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Motivational school climate and teachers' achievement goal orientations: A hierarchical approach

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Background. Teachers' achievement goal orientations are known to affect teachers' beliefs and behaviour. In contrast, we know relatively little on how school climate is associated with teachers' achievement goals, even though theoretical ideas can be derived from self-determination theory and empirical research on the impact of goal structures. The few studies that exist on the issue are limited as analyses were only conducted at the individual level and subsequent findings can, thus, not be interpreted as climate effects.

Aim. We aimed to overcome this shortcoming by analysing associations between teachers' perception of school motivational climate and their achievement goal orientations at individual and at school level. We postulated that at school level a school's learning goal structure, autonomy-supportive leadership, positive feedback culture, and a collaborative climate would be associated with teachers' learning goal orientation, whereas a school's performance goal structure was supposed to align with teachers' performance (approach and avoidance) goal orientation.

Sample. A total of 532 teachers from 40 different schools filled out questionnaires on their achievement goal orientations and aspects of their work context.

Methods. We used hierarchical linear modelling to analyse effects at individual and at school level.

Results. Teachers' learning goal orientations and their performance avoidance goal orientations varied significantly across schools. Positive perceptions of schools' feedback culture at school level corresponded positively with learning goal orientations, and collaborative climate was negatively associated with performance (approach and avoidance) goal orientations.

Conclusions. The results underline the importance of schools' motivational climate for teacher motivation and provide a starting point for developing strategies of workplace development.

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During the last decade, research has documented that teachers' motivation is related to their personal beliefs and behaviours, such as how teachers instruct students (Richardson, Karabenick, & Watt, 2014). This especially applies to teachers' achievement goal orientations, which determine their own learning and teaching (Butler, 2014). We know very little about climate factors that are associated with teachers' achievement goal orientations (i.e., individual preferences for specific achievement goals). This lack of research is problematic given that knowledge about antecedents bound to the school climate is needed to shape effective work environments at schools. Insights into how work conditions are associated with teachers' achievement goal orientations can inspire changes at schools that benefit teachers' motivation. We aim to provide such insights into the presented study. Our research draws from Achievement Goal Theory (AGT; Meece, Anderman, & Anderman, 2006) as well as Self-Determination Theory (SDT; Deci & Ryan, 2000) to identify school climate characteristics potentially associated with teachers' achievement goal orientations.

Empirical research has already shown that *individual perceptions* of school goal structure and satisfaction of the need for autonomy, competence, and relatedness matter for teachers' achievement goal orientations. However, many factors (including motivation itself) can influence individuals' perceptions of the school, which makes it difficult to dissect true school characteristics from aspects of the observer. Going beyond investigating individual perceptions, we aim to show that teachers' *shared* perception of school climate characteristics also relates to teachers' specific goal orientations.

Theoretical background

Achievement Goal Theory postulates that individuals' orientation towards specific achievement goals (i.e., their preferred reasons for engaging in achievement-related behaviours) guide their striving for competence in achievement situations (Murayama, Elliot, & Friedman, 2012). Recently, AGT has been expanded to the domain of teaching (see especially Butler, 2007; Nitsche, Dickhäuser, Fasching, & Dresel, 2011). The core idea of this expansion is that schools provide an achievement context not only for students but also for teachers (Butler, 2007). Teachers aim for a sense of competence at school and differ in how they strive for it. Researchers typically differentiate teachers' achievement goal orientations alongside a trichotomous model of achievement goal striving (Elliot, 2005). This model distinguishes teachers' orientation towards *learning goals* (i.e., striving for competence enhancement) from two kinds of performance goal orientations: Teachers' *performance approach goal orientation* (i.e., striving to demonstrate competence) and *performance avoidance goal orientation* (i.e., striving to avoid demonstrating a lack of competence).

Teachers' orientation towards specific achievement goals are differentially associated with other aspects of their psychosocial functioning at work: teachers with a higher learning goal orientation show lower rates of burn-out (Parker, Martin, Colmar, & Liem, 2012; Tönjes & Dickhäuser, 2009), a higher intrinsic work motivation (Malmberg, 2006), and a higher likelihood to participate in off-the-job training (Nitsche, Dickhäuser, Fasching, & Dresel, 2013). In contrast, teachers with a higher performance avoidance goal orientation show help-avoidance (Butler, 2007) and higher rates of burn-out (Tönjes & Dickhäuser, 2009). Instructional practices also differ depending on teachers' goal orientation (Retelsdorf, Butler, Streblow, & Schiefele, 2010). The achievement goal orientations that teachers hold for their own performance seem to transfer via their

instructional practices to their students' achievement goal orientations (Dresel, Fasching, Steuer, Nitsche, & Dickhäuser, 2013).

