemotional support, students' social skills and problem behavior. This is advantageous, since shorter scales tend to have higher response rates, and can more easily be included into larger school surveys [41]. Moreover, compared to student ratings, parent ratings, and standardized tests, teacher ratings are in many cases found to be highly reliable and valid, and predictive when it comes to student outcomes and future functioning [42-46]. Furthermore, validation studies from Scandinavia would be highly valuable to expand our understanding of classroom climate and the concept's generalizability to other cultural contexts.

### The Present Study

The overall purpose of this study was to provide a reliable and valid teacher-rated instrument to assess classroom climate in primary school (Grades 1-7). The Teacher Classroom Climate Scale (TCCS) consists of 14 items whereof five have a negative wording. These items were developed based on previous literature about the classroom environment [8, 11, 25, 44]. The fundamental idea behind the scale is that a) the teachers, through their daily interactions with students, affect and make important observations about the classroom climate, and b) that the classroom climate exerts an influence on the students' behaviors, motivations, and academic achievements. In accordance with other studies, we expected the new scale to be multi-dimensional and target distinct albeit related aspects of the classroom climate.

The analytic aim of the present study was twofold. The first purpose was to examine the latent structure and reliability of the teacher-rated classroom climate scale (TCCS). Specifically, we divided the sample in two randomized halves, and run parallel analysis in the first half, and confirmatory factor analysis in the second half to verify the factor structure. The second purpose was to investigate concurrent and predictive validity between the TCCS and student academic achievement and problem behavior. We expected classroom climate to correlate positively with academic achievements, and negatively with academic dif-

ferences and externalizing problem behavior in the classroom, as previously described [12-18].

### Method

#### Participants and Procedure

Data derived from a large-scale longitudinal effectiveness study of the School-Wide Positive Behavior Support model (SWPBS), which included 65 ordinary and representative Norwegian primary schools (Grades 1-7). The current study is based on pre-intervention data only (T1: 4 months prior to the SWPBS intervention, T2: at initiation of SWPBS) collected by questionnaires to all school staff members (teachers, assistants, special education teachers, after school personnel, and principals). Baseline group comparisons indicated that the school groups were comparable and representative for Norwegian primary schools [47]. The SWPBS intervention study was designed as a strengthened non-randomized experimental study, where participating schools were randomly invited either as intervention schools or as control schools. Altogether, 28 schools implemented the SWPBS model, 17 schools implemented an abbreviated version of SWPBS, and 20 schools continuing their ordinary practice made up the control group. All schools were matched on size and location, and data was assessed at six time points across five school years. See Sørli & Ogden for more information about the study details [47].

At T1, 1,720 participants responded to questionnaires, whereas 1,324 participants responded at T2 (77% participated at T2). Among the schools, 68% were considered large (251-780 students), 25% as medium (151-250 students) and 8% as small (77-150 students). Sixty-five percent of the staff members were employed as teachers, 68% worked full time, 80% were females, and most were middle-aged (75% were older than 35 years), adequately educated (11% had no formal training), and experienced (17% had worked fewer than 5 years in school).

#### Measurements

**The Teacher Classroom Climate Scale (TCCS)** consists of 14 items and assesses teacher perceptions of instructional support and socioemotional support. The instruction was as follows: "The following statements are features about the classroom climate. The climate might vary somewhat from lesson to lesson and from subject to subject. During the rating, think about how the situation usually is in the class/group for which you are the head teacher, or in which you teach the most". The 14 items include both positively and negatively formulated statements (see Table 1 as well as Appendix 1 for the full version of the original and translated items), with anchors for each item from 1= *does not fit at all* to 4= *fits very well*. Examples of statements included "The students in this class are good friends", "There is peace to work during lessons" and "The instruction is often disturbed by students". In the composition of the overall TCCS score, negatively formulated items should be reversed (item 2, 4, 9, 10, 13), and a higher total score indicates a more positive classroom climate.

