What reduces the adverse development of motivation at the beginning of secondary education: relationship between student-perceived teaching practices and changes in students' achievement goals

Stefan Janke, Martin Daumiller, Anna-Katharina Praetorius, Oliver Dickhäuser, Markus Dresel

Angaben zur Veröffentlichung / Publication details:

Janke, Stefan, Martin Daumiller, Anna-Katharina Praetorius, Oliver Dickhäuser, and Markus Dresel. 2021. "What reduces the adverse development of motivation at the beginning of secondary education: relationship between student-perceived teaching practices and changes in students' achievement goals." In Motivation und unterrichtlichen und fachbezogenen Lehr-Lernkontexten: Perspektiven aus Pädagogik, Psychologie und Fachdidaktiken, edited by Rebecca Lazarides and Diana Raufelder, 179–210. Wiesbaden: Springer VS. https://doi.org/10.1007/978-3-658-31064-6_7.

What reduces the adverse development of motivation at the beginning of secondary education: The relationship between student-perceived teaching practices and changes in students' achievement goals

Stefan Janke, Martin Daumiller, Anna-Katharina Praetorius, Oliver Dickhäuser and Markus Dresel

Abstract

Students' achievement goals exhibit maladaptive trends throughout their school careers (particularly a decline in learning goals). We examined how changes

Stefan Janke and Martin Daumiller contributed equally to the article and have split first authorship.

S. Janke (✉)
Universität Mannheim, Mannheim, Germany
E-Mail: stefan.janke@uni-mannheim.de

M. Daumiller (✉)
Universität Augsburg, Augsburg, Germany
E-Mail: martin.daumiller@phil.uni-augsburg.de

A.-K. Praetorius
Universität Zürich, Zürich, Switzerland
E-Mail: anna.praetorius@ife.uzh.ch

M. Dresel
Universität Augsburg, Augsburg, Germany
E-Mail: markus.dresel@phil.uni-augsburg.de

O. Dickhäuser
Universität Mannheim, Mannheim, Germany
E-Mail: oliver.dickhaeuser@uni-mannheim.de

in student-perceived teaching practices are associated with this development using longitudinal data from 1847 students in 69 classes (4 measurement points over 2 school years). Latent difference score models indicated that changes in class perceptions of whether teaching practices adhered to the CEAS practices (content, evaluation, autonomy, and social support) were positively related to changes in students' learning goals and performance approach goals. Conversely, if teaching was increasingly perceived to be characterized by competition and social comparisons, performance approach, performance avoidance, and work avoidance goals increased over time. These associations were mediated by changes in student-perceived classroom goal structures. Taken together, these findings highlight the importance of incorporating the CEAS practices into teaching to counteract unfavorable motivational development.

Keywords

Achievement goals • Goal orientations • Goal structures • Mastery • Motivation development • Teaching practices

Students exhibit clear deteriorations in motivations over the course of their school careers (Anderman and Maehr 1994; Dickhäuser et al. 2017). In particular, students' learning goals continuously decline (Chouinard and Roy 2008; Shim et al. 2008; Scherrer and Preckel 2019), meaning that students seem to find mastering new competences and further developing their existing skills less and less important as they proceed through school. Stage-environment fit theory suggests that these declines in motivation result from a combination of changes in students' needs and changes in teachers' teaching practices, particularly following school transitions (Eccles et al. 1993). In this paper, we comprehensively examine the relevance of changes in teaching practices for students' motivational development. Specifically, we focus on how changes in the application of mastery practices (Ames 1992b; Lüftenegger et al. 2014; Benning et al. 2019) affect the development of students' learning goals – which are typically found to decline over time. Empirical studies testing the importance of mastery practices for students' motivational development are rare – as are studies investigating the processes that mediate the relationship between (student-perceived) teaching practices and achievement goals. Consequently, the present study aims to contribute to closing these research gaps. Furthermore, we also investigate changes in performance goals, which describe strivings to demonstrate competence, and work avoidance goals, which describe strivings to minimize effort, to enhance the knowledge on students' motivational development at the beginning of secondary school. We argue

that changes in teaching practices (e.g., after school transitions) can make learning, performance, and work avoidance goals more salient, which in turn could lead students to more strongly develop corresponding achievement goals (see also Murayama and Elliot 2009; Lüftenegger et al. 2017).

1 Achievement Goals as Contextually Influenceable Motivational Characteristics

Achievement goals describe the extent to which students preferentially pursue certain end states that they perceive to be worthwhile with respect to everyday learning and achievement situations at school (Elliot 2005). These end states can be classified according to different approaches (for an overview, see Daumiller et al. 2019). A differentiation of three distinct classes of goals has proven to be useful to describe goal striving within school students (Senko et al. 2011; Skaalvik and Federici 2016): *Learning goals*[1] refer to striving to expand one's competence, while *performance goals* focus on demonstrating one's competence. Performance goals can be further differentiated according to whether the primary aim is to obtain a positive result, such as making a good impression (*performance approach goals*), or to avoid a negative result, such as making a negative impression (*performance avoidance goals*; see Murayama et al. 2011; Janke et al. 2016).