Given these findings, it would be beneficial to identify situational factors that could prompt learning goal orientations and diminish performance avoidance goal orientations within teachers. From the advent of AGT, achievement goals were conceptualized as being partly rooted within the situation (Dweck & Leggett, 1988). This assumption has been supported by experimental studies, which induced achievement goal preferences by situational cues (Dickhäuser, Buch, & Dickhäuser, 2011; Spinath & Stiensmeier-Pelster, 2003). However, this research was merely conducted in student populations. There is no exact evidence regarding how cues within teachers' work environments and different motivational climates at schools are associated with teachers' achievement goal orientations.

In order to deduce theoretical predictions about specific aspects of motivational climate at schools, which may be associated with teachers' achievement goal orientations, we rely on theoretical assumptions derived from AGT, referred to as achievement goal structures (Meece *et al*., 2006), as well as assumptions derived from SDT (Deci & Ryan, 2000; Janke, Nitsche, & Dickhäuser, 2015).

Motivational climate and teachers' goal orientations: Schools' goal structures

While research on climate factors associated with teachers' achievement goal orientations is scarce, this is not the case for the population of students. Here, achievement goal theorists have postulated that motivational climate, characterized by shared perspectives on the aims of specific teachers (referred to as *goal structures*), influences students' achievement goal striving (Midgley *et al*., 2000). The theoretical rationale behind this assumption is that students take their teacher's goals into account when evaluating whether their own goals are adaptive for acquiring feelings of competence in their learning environment (Meece *et al*., 2006).

Goal structures are important for the development of students' goal orientations (Meece *et al*., 2006). Like achievement goal orientations, goal structures can be distinguished into learning goal structures (teacher emphasizes the importance of learning), performance approach goal structures (teacher emphasizes the importance of performance) and performance avoidance goal structures (teacher emphasizes the importance of avoiding failure; Dresel *et al*., 2013; Schwinger & Stiensmeier-Pelster, 2012). Achievement goal structures facilitate corresponding achievement goal orientations in student populations (Bardach, Oczlon, Pietschnig, & Lüftenegger, 2019; Lüftenegger, van de Schoot, Schober, Finsterwald, & Spiel, 2014).

There have been few attempts to adapt the research on goal structures to the population of teachers. Skaalvik and Skaalvik (2017) tested whether teachers' perceptions of a school's goal structure were related to their motivation. They argue that teachers' perceptions of a school's goal structure result from signals that the teachers receive about educational goals and values emphasized most strongly at their school. They found that teachers' perception of schools' learning goal structure was positively associated with self-efficacy and negatively with motivation to quit at the individual teacher level.

Cho and Shim (2013) tested associations between teachers' perceptions of schools' goal structures and achievement goal orientations and found that teachers' perception of a school's *learning goal structure* was positively associated with their learning goal orientation at the individual teacher level; similarly, teachers' perception of a school's

performance goal structure was positively associated with teachers' performance approach goal orientation.

These findings provide support for the assumed relation between motivational climate (goal structures) and teachers' motivation (Skaalvik & Skaalvik, 2017) and especially their goal orientations (Cho & Shim, 2013) at *the individual teacher level*, but they do not clearly show that climate characteristics at the school level are related to teachers' motivational preferences. More specifically, the researchers did not demonstrate that there is actual variation in goal structures across different schools and that this variation is systematically associated with differences in teachers' achievement goal orientations at the school level. In both studies, the school climate characteristics were only analysed at the teacher level without aggregating them at the school level. This procedure is not appropriate in analysing climate variables. Marsh *et al*. (2012) pointed out that the level 2 aggregation of individual responses characterizes the level 2 climate if the respective item wording is bound to a referent outside the self, such as the school. In this case, level 1 perception should be considered as unique perceptions of the respective teachers that are not shared by other teachers and, thus, do not represent school climate.

Motivational climate and teachers' goal orientations: SDT

Measures of schools' goal structures assess rather abstract perceptions of climate. Asking teachers which goals are highly valued at their schools does not give any information on how the mentioned goals are emphasized. Therefore, findings on schools' goal structure may be difficult to transfer to workplace development strategies in order to foster teachers' motivation. Some researchers tried to overcome this limitation by applying assumptions derived from SDT to the field of teacher motivation. SDT postulates that individuals are more likely to strive for personal growth in a climate that supports the basic psychological need for autonomy, competence, and relatedness (Deci & Ryan, 2000). As a learning goal orientation indicates individual striving for personal growth in achievement situations (see Janke & Dickhäuser, 2019), support for basic psychological needs in the working environment of teachers should be positively associated with teachers' learning goal orientation (Janke et al., 2015). Thus, teachers' striving for learning goals supposedly depends on the relative freedom to try out new practices or to acquire knowledge (autonomy), the belief that one is capable of improving one's capacities (competence) as well as a social environment that welcomes such experimentation (social relatedness).