**Academic Achievement** was measured at the class level at T1 and T2. The teachers assessed the mean academic level and differences (dispersion) in the class in which they had most

lessons. A 13-item scale developed by Ogden was used [48]. This scale has two factors; Academic differences in class and Academic level in class. Item examples are: “The mean ability level in class is...”; “The mean academic level of achievement in class is...”; and “The academic efforts in class are....” Items were evaluated on a 4-point Likert scale (1 = below mean/small differences, 4 = very good/very large differences). Cronbach’s alphas for “Academic level in class” were 0.88 (T1) and 0.87 (T2) and for “Academic differences in class” alpha was 0.89 at both assessment points.

**Student Problem Behavior** was measured by the staff using a translated version of the scale “Problem Behavior in the Classroom last Week” [49]. Rather than focusing on individual student behavior, the teachers reported how many times they had observed various types of problem behavior in the classroom the week prior to the assessment (considered a random week) across 20 items. Item examples are “Verbal attack on a classmate” (e.g., offensive or insulting comments) and “Made unnecessary noise by scratching with the chair, hitting with objects or other noisy behavior”. A 5-point Likert scale was applied with scoring alternatives ranging from 1 (*not observed*) to 5 (*observed several times per day*). The scale has shown satisfactory psychometric properties in several prior Norwegian studies [48-52]. Cronbach alphas for the sum score were .87 (T1) and .88 (T2). Initial factor analyses revealed two factors across items, i.e., “Serious problem behaviors”, and “Moderate problem behaviors”, both with acceptable internal reliability respectively, ( $\alpha = .71$  at T1 and  $.77$  at T2 for serious problems, and  $\alpha = .89$  at T1 and  $.90$  at T2 for moderate problems).

### Analytic Plan and Statistical Analysis

Analyses were conducted in JASP version 0.16.4, which is an open-source statistical software [53]. If confirmatory factor analysis (CFA) is performed on the same sample as exploratory factor analysis (EFA), the results of CFA are likely to align with the EFA structures [54]. Consequently, we divided the first dataset (T1) into two randomized halves (Sample 1 and 2), and conducted EFA and CFA on each of the samples, respectively. The second dataset (T2) was used to investigate predictive validity.

EFA was conducted on the 14 TCCS items using parallel analysis with Promax oblique rotation to examine the number of factors in the dataset [55]. This is considered one of the most accurate methods to determine how many factors should be retained in a dataset [56, 57]. Factor loadings  $\lambda \geq 0.3$  were considered acceptable. Different from more traditional methods, parallel analysis determines the number of factors by comparing the eigenvalues in a Monte Carlo simulated random data set with the ones in the actual dataset [58, 59]. The rationale is that the underlying factor structure in the real data should have larger eigenvalues than the parallel components derived from random data having the same sample size and number of variables [60, 61]. Since data were ordinal in nature, analysis was based on the polychoric correlation matrix option in JASP.

Next, we performed latent confirmatory factor analysis. We evaluated model fit according to standard benchmark criteria for good model fit ( $RMSEA \leq 0.06$  and  $CFI/TLI \geq 0.95$ , and  $SRMR < 0.08$ ) [62]. Internal consistency was assessed using the Cronbach’s alpha and McDonald’s omega [63, 64]. Cohen’s conventions were used to interpret effect sizes ( $r = 0.10$ ,  $r = 0.30$  and  $r = 0.50$  were considered small, medium and large, respectively) [65].

## Results

### Initial Analyses

Descriptive analyses were performed on the whole dataset ( $N = 1,720$ ) at T1, and included tests to determine factorability of the TCCS items and descriptive statistics. Missing data was very low across the items ( $n = 5$  at T1). To examine if items were suited for factor analysis, we inspected the Kaiser-Meyer-Olkin (KMO) test and Bartlett’s sphericity test. The KMO test showed an overall KMO-value of 0.90 (range from .76 to .95) whereas the Bartlett’s test was significant ( $p < .001$ ), which support adequacy to perform factor analyses on the data. Table 1 displays the means and standard deviations (SD) for the 14 TCCS-items, along with item descriptions (see Appendix 1 for full item descriptions).