The goal classes which compose this trichotomous achievement goal model describe competence-related behavioral intentions that motivate students in class. However, they are not as well suited to explain the conditions under which students reduce their efforts or become unwilling to do more than is absolutely necessary. As such behavior can frequently be observed in the classroom, early achievement goal researchers proposed *work avoidance goals* as an additional goal class (Nicholls et al. 1985). This type of goals cannot be described as the absence of other goals (cf. Elliot 1999), but rather expresses the extent to which students are motivated to minimize the amount of effort they put in. Research on this goal class has shown that it is highly relevant in populations of school students, can

[1] In the present work, we focus on learning goals as a specific type of mastery goals. Specifically, we define learning goals based on their underlying standpoint of seeking to improve and expand one's competence. Therefore, they are conceptually different to task-based goals (which focus on doing tasks correctly), and self-based goals (which focus on doing better than one has done in the past). To highlight this theoretical distinction, we use the label "learning goal" opposed to the more general mastery goal label in the present work (see Daumiller et al. 2019).

be clearly differentiated from other goal classes, and negatively predicts school engagement and achievement beyond the other goal classes (Skaalvik 1997; King and McInerney 2014). These incremental associations highlight the importance of work avoidance goals for students' experiences and behaviors in learning and performance situations, which is why we include them in the present study as a fourth relevant class of achievement goals (see Daumiller 2018). Given the maladaptive effects, it is particularly important to understand how aspects of teaching are related to students' work avoidance goals.

Empirical findings concerning the four achievement goal classes described above indicate that learning goals are associated with persistent engagement with learning materials (Payne et al. 2007; Bieg et al. 2016; Dickhäuser et al. 2016), while the opposite is true for work avoidance and performance avoidance goals (Elliot and Church 1997; King and McInerney 2014; Daumiller et al. 2021). A few studies have found positive associations between performance approach goals and achievement tests (Diseth 2011; Senko et al. 2013), while performance avoidance goals have consistently been found to be negatively associated with achievement (Elliot and Church 1997; Van Yperen et al. 2014) and positively associated with test anxiety (Elliot and McGregor 1999; Payne et al. 2007; Huang 2011; Janke et al. 2016).

A recent meta-analysis by Scherrer and Preckel (2019) illustrates that learning goals and performance approach goals decline over the course of students' school careers, while performance avoidance goals remain relatively stable. Work avoidance goals were not considered in this meta-analysis; however, studies have also found these goals to be relatively stable over time (Chouinard and Roy 2008). This qualitative change in the relative importance of different goal classes can be considered maladaptive given their previously described consequences. At the same time, however, the fact that achievement goals change over time (see also Fryer and Elliot 2007; Praetorius et al. 2014) implies that they may be susceptible to the influence of teaching practices.

This assumption is strengthened by studies showing that changes in achievement goals are particularly apparent following changes in educational contexts, such as the transition to secondary school (Meece and Miller 2001; Chouinard and Roy 2008) or university (Meier et al. 2013). Alongside other potential explanations (e.g., increasingly differentiated interests; Krapp 2002), the effect of context changes on students' motivational development could be related to systematic changes in the teaching practices teachers employ (Tröbst et al. 2016). Taken together, it seems critical to understand how teaching practices promote learning goals to counteract the decline in students' learning goals in secondary school.

1.1 Teaching Practices, Learning Goal Structures, and Learning Goals

The extent to which teachers' teaching practices create the impression among students that pursuing certain goals will lead to school success is described within the literature under the term *goal structure* (Meece et al. 2006). A *learning goal structure* describes the extent to which the importance of learning goals is salient to students in class. Goal structures are frequently described in the literature as class-level characteristics (Meece et al. 2006). However, we propose that measures commonly used to assess goal structures are also well-suited to capture which goals individual students see as particularly important in class. It can be assumed that students who perceive certain goals as important in class are also more likely to orient their own behaviors towards the pursuit of these goals and thus develop corresponding achievement goals.

Indeed, a recent meta-analysis found that goal structures are strongly associated with students' achievement goals when the two constructs have corresponding content (Bardach et al. 2019). For example, a learning goal structure has a higher correlation with learning goals than other goal structures have. Medium to large sized correlations can be expected for such corresponding pairs. However, the meta-analysis also found correlations between non-corresponding pairs of goal structures and achievement goals, which can largely be attributed to overlap in valence (e.g., approach focus in goal structure and achievement goal) or content (e.g., performance focus in goal structure and achievement goal). In summary, these findings suggest that teaching practices which promote a learning goal structure are particularly well suited to strengthening learning goals among students. One well-established approach to describing such teaching practices is the *TARGET model* (Ames 1992a; Lüftenegger et al. 2014, 2017).