This line of thought allows us to deduce hypotheses on climate factors that are more specific and potentially more susceptible to modification: aspects of the working environment that support the facilitation of certain needs should also facilitate a learning goal orientation. For instance, the working environment is considered to be supportive of autonomy when superiors encourage free thinking and foster meaningful freedom of choice (Slemp, Kern, Patrick, & Ryan, 2018). Therefore, feelings of autonomy should blossom within teachers if principals (teachers' main supervisors) provide them with opportunities to develop and enact their own approaches to instruction. When it comes to competence support, feedback on personal development is critical as it can facilitate the development of competence and feelings of accomplishment (Vallerand & Reid, 1984), meaning that schools that value feedback and facilitate feedback procedures should be perceived as supportive of competence. Finally, research has shown that teachers' social relatedness benefits from positive collaborations between colleagues (Vangrieken, Dochy, Raes, & Kyndt, 2015). Thus, a collaborative school climate should foster teachers' learning goal orientation.

Taken together, we assume that teachers' achievement goal orientations are associated with characteristics of their school that are detrimental to the facilitation of need satisfaction, namely autonomy-supportive leadership, a feedback culture (i.e., reliance on feedback procedures), and a collaborative school climate. The specific reasoning behind this prediction is that a learning goal orientation indicates that individual striving for personal growth and support for basic psychological needs in the working environment should be positively associated with teachers' learning goal orientation. The value in identifying ties between (need supportive) characteristics of teachers' working environment and their motivation is that these characteristics are likely to be more malleable regarding workplace development than more omnibus school goal structures. Even though the assumed associations are plausible from a theoretical perspective, to our knowledge, such specific climate factors (as school-level variables) and their relation to teachers' achievement goal orientations have not yet been investigated.

Research desiderata and questions

We intended to overcome shortcomings of available studies on the relation between-school climate characteristics and teachers' achievement goal orientations by applying a hierarchical approach (i.e., analysing associations at both the individual teacher level and school level; see Figure 1 for the tested relations). We tested goal structure (learning goal, performance approach goal and performance avoidance goal structure) as well as specific climate factors (autonomy-supportive leadership, positive feedback culture, and collaborative climate) in relation with teachers' achievement goals. We intended to test each of these factors at the school level (by means of aggregated individual ratings) as well as at the individual level.

We expected substantial between-school variations of goal structures and specific climate factors. Furthermore, we expected that these aspects of motivational school climate would be statistically associated with teachers' achievement goal orientations at the school level. More specifically, we expected that goal structure would be positively
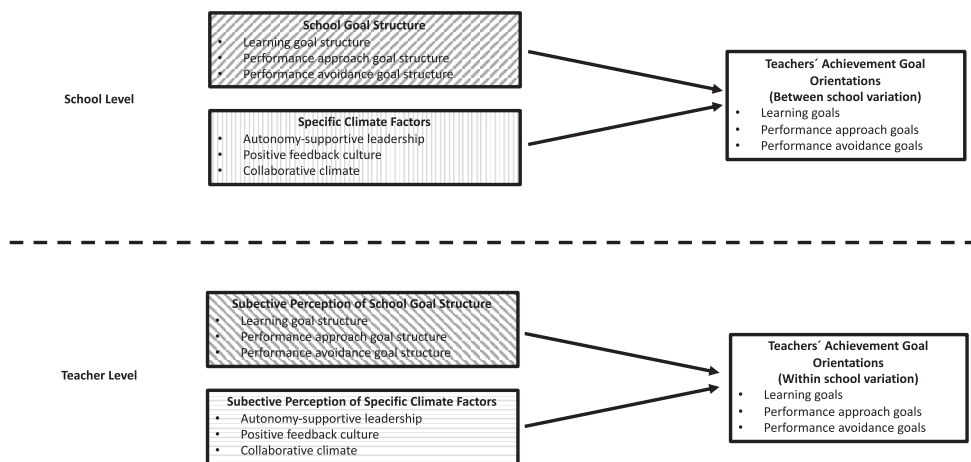

Figure 1. Graphical model illustrating the postulated relations between climate variables and teachers' achievement goal orientations at the school level and at the teacher level. The hatching of the boxes corresponds to the hatching used in Table 4 when presenting the results.

associated with teachers' corresponding achievement goal orientations at the school level. Moreover, we assumed that autonomy-supportive leadership, positive feedback culture, and a collaborative climate at the school level would all be positively associated with teachers' learning goal orientation. In addition, we also investigated these relations at the individual level as done in previous studies.