**Table 1: Descriptive Statistics of the TCCS-items**

Item description	M	SD
C1. The students in this class are good friends	2.96	.59
C2R. There is competition among the students to be the best	2.96	.67
C3. There is peace to work during lessons	2.58	.73
C4R. There is a lot of noise and unrest during lessons	3.29	.68
C5. Most students are attentive during instruction	2.91	.60
C6. When asked, the students in this class cooperate well	2.80	.62
C7. Usually, we finish the planned tasks for the lessons	2.92	.58
C8. The students usually complete required tasks	2.87	.60
C9R. The instruction is often disturbed by students	2.88	.79
C10R. There are groups or cliques in the class that do not get along so well	3.06	.82
C11. The teachers who have this class cooperate quite a lot	3.18	.72
C12. Teacher and class get along well with each other	3.32	.61
C13R. Some teachers have problems with this class	3.22	.92

C14. The students are interested and active during lessons	2.88	.65
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Note: Reversed item numbers end with an "R". Skewness and kurtosis were all within  $\pm 1$ .

### Exploratory Factor Analysis

EFA was conducted on Sample 1 ( $n = 846$ ) using parallel analysis with Promax oblique rotation. Table 2 shows the results of the parallel analysis.

**Table 2: Factor Loadings and Uniqueness for the Parallel Analysis**

Item	F1	F2	F3	Uniqueness
C1	0.94			0.34
C2R				0.95
C3		0.64		0.36
C4R		0.82		0.44
C5	0.35		0.36	0.45
C6	0.53			0.42
C7			0.63	0.21
C8			0.63	0.27
C9R		0.92		0.30
C10R	0.60	0.36	-0.37	0.49
C11	0.40			0.84
C12	0.53			0.57
C13R		0.39		0.73
C14	0.52			0.36

Note: Rotation method is Promax, and loadings  $\geq 0.3$  are shown.

The results indicated a three-factor solution. All factor loadings were above  $|\lambda| \geq 0.3$  except from one item (C2R) that did not load on any of the three factors. This item also showed high uniqueness (i.e., variance that is unique to this variable and not shared with other variables), or low communality (communality =  $1 - \text{uniqueness}$ ), which suggest that it should be omitted from the item pool. In addition, findings show that two items (C5 and C10R) loaded on several factors. These items were assigned to the factor where they showed the highest loading. As a result, Factor 1 comprises item C1, C6, C10R, C11, C12 and C14 (eigenvalue 6.0, proportion of variance explained: 0.20), Factor 2 comprises item C3, C4R, C9R and C13R (eigenvalue 1.55, proportion of variance explained: 0.18), and Factor 3 comprises item C5, C7 and C8 (eigenvalue 1.24, proportion of variance explained: 0.13). The sum of squared loadings within each of the three rotated factors were all above the recommended value of 1 (2.83-1.86). Factor correlations were 0.39 (between F2 and F3), 0.57 (between F1 and F2) and 0.59 (between F1 and F3). The three factors were labelled Social relations, Learning conditions and Task orientation, based on the item clustering and factor loadings.