The TARGET model identifies six teaching dimensions that determine the learning goal structure in a class (Ames 1992a): providing interesting learning materials (Task), granting students autonomy over the learning process (Autonomy/Authority), recognizing students' learning process (Recognition), forming learning groups (Grouping), applying feedback procedures (Evaluation), and granting sufficient time for learning (Time). Only a few empirical studies have applied the TARGET model to date. Potential reasons for this could be that the dimensions cannot always be clearly conceptually distinguished from one another (especially recognition and evaluation, but also time and task) and that the model is not sufficiently linked to research on teaching quality, which has also extensively examined teaching practices that increase students' motivation (e.g., Rakoczy 2008). In order to overcome these problems, Benning et al. (2019) suggested to

reduce the TARGET model to four dimensions. These four dimensions are more distinct and better take recent findings from research on teaching quality into account (Benning et al. 2019). The resulting CEAS model encompasses a content dimension, an evaluation dimension, an autonomy dimension, and a social dimension. These four dimensions are briefly described below with respect to what they entail and how they can be expected to matter for learning goal structures in class.

The content dimension describes the extent to which the lessons cognitively activate students and are linked to their interests. In this regard, making the teaching material more interesting can increase students' excitement about engaging with the subject matter, and simultaneously increase their cognitive activation—for example through complex tasks (Praetorius et al. 2018)—in turn, this should encourage students to view acquiring competence as an important goal when dealing with challenging tasks.

The evaluation dimension expresses the extent to which teachers create an evaluation climate that validates competence development. To foster a learning goal structure, teachers should provide feedback on students' individual learning progress (temporal reference norm; Schöne et al. 2004; Rheinberg and Fries 2018) and explicitly praise effort to facilitate effort-based attributions (see Ziegler and Finsterwald 2008). This type of evaluation climate should facilitate the belief within students that achieving one's learning goals is rewarded in-class. To maintain this perspective, it is also important for teachers to deal with student errors constructively, so that students learn to percieve mistakes as learning opportunities (Steuer et al. 2013).

The autonomy dimension describes the extent to which students are given opportunities to make meaningful choices and to take personal responsibility for their learning process. This should enable them to independently engage with the subject matter, leading them to experience the pursuit of learning goals in class as more pleasant (see also Benita et al. 2014).

Finally, the social dimension refers to the assumption that teaching practices are more likely to facilitate a learning goal structure when students receive social support during the learning process, as this helps students feel less alone in their learning process and less frustrated by learning tasks (Patrick et al. 2011). Social support can be provided either directly through teachers' behaviors, such as emotional support and recognition, or indirectly through the creation of a positive climate among students. Cooperative forms of teaching and learning are assumed to be especially suitable to facilitate such a class climate. Furthermore, heterogeneous groups that are characterized by a diversity in task-relevant competencies should be formed to avoid labelling poor-performing students as outsiders (Ross and Harrison 2006).

The results of a first cross-sectional study indicated that teaching rooted in the CEAS dimensions (hereafter referred to as CEAS-based teaching practices) is positively associated with students' perceptions of learning goal structures in class (Benning et al. 2019). However, the authors emphasized that each CEAS dimension alone is unlikely to facilitate a learning goal structure if the other dimensions are ignored or disregarded altogether. For example, social support in class will not evoke a learning goal structure if students are forced to engage with learning content which they find uninteresting. Thus, it is assumed that the individual CEAS dimensions cannot be compensated by one another, but rather work synergistically, which is further confirmed by profile analyses indicating that interactions among the CEAS dimensions serve as the foundation for learning goal structures (Benning et al. 2019). This reasoning is also in line with prior theoretical work on the TARGET dimensions, which are also typically considered holistically rather than as isolated dimensions (Lüftenegger et al. 2014, 2017).

To date, there is a lack of empirical evidence on the association between CEAS-based teaching practices and students' adoption of learning goals, mediated by learning goal structures. Further, longitudinal investigations examining the associations between teaching practices and goal structures are generally rare. Moreover, it is not yet known whether CEAS-based teaching practices are negatively associated with students' adoption of performance avoidance and work avoidance goals (as assumed by Ames 1992a, for TARGET-based teaching practices). Likewise, there is a lack of literature on teaching practices that are suitable for fostering students' adoption of performance goals, although it stands to reason that frequent social comparisons by teachers should encourage students to adopt performance goals.