Method

Procedure and participants

Our sample of teachers from 40 different schools in Germany covered a wide range of school forms: 11 schools were primary/secondary general schools (*Grund- und Hauptschule*), 14 were intermediate secondary schools (*Realschule*), 14 were grammar schools (*Gymnasium*) and one was a school for special needs education. Twenty-six of the schools were located in the federal state of Baden-Württemberg, 13 were located in Rhineland-Palatinate, and one school was in North Rhine-Westphalia. The teachers in these schools were invited to answer a questionnaire – participation was voluntarily and, on average, 16.8 teachers per school participated.

In the final question, 138 teachers reported that they answered the questionnaire only partially or not at all honestly or did not give an answer. We tested for deviations in the covariance matrices of achievement goal orientations and features of the school climate between both groups (indicated truthfulness yes vs. no). Thereby, we found substantial, statistically significant differences. We concluded that those who reported that they had not answered entirely truthfully should not be included in the same sample as those who indicated that they had answered truthfully and excluded the respective 138 teachers from the final sample to avoid biases due to social desirability and inflated error variances.

The final sample consisted of 532 teachers with a mean age of 44.9 years ($SD = 11.4$) and a mean teaching experience of 16.9 years ($SD = 12.2$). Of them, 344 (65%) teachers reported being female. Compared to the population of teachers in Germany (Statistisches Bundesamt, 2018), where the proportion of females is 73%, our sample comprised a somewhat lower proportion of females. Teachers' mean age in our sample corresponds to the mode category of the population of teachers in Germany (40–50 years).

Measures

All measures (including sample items) are depicted in Table 1, while descriptives and internal consistencies are reported in Table 2.[1]

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[1] *The scales measuring school goal structure were adapted based on a well-established instrument keeping the content of the items strictly parallel to the original version. The scales assessing specific aspects of schools' motivational climate were developed for the purpose of this study. Beside the internal consistencies of the scales, we tested for factorial validity. For the school goal structure, a two-level CFA using WLSMV as an estimator (given the non-normal answers and the restricted range of the answers) assuming three distinct factors (learning goal structure, performance approach goal structure, and performance avoidance goal structure) fitted the data better (CFI = .91, TLI = .90, RMSEA = .10, SRMR = .15) than a one-factorial two-level model (CFI = .79, TLI = .78, RMSEA = .15, SRMR = .21). However, given the absolute fit of a two-level three-factorial model of goal structures to the data, any findings on goal structures at the school level have to be interpreted very cautiously. A two-level confirmatory factor analysis for the specific climate factors showed that the expected three-factorial solution described the data satisfactorily (CFI = .92, TLI = .91, RMSEA = .04, SRMR = .08) and statistically significantly better than alternative models with one factor.*

Table 1. Measures and sample items

	Source	Item number	Sample item
Teachers' AGO			
Learning AGO	Teachers' achievement goal orientation questionnaire (Nitsche, 2011)	9	*In my vocation, I aspire…* *… to improve my pedagogical knowledge and competence.*
Performance AGO		12	*… to make my colleagues realise that I teach better than other teachers.*
Performance AGO		12	*… to conceal from my colleagues when I do something less satisfying than other teachers.*
School goal structures			
Learning goal structure	Adapted version of the Pattern of Adaptive Learning Scales (PALS) (Midgley et al., 2000)	6	*At our school…* *… how much one improves is really important for teachers.*
Performance approach goal structure		3	*… it is important to come off well compared to other teachers.*
Performance avoidance goal structure		5	*… it is important not to appear incompetent as a teacher.*
School need support			
Autonomy-supportive leadership	Adapted PISA-Scales (Frey et al., 2009)	5	*Our principal encourages all teachers to develop and implement their own solutions to a problem.*
Positive feedback culture	Self-constructed measure	8	*At our school, feedback is perceived as helpful and beneficial.*
Collaborative climate	Adapted from PISA-Scales (Frey et al., 2009) and IGLU-Scales (Bos et al., 2005)	8	*Concerning the collaboration of the members of the teaching staff at our school, I have the impression that we are all pulling in the same direction.*

Table 2. Descriptive statistics

	M	SD	Range		Skew	α	ICC1	ICC1*	ICC2
			Potential	Actual					
Teachers' achievement goal orientations									
Learning goals	4.18	0.47	1–5	2.3–5.0	−0.39	.86	.04*	.05	
Performance approach goals	2.13	0.80	1–5	1.0–4.8	0.35	.95	.01	.01	
Performance avoidance goals	2.35	0.83	1–5	1.0–5.0	0.12	.93	.05*	.05	
School goal structures									
Learning goal structure	3.99	0.74	1–6	1.0–6.0	−0.65	.83	.07**	.09	.53
Performance approach goal structure	3.10	0.87	1–6	1.0–5.7	0.01	.78	.03	.04	.31
Performance avoidance goal structure	3.11	0.94	1–6	1.0–6.0	−0.03	.90	.04*	.04	.37
School need support									
Autonomy-supportive leadership	4.23	0.61	1–5	1.8–5.0	−1.01	.80	.16***	.20	.74
Positive feedback culture	3.26	0.72	1–5	1.1–5.0	−0.23	.87	.30***	.35	.87
Collaborative climate	2.90	0.58	1–4	1.0–4.0	−0.55	.90	.33***	.37	.88