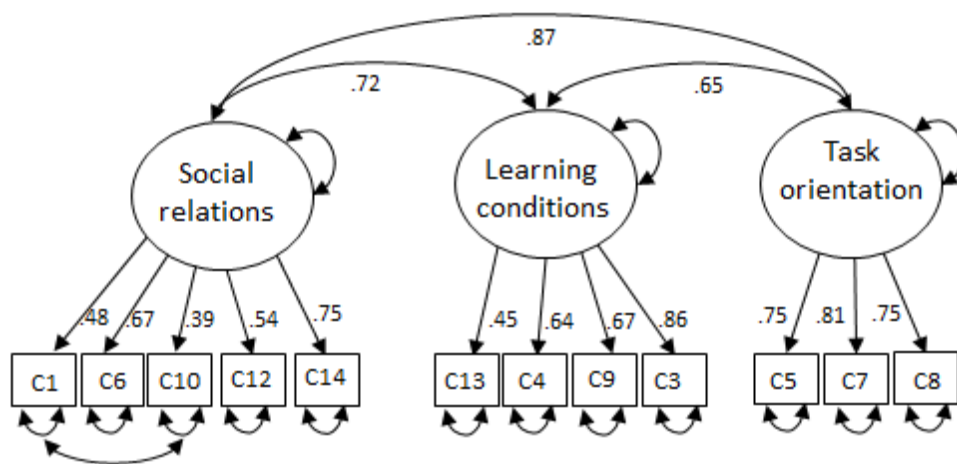
### Confirmatory Analyses

CFA was conducted in Sample 2 ( $n = 874$ ) to validate the previous results. The baseline model (M1) was specified in accordance with the EFA results, i.e., item C2 was omitted due to a low factor loading and high uniqueness. Methodologically, EFA allows items to have cross-loadings, that is, items can load on several factors at the same time. CFA on the other hand is model-based, and items are only allowed to load on the target factor. The baseline model showed mediocre fit and TLI and NNFI were below recommended cut-off values [62]. Standardized factor loadings ranged from .27 (C11) to .83 (C7). As item C11 had a factor loading of .27, it fell below our pre-defined threshold value ( $\lambda \geq .30$ ). In addition, item C11 is the only one that does not address student/class-teacher relations, and we decided to omit this item. The final item pool consists of 12 TCCS items. The revised model (M2) showed improved model fit with acceptable values. Inspections of modification indices (MIs) did, however, suggest a residual covariance between item C1 and C10R. These items essentially reflect the same content (i.e., friendship) and are indicators on the same factor. Inclusion of this covariance resulted in a model (M3) showing excellent model fit. Table 3 describes model fit indices for the three models (M1-M3) and Figure 1 depicts the final model with standardized factor loadings.

**Table 3: Fit Indices for the Correlated Three-Factor Model**

	$\chi^2$	df	RMSEA (90% CI)	CFI	TLI	NNFI	SRMR
M1. Baseline model	432.00	62	0.08 (.08 – .09)	0.90	0.88	0.88	0.06
M2. Without C11	337.24	51	0.08 (.07 – .09)	0.92	0.90	0.90	0.05
M3. $\Theta$ C1,C10R (MI = 15.61)	311.35	60	0.04 (.04 – .05)	0.99	0.98	0.98	0.05

RMSEA: Root mean square error of approximation, CFI: Comparative Fit Index, TLI: Tucker-Lewis Index, NNFI: Bentler-Bonett Non-normed Fit Index, SRMR: Standardized root mean square residual



**Figure 1:** The Final Correlated Three-Factor Model of the TCCS-12 With Standardized Factor Loadings

### Reliabilities

The TCCS-12 showed acceptable reliability as measured by Cronbach's alpha and McDonald's omega (Table 4). When considering each of the sub-scales, the task orientation showed the highest reliability (.81), but also the other two were within an acceptable range (i.e.,  $\alpha > 0.7$ , [66]). Test-retest correlation between TCCS-12 at T1 and its parallel version at T2 was  $r = .525$  ( $p < .001$ ).

**Table 4: Reliability Estimates of TCCS Sub-Scales and Total Scale**

	McDonald's $\omega$	Cronbach's $\alpha$
F1. Social relations	.71	.70
F2. Learning conditions	.74	.75
F3. Task orientation	.82	.81
Total scale	.85	.86

*Note:* Estimates are standardized and calculated from the correlation matrix. McDonald's omega was obtained by a CFA.

### Concurrent and Predictive Validity

Correlations between the TCCS-12 (T1) and student outcomes (academic achievements and observed problem behaviors in the classroom) at T1 and T2 were examined to investigate concurrent and predictive validity of the scale. Since the academic achievement scale included a specific item about student's well-being in the class, this item was also inspected as a single indicator, as we expected classroom climate and well-being to overlap considerable. Results are presented in Table 5. As expected, high

and positive correlations were found between classroom climate and the students' well-being, especially at T1. In addition, classroom climate showed large to moderate correlations with academic level in class at T1 and T2, and medium to small negative correlations with academic differences in class. Results show negative correlations between TCCS-12 and moderate problem behavior but low correlations with serious problem behavior in class at both T1 and T2.