1.2 Teaching Practices, Performance Goal Structures, and Performance Goals

We assume that teaching is particularly conducive to students' adoption of performance approach and performance avoidance goals when students assume that the pursuit of such goals will increase their school success (as indicated by their individual perception of a performance approach or performance avoidance goal structure; Murayama and Elliot 2009; Bardach et al. 2019). A core element of performance goals is the use of social comparisons to evaluate one's own competence (Janke et al. 2016; Korn et al. 2019). Thus, performance goal structures become salient when teachers' behaviors indicate to students that (a) exhibiting strong performance is important for receiving recognition, and (b) the teacher will

evaluate students' performance by employing social comparisons (Meece et al. 2006). Extending these core assumptions, a set of competition-based teaching practices can be identified that should promote students' perceptions that social comparisons are of high importance in the classroom.

For example, applying a social reference norm to evaluate students' performance (Schöne et al. 2004) or creating competition among students (Janke et al. 2016) directly highlight the importance of social comparisons in the classroom. Publicly announcing students' grades can also increase the salience of such comparisons. Likewise, if teachers form learning groups of students with homogeneous competence levels, students might consider their group membership as valuable information indicating how competent their teacher considers them to be. In turn, this could lead to further competition among students in order to gain membership in certain learning groups. In summary, we assume that competition-based teaching practices are positively associated with students perceiving performance goal structures in their classroom and ultimately with their pursuit of performance approach and performance avoidance goals.

2 Research Questions and Hypotheses

In this study, we investigate whether the changes of students' achievement goals over the course of their school careers can partially be explained by changes in teaching practices. It is of critical importance to examine this research question with a longitudinal study design in order to (a) describe patterns of change over time, and (b) investigate whether changes in students' perceptions of teaching practices are associated with changes in their individual perceptions of the goal structure in class and their own achievement goals. With respect to the direction of change, we assume, in accordance with prior studies (especially Chouinard and Roy 2008; Shim et al. 2008; Scherrer and Preckel 2019), that students' learning goals (Hypothesis 1a) and performance approach goals (Hypothesis 1b) will decline over time, while their performance avoidance and work avoidance goals should remain relatively stable. We expect to find a maladaptive development in perceived teaching practices over time (i.e., a reduction in CEAS-based teaching practices, Hypothesis 2a; and learning goal structures, Hypothesis 2b), as we assume that changes in perceived teaching practices at the class level are at least partially responsible for maladaptive changes in students' achievement goals at the individual level. We had no prior assumptions concerning the direction of change in perceived competition-based teaching practices at the class level and perceived performance goal structures at the individual level.

In accordance with social constructivist approaches, we assume that changes in students' shared perceptions of their teacher's teaching, as a contextual characteristic at the class level, affect changes in students' achievement goals (e.g., Martin et al. 2011). Specifically, we posit that a shared perception of CEAS-based teaching practices among students is positively associated with a perceived learning goal structure at the individual level (Hypothesis 3). Understanding whether CEAS-based teaching practices are negatively associated with a perceived performance goal structure at the individual level (sensu Ames 1992a; Wolters 2004) requires further examination. Furthermore, we assume that a shared perception among students that social comparisons are emphasized in class (i.e., competition-based teaching practices) positively predicts the extent to which students perceive performance approach goal structures (Hypothesis 4a) and performance avoidance goal structures (Hypothesis 4b) in class.

Finally, we assume that students' perceptions of changes in classroom goal structures are directly related to changes in their personal achievement goals. In other words, perceived goal structures at the individual level should mediate the effects of perceived teaching practices at the class level. Accordingly, we anticipate a positive association between CEAS-based teaching practices and the development of individual learning goals, mediated by the perception of learning goal structures (Hypothesis 5a). Conversely, competition-based teaching practices should be positively associated with the development of performance approach (Hypothesis 5b) and performance avoidance goals (Hypothesis 5c), mediated by perceived performance approach and performance avoidance goal structures. We had no specific hypotheses concerning the direction of context effects on the development of work avoidance goals. In light of the critical importance of this class of goals, we examined potential associations in an exploratory manner.

3 Methods

We examined our research questions using data from an existing two-year longitudinal study of school students. Subsamples of this dataset have already been used to examine research questions concerning the importance of migration background for the assignment of grades (Bonefeld et al. 2017), the development of students' academic self-concepts over time (Dickhäuser et al. 2017), the associations between teachers' motivation and perceived teaching quality (Praetorius et al. 2017), and to investigate dimensions underlying performance approach and performance avoidance goals (Janke et al. 2016). The latter study also demonstrated initial correlations between performance goals and perceived competition in

class on the individual level, but not on the class level. Other research questions relevant to the present study have not yet been addressed in previously published research.