Note. N = 532 teachers from 40 schools.
ICC1 = Intra-class correlation 1 quantifies the proportion of between-school variance to total variance. *ICC1** = Adjusted intra-class correlation 1 (corrected for scale inconsistency). *ICC2* = Intra-class correlation 2 can be interpreted as a reliability measure of the school-mean rating.
*$p < .05$; **$p < .01$; ***$p < .001$.

Data analyses

We conducted two-level modelling using HLM (Raudenbush, Bryk, & Congdon, 2004). This procedure allows us to estimate effects at the teacher level (lower half of Figure 1) and effects at the school level (upper half of Figure 1). Missing values occurred for <6% of the items and were imputed using the expectation-maximization algorithm (Peugh & Enders, 2004). Teacher goal orientations and individual teacher perceptions of school climate characteristics were analysed at the individual teacher level and shared perceptions of these characteristics at the school level. Shared perceptions at the school level were computed by averaging all pertaining teacher perceptions. We modelled random intercepts – that is we predicted both within-school variation in teacher's achievement goals on the teacher level and between-school variation of these goals on the school level. Predictors on the school level were grand-mean centred and individual perceptions at the teacher level were group-mean centred, which is most appropriate when school- and teacher-level effects are tested simultaneously (Enders & Tofighi, 2007). The group-mean centred variable represents how much individual teachers' scores deviate from the average score of their school. We considered results on the school level as mainly important for the question of school effects on teacher motivation. Results on the teacher level are additionally important because individuals' perceptions are of supplementary relevance for individual cognition, affect, and behaviour (Martin, Bobis, Anderson, Way, & Vellar, 2011). All variables were *z*-standardized prior to the analyses – the coefficients of fixed effects can be interpreted similarly to standardized regression coefficients. Table 3 presents a matrix of correlations at level 1. A multilevel correlation matrix is presented in a Table S1.

Results

Variation of teacher motivation across schools

The intra-class coefficients (*ICC*) 1 give us information about the proportion of between-school variance to total variance. Table 2 illustrates the *ICC1* for all measures of teachers' goal orientations and presents the *ICC*1*, which are corrected for inconsistencies. As indicated by the statistically significant intra-class correlations, teachers' learning goal orientations (*ICC1* = .04), and performance avoidance goal orientations (*ICC1* = .05) varied between the different schools. The variation in teachers' performance approach goal orientations between schools was statistically not significant.

Variation of school climate across schools

For *goal structures*, only small variance proportions were located on the between-school level (*ICC1* = .03–.07), which were significantly different from zero in two out of three cases (see Table 2). The *ICC2* coefficients presented in Table 2 can be interpreted as the reliability of the aggregate measures (see Lüdtke, Trautwein, Kunter, & Baumert, 2006). As can be seen, all coefficients were .53 or even much lower, indicating low reliability for the aggregate measures of school goal structures. School goal structures could not be reliably measured via aggregated teacher ratings. Given this finding and the rather low between-school variations, goal structures could not be considered as level 2 predictors in the subsequent analyses. This was mainly due to the fact that the low ICC2 scores would not allow a specific school to be reliably characterized by a specific goal structure.

Table 3. Correlation matrix at Level 1

	1	2	3	4	5	6	7	8
Teachers' achievement goal orientations								
[1] Learning goals								
[2] Performance approach goals	−.05							
[3] Performance avoidance goals	−.03	.81***						
School goal structures								
[4] Learning goal structure	.13**	<.01	−.01					
[5] Performance approach goal structure	<.01	.41***	.38***	.09*				
[6] Performance avoidance goal structure	−.06	.42***	.45***	−.04	.86***			
School need support								
[7] Autonomy-supportive leadership	.15**	−.12**	−.11*	.33***	−.30***	−.34***		
[8] Positive feedback culture	.14**	−.08	−.12**	.44***	−.11**	−.21***	.42***	
[9] Collaborative climate	.10*	−.16***	−.19**	.43***	−.32***	−.41***	.46***	.62***

Note. $N = 532$ teachers from 40 schools.

$*p < .05$; $**p < .01$; $***p < .001$.

The specific climate factors *autonomy-supportive leadership* (*ICC1* = .16), *positive feedback culture* (*ICC1* = .30), and *collaborative climate* (*ICC1* = .33) varied significantly between schools – indicating quite large differences between schools in autonomy-supportive leadership, positive feedback culture, and collaborative climate. Level 2 reliability of these measures (*ICC2* coefficients) was ≥.74, indicating good reliability.