**Table 5: Correlations Between TCCS (T1) and Academic Achievements and Problem Behavior (T1 and T2)**

Outcomes	Classroom Climate	
	T1	T2
Well-being (single item)	.619**	.347**
Academic level in class	.698**	.408**
Academic differences in class	-.404**	-.230**
Moderate problem behavior	-.524**	-.349**
Serious problem behavior	-.200**	-.315**

*Note:* \*\* $p \leq .001$ ,  $n = 1,317-1,713$

### Discussion

Several meta-analyses have demonstrated a significant relation between classroom climate and several important student outcomes, including academic achievements, social competence, well-being, safety, externalizing and internalizing problem behavior [3, 5, 8, 11, 23-25, 39, 40]. These findings apply both

concurrently and longitudinally. Consequently, the quality of the classroom climate stands out as an important school-related factor that significantly affect students' psychosocial and academic functioning in school. Despite these findings, there is a shortage of instruments that address the classroom climate for primary school students, and which are relevant for the Scandinavian

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context, including Norway. In the present study, we aimed to fill this gap by presenting a new teacher-rated classroom climate scale, the Teacher Classroom Climate Scale (TCCS), for the use in primary schools.

### Factor Structure

Exploratory factor analysis (EFA) suggested a three-factor model (“Social relations”, “Learning conditions in class” and “Task orientation”), which was confirmed in our secondary CFA analyses. The analyses revealed that two items did not load on any of the factors, leaving us with a final item pool of 12 items. The reliabilities for the three sub-scales and the total scale were all within acceptable range.

A challenge in the literature is the lack of consensus regarding the definition of what classroom climate is, which makes it difficult to operationalize the concept. In terms of content, the three TCCS factors seem to correspond fairly well with the factors that Wang et al. presented in their meta-analysis as the three most significant classroom climate dimensions [11]. That is, the dimension “Social relations” corresponds with “Socioemotional support” while “Learning conditions in class” and “Task orientation” partly corresponds with “Instructional support” and partly with “Classroom organization and management”. Our findings suggest that the three dimensions are overlapping but distinct factors that target key aspects of the classroom climate.

### Concurrent and Predictive Validity

Considering convergent validity, we expected from prior research that TCCS would correlate positively with students’ academic achievements (i.e., academic level in class) and negatively with academic differences and externalizing problem behavior in the classroom context. The results showed that all correlations were in the expected directions, concurrently as well as over time. These findings provide evidence of convergent and predictive validity for the TCCS scale. Primary school students in more supportive classroom environments tend to perform better (i.e., higher academic level in class) and show less moderate and severe problem behaviors. The results also support that students in less supportive and academically diverse learning environments (i.e., greater academic differences in class) will often not perform to their potential, neither academically nor socially.

The results illustrate the wide-reaching impact of a positive school context. It not only creates a good work environment for the teachers, but also facilitates students’ learning and well-being. The results are not surprising, given that primary school represents children’s first encounter with the school system, and it is crucial that they feel safe and welcomed. Students in an insecure and disregarded climate will to a less extent be able to concentrate and take part in the joy of learning and positive social interactions. A study by Rudasill and colleagues found that a positive classroom climate was linked to higher levels of social competence in addition to lower levels of externalizing problem behaviors, as in the current study [67]. Overall, prior and current findings pinpoint the importance of creating a positive classroom climate for teachers and students as it provides a wide-ranging impact on their everyday school life. Notably, it should be easy for teachers both to map the classroom climate

and to search for help when the classroom climate is experienced as difficult or challenging for the students or themselves. Our findings indicate that Social relations, Learning conditions in class, and Task orientation represent three important aspects that should be addressed when classroom climate is a problem.