3.1 Sample

In the longitudinal study (for a more detailed overview see Nitsche et al. 2017), 4,077 students were surveyed about their teacher's teaching practices in the first half of fifth and sixth grades (T1: $n = 3{,}759$, T3: $n = 1{,}547$) and about perceived goal structures and achievement goals in the second half of each school year (T2: $n = 3{,}575$, T4: $n = 1{,}498$), always with respect to their mathematics class. To answer our research questions, we examined classes for which data on perceived teaching practices were available for both T1 and T3. This subsample encompassed 1,847 students (47.5 % male, 52.2 % female; from 69 different classes with an average class size of $M = 27.0$, $SD = 3.1$, students). A multivariate analysis of variance (MANOVA) showed no statistically significant differences in the constructs measured at T1 between classes who also participated at T3 and those who dropped out. Data from T2 and T4 was also available for 1,282 of the students in our sample. A second MANOVA indicated that these students did not significantly differ in the constructs assessed at T1 and T3 from students who did not participate at T2 or T4. Missing values were handled using the full information maximum likelihood procedure in Mplus.

3.2 Measures

All measures employed in the study related to teaching or goals in mathematics class. Details on the scales (sources, example items, number of items, and satisfactory internal consistencies, with an average of $\alpha = .84$) can be found in Tab. 1. Data on teaching practices as well as shared perceptions of teaching characteristics were assessed at T1 and T3, while the individual student variables perceived goal structures and achievement goals were assessed at T2 and T4. Descriptive information on the individual scales can be found in Tab. 2.

Tab. 1 Overview of the Included Scales with Example Items, Number of Items, Response Formats, and Internal Consistencies

	Source	Example item	Number of items	Response format	α
Teaching practices					
CEAS-based					
Interesting-ness/relevance for everyday life	Adapted from Ditton (2001) and PISA (Ramm et al. 2006)	Our teacher assigns us interesting tasks in math	6	1 (*never*) – 5 (*always*)[a]	.91–.91
Clarity	Abapted from PISA (Ramm et al. 2006)	Our teacher expresses him-/herself clearly in math class	3	1 (*never*) – 5 (*always*)[a]	.94–.94
Cognitive activation	Adapted from PISA (Ramm et al. 2006)	In math class, our teacher asks questions you can't answer right off the top of your head, but make you think	6	1 (*never*) – 5 (*always*)[a]	.77–.84
Positive error climate	Subscales from Steuer et al. (2013)	In our class, when someone completes a task incorrectly in math, the teacher helps him or her	20	1 (*not at all true*) – 6 (*completely true*)[b]	.85–.91
Personal responsibility for the learning process	Adapted from existing scales (Black and Deci 2000; Rakoczy et al. 2005; Kunter et al. 2007; Frey et al. 2009)	In our math class, we are encouraged to work independently	6	1 (*never*) – 5 (*always*)[a]	.84–.86
Granting opportunities for meaningful choices	Adapted from Baumert et al. (2008)	In our math class, the teacher involves us in selecting the topics we will learn	7	1 (*never*) – 5 (*always*)[a]	.84–.90
Emotional recognition	Wild (1999; see also Benning et al. 2019)	In our math class, I feel understood and supported by my teacher	3	1 (*not at all true*) – 6 (*completely true*)[b]	.78–.84

(Continued)

Tab. 1 (Continued)

	Source	Example item	Number of items	Response format	α
Cooperative learning	PISA items (Ramm et al. 2006)	In our math class, the teacher gives us tasks in which we have to work together	6	1 (*never*) – 5 (*always*)[a]	.88–.89
Formation of groups with heterogeneous competence levels	Dresel et al. (2013)	When we work in groups or with partners in math, stronger and weaker students work together	3	1 (*never*) – 5 (*always*)[a]	.77–.83
Competition-based					
Teacher's negative reactions to mistakes	Steuer et al. (2013)	When someone makes a mistake in our math class, the teacher often looks annoyed	4	1 (*not at all true*) – 6 (*completely true*)[b]	.89–.92
Publicly announcing grades	Dresel et al. (2013)	In our math class, the teacher passes out graded assignments so that the whole class knows what grade each student got	3	1 (*not at all true*) – 6 (*completely true*)[b]	.85–.90
Competition	Expanded PISA scale (Ramm et al. 2006)	In our math class, the teacher lets us enter into competitions with one another	6	1 (*never*) – 5 (*always*)[a]	.74–.81
Social reference norm	Short scale by Plenter (2004)	My teacher thinks a good result in math is one that is better than everyone else's	3	1 (*not at all true*) – 6 (*completely true*)[b]	.91–.92
Formation of groups with homogeneous competence levels	Dresel et al. (2013)	When we work in groups or with partners in math, the good students work together and the bad students work together	3	1 (*never*) – 5 (*always*)[a]	.80–.81

(Continued)

Tab. 1 (Continued)