Associations between-school climate and teacher motivation

In a final step, we regressed teachers' achievement goal orientations on the individual perceptions of school climate characteristics at the individual teacher level and on the school climate characteristics at the school level. However, as already mentioned, we had to drop goal structure as school-level predictors given the low reliability of these measures. To allow for more robust findings, we additionally controlled for potentially important variables at the school level (school type, elementary vs. secondary school) and at the individual teacher level (age, gender, teaching experiences). We ran three HLM analyses, one for each goal orientation. Results are presented in Table 4.

Concerning teachers' orientation towards *learning goals*, we found the predicted statistically significant relation to positive feedback culture at the *school level*: teachers' shared perceptions of the reliance on feedback procedures in the school was positively associated with teachers' learning goal orientations ($B = .17$). At the *teacher level*, learning goals were positively related to performance approach goal structures ($B = .18$) and negatively to performance avoidance goal structures ($B = -.18$); in addition, autonomy-supportive leadership was positively associated with learning goals ($B = .11$).

Although no significant differences between schools were observed for performance *approach goal orientations* (see Table 2), we found a negative relation to the shared perceptions of collaborative climate ($B = -.17$) at the *school level* – however, this association should be interpreted cautiously, because the respective significance test is known to frequently produce Type II errors (Snijders & Bosker, 1999). At the *individual teacher level*, approach goal orientations were also related to higher performance approach goal structures ($B = .22$) as well as to higher performance avoidance goal structures ($B = .28$).

Concerning teachers' orientation towards *performance approach goals,* we found a positive relation to autonomy-supportive leadership ($B = .13$) and a negative relation to the shared perceptions of collaborative climate ($B = -.18$) at the *school level*. At the *individual teacher level*, we found that teachers' perceptions of performance avoidance goal structures were positively associated with teachers' performance approach goal orientations ($B = .47$). Results of all control variables can be found in Table 4.

Discussion

In the present study, we investigated school climate characteristics and their associations with goal orientations of teachers. Our study is characterized by a broad sample of teachers and hierarchical analyses at both the individual and school level, which is an important advance from previous research that only addressed relations at the individual level (e.g., Cho & Shim, 2013; Skaalvik & Skaalvik, 2017).

Table 4. Prediction of teachers' achievement goal orientations from motivational school climate at the school level and at the teacher level (analyses including school type, age, gender, and teaching experience as control variables)

	Teachers' achievement goals		
	Learning goals	Performance approach goals	Performance avoidance goals
Intercept			
	0.00 (0.05)	0.02 (0.04)	0.03 (0.04)
School level			
Specific climate factors			
Autonomy-supportive leadership	0.11 (0.09)	0.08 (0.05)	0.13* (0.06)
Positive feedback culture	0.17⁺ (0.09)	−0.07 (0.08)	−0.13 (0.08)
Collaborative climate	−0.14 (0.13)	−0.16* (0.07)	−0.18* (0.09)
Type of school (primary = 1, other = 0)	−0.09 (0.13)	−0.15(0.08)	−0.15* (0.07)
Teacher-level			
Goal structure			
Learning goal structure	0.02 (0.05)	−0.05 (0.06)	−0.01 (0.06)
Performance approach goal structure	0.18* (0.08)	0.22** (0.08)	−0.01 (0.08)
Performance avoidance goal structure	−0.18* (0.08)	0.28** (0.09)	0.47** (0.09)
Specific climate factors			
Autonomy-supportive leadership	0.11* (0.05)	−0.01 (0.04)	0.00 (0.05)
Positive feedback culture	0.03 (0.04)	0.01 (0.07)	−0.01 (0.06)
Collaborative climate	0.01 (0.07)	0.07 (0.07)	0.04 (0.05)
Age	0.17 (0.10)	−0.22* (0.10)	−0.04 (0.08)
Gender (1 = male, 2 = female)	0.13** (0.04)	−0.11** (0.04)	−0.11* (0.05)
Teaching experience	−0.30** (0.00)	0.13 (0.10)	−0.07 (0.08)
Explained Variance			
$R^2_{Between}$	.06	.21	.20
R^2_{Within}	.06	.21	.18

Note. All variables were z-standardized prior to analyses. Predictors on the school level were grand-mean centred and predictors on the teacher-level were group-mean centred. Presented are regression coefficients and standard errors (in parentheses). The hatching within the rows corresponds to the hatching used in Figure 1.
[†]$p < .05$ (one-tailed); *$p < .05$ (two-tailed); **$p < .01$ (two-tailed).