### Strengths and Limitations

Several strengths and limitations pertain to this study. First, the present study fills a gap in literature and research by presenting a teacher-rated classroom climate scale for use in primary school. Second, the TCCS contains only 12 items, and is therefore less costly to administer and score than longer instruments. Third, the TCCS addresses the Scandinavian school context, and as such, it presents valuable findings from a Scandinavian country. Furthermore, our findings derive from a large representative sample of Norwegian teachers in primary schools, which allows us to draw conclusions about the entire teacher population in Norway. This increases the external validity and statistical power of the study. Last, the TCCS is one of few instruments that is free of charge and can be used by anyone who is interested in the classroom climate.

Several limitations of the study should also be acknowledged. The TCCS is a subjective teacher-rated evaluation of the classroom climate, and such ratings are often more positive than student ratings [30]. For the time being, we have not validated a corresponding measure for primary school children. However, future studies should compare teacher and student perceptions of the classroom climate, to assess differences and similarities across respondents. Another potential limitation is that we did not examine the effects of structural and organizational factors in the school context that may influence on the classroom climate. For example, it is likely that school culture, school SES environment, and composition of the student- and teacher groups impact on the classroom climate. In future studies, such factors should be included in the analyses to provide a better understanding of how a supportive classroom climate can be formed.

### Practical and Empirical Implications

By prioritizing the classroom climate and other psychosocial school-related variables (e.g., collective teacher efficacy), schools can prevent and reduce student problem behavior and improve academic outcomes for all students. Accordingly, it is crucial to have validated instruments that target these factors. The TCCS measures teachers’ perceptions of classroom climate in primary school, and it is of practical significance to teachers, school leaders, researchers, and policy makers. These first results of the TCCS indicate that the instrument may be a useful tool for researchers who wish to assess the classroom climate (e.g., as an outcome in intervention studies). Moreover, the TCCS can be easily administered by teachers or school administrators to obtain information about the social and academic learning environment in their school, which further can contribute to explain problem behavior and academic achievements in primary school [68, 69].

### Conclusion

The findings indicate that the TCCS may be a useful instrument to assess important aspects of classroom climate in pri-

mary school. Furthermore, the TCCS associated with students' academic achievements and problem behaviors in the expected directions. Future research should make further investigations of the instrument's validity and reliability. By doing so, more definitive conclusions can be drawn about the quality of the instrument. The present study represents a first step on this road.

### Acknowledgements

The standards of the Regional Committee for Medical and Health Research Ethics (REK South-East) and of the Norwegian Social Science Data Services were followed throughout the conduct of the study. This research was supported by the Norwegian Center for Child Behavioral Research and in part by a grant from the Norwegian Directorate for Education and Training. The authors declare no conflict of interest.

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## Appendix 1

### TCCS-items in English and Norwegian

1. The students in this class are good friends	1. Elevene i klassen er gode venner
2. There is competition among the students to be the best	2. Det er konkurranse blant elevene om å være flinkest
3. There is peace to work during lessons	3. Det er god arbeidsro i timene
4. There is a lot of mess and unrest during lessons	4. Det er mye rot og uro i timene
5. Most students are attentive during instruction	5. De fleste elevene følger med når læreren underviser
6. When asked, the students in this class cooperate well	6. Elevene i klassen samarbeider godt når de blir bedt om det
7. Usually, we finish the planned tasks for the lessons	7. Vi får som regel gjort det vi skal i timene
8. The students usually complete required tasks	8. Elevene fullfører vanligvis pålagte oppgaver
9. The instruction is often disturbed by students	9. Undervisningen forstyrres ofte av elever
10. There are groups or cliques in the class that do not get along so well	10. Det er grupper eller klikker i klassen som ikke går så godt sammen
11. The teachers who have this class cooperate quite a lot	11. Lærerne som har klassen samarbeider ganske mye
12. Teacher and class get along well with each other	12. Lærer og klasse kommer godt ut av det med hverandre
13. Some teachers have problems with this class	13. Enkelte lærere har problemer med denne klassen
14. The students are interested and active during lessons	14. Elevene er interesserte og aktive i timene

*Note:* Items were translated into English by an experienced and bilingual researcher

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