	Source	Example item	Number of items	Response format	α
Goal structures					
Learning goal structure	Adapted from Midgley et al. (2000)	In our math class, the main goal is to really understand the content	6	1 (*not at all true*) – 6 (*completely true*)[b]	.65–.72
Performance approach goal structure		In our math class, the main goal is to get good grades	3	1 (*not at all true*) – 6 (*completely true*)[b]	.68–.71
Performance avoidance goal structure		In our math class, it's really important to show the class that you're not bad at something	5	1 (*not at all true*) – 6 (*completely true*)[b]	.81–.86
Achievement goals					
Learning goals	SELLMO (Spinath et al. 2002)	My goal in math is to learn something interesting	8	1 (*not at all true*) – 6 (*completely true*)[b]	82–.88
Performance approach goals		My goal in math is to show that I am good at something	7	1 (*not at all true*) – 6 (*completely true*)[b]	.79–.83
Performance avoidance goals		My goal in math is to hide the fact that I sometimes know less than others	8	1 (*not at all true*) – 6 (*completely true*)[b]	.89–.90
Work avoidance goals		My goal in math is to not have any hard tests or assignments	8	1 (*not at all true*) – 6 (*completely true*)[b]	.87–.88

Note. a) Complete scale: 1 (*never*), 2 (*rarely*), 3 (*occasionally*), 4 (*often*), 5 (*always*). b) Complete scale: 1 (*not at all true*), 2 (*untrue*), 3 (*somewhat untrue*), 4 (*somewhat true*), 5 (*true*), 6 (*completely true*).

Tab. 2 Descriptive Statistics

	T1			T2			T3			T4		
	M	*SD*	Skew	*M*	*SD*	Skew	*M*	*SD*	Skew	*M*	*SD*	Skew
CEAS-based teaching practices												
Interestingness/relevance for everyday life	3.48	0.90	−0.44				3.17	1.02	−0.30			
Clarity	4.15	0.89	−1.33				3.77	1.15	−0.91			
Cognitive activation	3.43	0.62	−0.43				3.36	0.70	−0.67			
Positive error climate	4.57	0.61	−0.72				4.42	0.75	−0.99			
Personal responsibility for one's learning process	3.69	0.72	−0.75				3.55	0.86	−0.44			
Granting opportunities for meaningful choices	3.85	0.80	−0.96				3.63	0.99	−0.84			
Emotional recognition	4.10	1.03	−0.39				3.80	1.20	−0.46			
Cooperative instruction	3.15	0.82	−0.17				2.98	0.86	−0.27			
Groups with heterogeneous competence level	4.71	0.89	−0.77				4.48	1.01	−0.91			
Competition-based teaching practices												
Social reference norm	2.87	1.33	0.41				3.01	1.37	0.25			
Use of competition	2.28	0.74	0.57				2.38	0.81	0.41			
Publicly announcing grades	1.63	0.96	2.01				1.80	1.11	1.65			
Groups with homogeneous competence level	1.54	0.73	1.68				1.71	0.85	1.23			

(Continued)

Tab. 2 (Continued)

Goal structures												
Learning goal structure				4.94	0.77	−1.14				4.75	0.91	−1.39
Performance approach goal structure				3.45	1.12	0.10				3.46	1.08	0.18
Performance avoidance goal structure				2.47	1.12	0.84				2.58	1.18	0.73
Achievement goals												
Learning goals				4.92	0.83	−0.96				4.29	1.03	−0.71
Performance approach goals				3.55	1.04	0.19				3.38	0.99	0.08
Performance avoidance goals				2.67	1.15	0.56				2.91	1.11	0.30
Work avoidance goals				2.70	1.16	0.58				3.02	1.10	0.27

Note. N(T1, T3) = 1,847, N(T2, T4) = 128.

Teaching practices. The teaching characteristics that indicated CEAS-based teaching practices corresponded to those measured in the study by Benning et al. (2019). To represent the different teaching practices in a synergistic manner, we operationalized CEAS-based teaching practices by aggregating the individual scales, giving each scale equal weight (following Dresel et al. 2013; Lüftenegger et al. 2017). The individual scales are each presented briefly below. For the content dimension, we assessed the extent to which students perceived teaching as interesting/relevant to everyday life, clear, and cognitively activating. For the evaluation dimension (competence-oriented evaluation climate), we assessed the extent to which students reported receiving support from their teacher when they made mistakes. The autonomy dimension was measured with scales on transferring responsibility for the learning process to students and granting students opportunities to make meaningful choices. Finally, we assessed the social dimension (social support) via scales on emotional recognition by the teacher, cooperative learning, and the formation of groups with heterogeneous competence levels.

We assessed competition-based teaching practices using scales on the teacher's employment of social reference norms, competition in class, publicly announcing grades, a negative error climate, and the formation of groups with homogeneous competence levels. Analogously to the CEAS-based teaching practices, we created an index by combining the individual scales, giving each scale equal weight.