Interestingly, the scales used to assess goal structures did not form a reliable measure at the school level. In order to avoid biased findings, these measures were therefore only included at the individual teacher level. Thus, they represent an individual teacher's perception of a school's goal structure and cannot be used to approximate actual climate effects.

However, the measures of specific climate factors (autonomy-supportive leadership, positive feedback culture, and collaborative climate) varied substantially across schools and formed a reliable measure at the school level. These specific climate characteristics on the level of schools were systematically associated with teachers' achievement goal orientations. More specifically, a collaborative climate was negatively related to performance (approach and avoidance) goal orientations on the school level. Further-more, as predicted, a positive feedback culture was positively related to a learning goal orientation on the school level. Surprisingly, autonomy-supportive leadership was positively associated with performance avoidance goals at the school level.

At the individual teacher level, pronounced relations between individual perceptions of schools' goal structures and teachers' achievement goals were observed. On a broad level, these findings correspond to prior research illustrating that individual perceptions of school goal structures are related to teachers' motivation (Cho & Shim, 2013; Skaalvik & Skaalvik, 2017). More specifically, in the present study, a stronger perceived performance approach goal structure was associated with stronger learning and performance approach goals, whereas a stronger perceived performance avoidance goal structure was associated

with weaker learning goals but more pronounced performance approach and performance avoidance goals. These findings illustrate that teachers' individual perceptions of schools' performance goal structures are not always negatively related to motivational outcomes, as previous research has suggested (Skaalvik & Skaalvik, 2017), but that the relations may differ depending on the valence component (approach vs. avoidance) of the goal structure. However, we do not consider these findings at the individual teacher level as a hint for school effects on teachers' achievement goals. Such a conclusion would only be warranted by a hierarchical analysis including the school level.

Theoretical and practical implications

Our analyses on the extent to which teachers' goal orientations varied by school indicated that, to a small but statistically significant extent, schools make a difference for teachers' learning goal orientations and performance avoidance goal orientations. The variation across schools is in line with the assumption that achievement goal orientations are not solely founded in individual differences but also in factors bound to the school climate (e.g., Bong, 2001, 2004). The magnitudes of the observed differences imply that teachers' achievement goal orientations vary across schools to a similar extent as students' achievement goal orientations vary across classrooms (e.g., Schwinger & Stiensmeier-Pelster, 2012). We did not find that performance approach goal orientations varied between schools to a statistically significant extent. This could point to the possibility that they are less closely related to (and probably less influenced by) climate variables than learning and performance avoidance goal orientations. However, it is also quite possible that schools do not differ much regarding climate factors that could induce a performance approach goal orientation, which could also be reflected in the rather small variation of goal structures between schools.

Regarding the theoretical foundation of our research, we provide new insights into where Self-Determination Theory and Achievement Goal Research intersect. More specifically, we provide evidence on how a climate that supposedly supports teachers' basic psychological needs might be linked to teachers' achievement goal orientations. Prior studies merely investigated the respective associations for achievement goals and need satisfaction on the level of the individual (e.g., Janke & Dickhäuser, 2019; Janke et al., 2015) rather than focusing on aggregated individual perceptions of need support.

Here, we found first evidence on the notion that need supportive structures at school are indeed tied to teachers' achievement goal orientations. However, besides the finding that competence support (operationalized as positive feedback culture) was positively associated to learning goal orientation at the school level, we could not provide further support for the notion that autonomy support or a collaborative climate are important factors for the development of teachers' learning goal orientation as previously suggested (see Janke & Dickhäuser, 2019). While this might be partly due to a lack of power for autonomy support, this explanation does not hold for a collaborative climate, which did not show any descriptive trend that could be interpreted as an indication of a positive association to teachers' learning goal orientation. For future studies, it would be interesting to further investigate under which condition (supposedly) need supportive structures affect need satisfaction and in turn teachers' learning goal orientation.

Moreover, collaborative climate emerged as being negatively associated to performance goal orientations. Furthermore, there was one surprising effect at the school level, namely that autonomy-supportive leadership was associated with *higher* performance avoidance goals. One potential reason for this relation is that seemingly autonomy-

supportive strategies, like encouraging teachers to find their own solutions to problems, might have undesirable motivational side effects, as such strategies may foster teachers' goals to not produce bad solutions (see Langfred, 2004, for additional reflections on negative effects of autonomy).

Besides their theoretical implications, our findings on need supportive school structures are also promising for educational practitioners and policy makers. This is because feedback procedures and a collaborative climate as specific aspects of the school climate are probably easier to address through workplace development and educational reform than hard-to-grasp omnibus goal structures. For instance, the implementation of mentoring programs in which experienced teachers help younger colleagues to develop their teaching skills in their first years could provide both a culture of feedback and a collaborative climate at the same time. This could facilitate a climate that fosters teachers' learning goals, while simultaneously reducing performance avoidance goals.