A multi-level confirmatory factor analysis supported our classification of the individual teaching elements to the two overarching factors representing CEAS-based and competition-based teaching practices. Specifically, we latently modeled the individual teaching characteristics and formed two overarching second-order factors (CEAS-based teaching practices and competition-based teaching practices). This model exhibited satisfactory model fit (T1: $\chi^2 = 2{,}516$, $p < .001$, CFI = .92, TLI = .92, RMSEA = .04; T3: $\chi^2 = 2{,}722$, $p < .001$, CFI = .93, TLI = .92, RMSEA = .04). Even though a model without the second-order factors fit the data better (T1: $\chi^2 = 145$, $p < .001$, CFI = .97, TLI = .97 RMSEA = .03; T3: $\chi^2 = 1{,}072$, $p < .001$, CFI = .98, TLI = .98, RMSEA = .02), we used the model with the two second-order factors for the subsequent analyses for both theoretical reasons (the individual teaching practices cannot be substituted for one another) and reasons of parsimony. This measurement model was satisfactory at both the individual and class level. Moreover, the substantial intraclass correlations (ICC1 = .06–.29; ICC2 = .55–.91) indicate that the teaching practice measures differed systematically among school classes and were answered by the individual students in each class with sufficient reliability.

Perceived goal structures. We assessed perceived goal structures with a German translation of the PALS scale (adapted from Midgley et al. 2000). This

scale distinguishes between perceived learning, performance approach, and performance avoidance goal structures. Based on our theoretical assumption that a person's achievement goals are influenced by their individual perceptions of goal structures, we conceptualized perceived goal structures as an individual-level characteristic. In addition to measuring perceived goal structures as an individual characteristic, we could also have modeled goal structures on the class level (analogously to teaching practices). However, in addition to our initial theoretical considerations, it also did not seem appropriate to examine goal structures as a class-level construct in the present study due to the scale's low reliability at the class level (ICC2 = .25–.64).

Achievement goals. We assessed students' achievement goals with a well-validated German inventory (Skalen zur Erfassung der Lern- und Leistungsmotivation, SELLMO; Spinath et al. 2002) that measures learning goals, performance avoidance goals, and work avoidance goals with eight items each, and performance approach goals with seven items.

3.3 Analyses

We calculated latent difference score models (LDSM) in Mplus 8.1 (Muthén and Muthén 2019) to answer our research questions. This analysis models the mean difference between a latent factor score at an earlier measurement point and at a later measurement point as a latent variable. In light of the complexity of the model, we used item parcels as basic indicators (this approach is preferred to the inclusion of all items when estimating complex models; Little et al. 2013). The parcels were created using the item-to-construct method, with two parcels per construct (Little et al. 2002). Given that both forms of teaching practices represent class-level characteristics that were reliably assessed by the students in each class, we created indicators for these constructs using a two-level analysis in which we modeled teaching practices at both the student and class levels and saved each student's factor scores. The class-level scores, which reflect students' shared perceptions of teaching practices, were used as indicators for teaching practices in the subsequent LDSMs. As a prerequisite for calculating the difference scores, we conducted measurement invariance analyses based on a measurement model in which, like in the LDSM, all constructs (teaching practices, goal structures, and achievement goals) were modeled as latent variables and both measurement points for each construct were considered by applying a multi-group model (T1 + T2 vs. T3 + T4). The model fit did not significantly decline when restricting the indicator loadings across the two measurement points and subsequently restricting

the intercepts of the indicators, indicating scalar measurement invariance (configural model: $\chi^2 = 771.6$, $p < .001$, CFI = .985, TLI = .977, RMSEA = .042; metric model: $\chi^2 = 822.5$, $p < .001$, CFI = .984, TLI = .977, RMSEA = .042; scalar model: $\chi^2 = 874.9$, $p < .001$, CFI = .983, TLI = .976, RMSEA = .043).

In the LDSM, we simultaneously calculated nine difference scores representing changes in shared perceptions of both forms of teaching practices between T1 and T3 and changes in individually perceived goal structures and achievement goals between T2 and T4. The first model did not include any further specifications; it simply tested whether the mean difference scores were statistically significantly different from zero and examined their latent correlations. In the second model, we examined the associations between the changes more closely by regressing the difference scores for achievement goals on the difference scores for perceived goal structures. We then regressed the difference scores for these individual perceptions on the difference scores for the shared perceptions of teaching practices. We also modelled the correlations among the difference scores for teaching practices, goal structures, and achievement goals, respectively. We took into account the nested structure of the data (students within classes) by using the type = complex command in Mplus. Because the normality assumption did not hold for all variables, we applied the MLR estimator. We estimated indirect effects to investigate potential mediations. For ease of interpretation, we report standardized parameters expressing the extent to which a one-standard-deviation change in the predictor variable leads to a change in the criterion variable relative to its own standard deviation.