Limitations and future research

Even though research on goal structures has a long tradition when it comes to investigating potential determinants of students' achievement goal orientations, measures of schools' goal structures have rarely been studied as school-level predictors. In the present study, the three scales used to assess goal structures did not provide reliable measures at the school level.

One may speculate whether schools' goal structures may not be reliably measured at the school level and that prior research (Cho & Shim, 2013; Skaalvik & Skaalvik, 2017) has sought to overcome this problem by interpreting school goal structure as a school level variable without having analysed it at the school level. Once again, note that all observed associations between perceived school goal structures and achievement goal orientations on the individual level should not be equated with investigations into school climate (Marsh *et al*., 2012). This is true for prior studies as it is for all associations that we observed on level 1 of our multilevel model.

It is worth pointing out that we assessed school goal structures with items that strongly followed the wording of the original PALS-scales (Midgley *et al*., 2000). In these scales originally developed to capture students' shared perception of classroom goal structures, we replaced the referent 'class' with the referent 'school' in order to assess schools' goal structure. While this instrument was established to measure aspects of the classroom climate, it might not be as suitable for assessing school goal structures (although the scales are sufficiently consistent at the individual level). The analyses on the postulated two-level three-factorial structure of these scales pointed to some problems in the psychometric property of these scales. This might be one reason for the rather low *ICC*.

The appreciation of learning and the emphasis on performance may not be as clear to teachers at a school level as it may be to students in classrooms, making it more difficult for teachers within one school to have similar perceptions. A more specific formulation of the items (e.g., 'A lot of teachers in my school would say that⋯' instead of 'In our school, ⋯') might be required to measure school goal structures in a sufficiently reliable manner. Having found only a few school differences in goal structures therefore does not diminish the relevance of this concept for teacher motivation nor does it imply that it is inadequate to describe differences between different schools. Instead, our findings highlight the need for more research on this topic that specifically focuses on alternative ways to assess goal structures as school-level variables.

Another limitation of our study is its cross-sectional nature. We theoretically expect autonomy-supportive leadership, positive feedback culture, and collaborative climate, as specific aspects of the school climate, to be relevant for teachers' goal adoption. However, effects in the other causal direction cannot be ruled out. For instance, teachers' learning goal orientations are likely to contribute to a high-quality feedback climate because giving and receiving feedback can constitute a good opportunity to realize one's potential. It is also plausible that the shared perception of the collaborative climate deteriorates due to performance goal-induced competition between teachers. Therefore, it is important to follow up on the present findings with further longitudinal studies that investigate the causality behind the associations between aspects of the school climate and achievement goal orientations.

Two limitations regarding the sample of this study need to be mentioned. Our sample was not representative (especially due to the fact that participation was voluntarily). However, as we have pointed out, the significant results remain stable even after controlling for available teacher and school variables (such as teaching experience or type of schools). This illustrates that the reported findings are not due to the specificity of the composition of our sample. Second, a greater sample size, especially at level 2 (schools) would allow latent modelling of the constructs, which takes measurement errors into account. The current sample size allowed only manifest modelling of the constructs. A bigger sample size at level 2 might also allow schools' goal structure to be assessed with acceptable reliability.

The current study is one of the first to investigate the relation between school-level climate variables and teachers' achievement goal orientations. Although we did not find strong differences in the school climates, this does not imply that the climate has only weak effects. Educational policies often aim to standardize educational structures and procedures, which may lead to underestimations of effects due to restrictions of range.

Conclusion

The current study documents that teachers' shared perceptions of the school climate can be regarded as a factor related to teachers' motivation. In particular, aspects such as a positive feedback culture and the collaborative climate at a specific school could be related to goal setting processes within teachers. Given the hierarchical approach of the present analysis, this research especially highlights the role of school climate as a factor that potentially contributes to teachers' goal orientations and helps us to overcome existing research gaps due to a strong focus on teachers' individual perceptions of motivational factors at their school.

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Conflicts of interest

All authors declare no conflict of interest.

Author contributions

Oliver Dickhäuser, Ph.D. (Conceptualization; Data curation; Funding acquisition; Investigation; Methodology; Project administration; Resources; Supervision; Writing –

original draft; Writing – review & editing); Stefan Janke (Project administration; Writing – original draft; Writing – review & editing); Martin Daumiller (Writing – original draft; Writing – review & editing); Markus Dresel (Conceptualization; Formal analysis; Funding acquisition; Investigation; Methodology; Visualization; Writing – original draft; Writing – review & editing).

Data availability statement

The informed consent obtained from the participants does not allow the data to be made freely available through any public repository. Research data can be made available upon individual request.

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Supporting Information

The following supporting information may be found in the online edition of the article:

Table S1. Multilevel correlation matrix.