4 Results

On a descriptive level, students perceived stronger learning goal structures than performance goal structures at the beginning of the study and also reported stronger learning goals than performance goals ($t > 49.43$, $p < .001$). The measured constructs exhibited a low to moderate level of stability (auto-correlations for teaching practices: $r_{T1–T3} = .33–.38$; goal structures: $r_{T2–T4} = .28–41$; achievement goals: $r_{T2–T4} = .39–.43$).

The results of the first LDSM (Tab. 3) indicate that students' learning goals declined markedly over time (Cohen's $d = –0.72$; Hypothesis 1a), while performance approach goals declined only slightly (Cohen's $d = –0.17$; Hypothesis 1b). Moreover, and unexpectedly, performance avoidance goals and work avoidance goals increased to a small to moderate extent ($d = 0.27–0.35$). Students' shared

Tab. 3 Estimated Parameters for the Latent Difference Score Model

	Latent baseline score		Latent difference score		Bivariate latent correlations								
	M	*Var*	*M*	*Var*	1	2	3	4	5	6	7	8	9
Shared perceptions of teaching practices (T1; T3)													
[1] CEAS-based	3.54	0.02	−0.27*	0.08*		−.14	.10*	−.05	−.08*	.11*	.02	−.04	−.06*
[2] Competition-based	2.00	0.01	0.19*	0.03*	−.40		−.01	.11*	.10*	−.05	.06*	.08*	.08*
Goal structures (T2; T4)													
[3] Learning goal structure	4.91	0.37	−0.19*	0.65*	.18*	−.12*		.12*	−.06*	.49*	.14*	−.04	−.14*
[4] Performance approach goal structure	3.65	0.76	0.03	0.82*	−.01	.05*	.15*		.61*	.07*	.52*	.54*	.36*
[5] Performance avoidance goal structure	2.39	0.93	0.13*	1.05*	−.04	.08*	−.09*	.48*		−.10*	.59*	.73*	.51*
Achievement goals (T2; T4)													
[6] Learning goals	5.03	0.51	−0.63*	0.77*	.19*	−.13*	.33*	.01	−.11*		.19*	−.11*	−.28*
[7] Performance approach goals	3.28	0.78	−0.15*	0.74*	.06	.03	.16*	.32*	.40*	.32*		.76*	.47*
[8] Performance avoidance goals	2.58	1.02	0.28*	1.10*	−.01	.08*	−.02	.31*	.49*	.01	.75*		.63*
[9] Work avoidance goals	2.88	1.01	0.36*	1.04*	−.06*	.09*	−.07*	.23*	.38*	−.17*	.50*	.65*	

Note. Based on the first LDSM ($\chi^2 = 1{,}878$, $p < .001$, CFI = .94, TLI = .92, RMSEA = .04), the following values are reported: mean and variation of the latent baseline scores at T1 or T2 and latent difference scores from T1 to T3 or T2 to T4; latent correlations among the difference scores (triangular matrix below the diagonal) and baseline scores (triangular matrix above the diagonal). *: $p < .05$.

perceptions of CEAS-based teaching practices decreased (d = –0.94; Hypothesis 2a), while perceived competition-based teaching practices increased (d = 1.15). Learning goal structures also declined slightly (d = –0.24; Hypothesis 2b). The other changes were less relevant in terms of size ($|d| < .20$; see also Tab. 3; with the exception of performance approach goal structures, all changes were statistically significant).

The results of the second LDSM provide more detailed insight into these changes (see Fig. 1). The extent and direction of change in shared class-level perceptions of CEAS-based teaching practices was positively associated with the subsequent extent and direction of change in students' individual perception of a learning goal structure (Hypothesis 3), which was in turn associated with a corresponding change in the students' own learning goals. In accordance with our expectations, this association with learning goals was mediated by learning goal structures (indirect effect: $\beta = .13$, $p = .004$; Hypothesis 5a). The analyses further revealed that the change in learning goal structures was positively associated with corresponding the change in students' performance approach goals. Changes in learning goal structures mediated the positive association of CEAS-based teaching practices with students' development of performance approach goals ($\beta = .07$, $p = .015$).

Conversely, extent and direction change of in-class level perceptions of competition-based teaching practices were negatively associated with the extent and direction of changes in students' individual perceptions of learning goal structures, and positively associated with perceived performance approach goal structures (Hypothesis 4a), performance avoidance goal structures (Hypothesis 4b), as well as with students' adoption of performance avoidance goals. The associations with performance avoidance goals were partially mediated by the perception of a corresponding goal structure ($\beta = .05$, $p = .036$; Hypothesis 5c). Change in perceived performance avoidance goal structures was also positively associated with change in performance approach goals and work avoidance goals. Moreover, the perceived changes in learning goal structures mediated the association of the changes in competition-oriented teaching practices on changes in students' learning goals ($\beta = .05$, $p = .012$), as well as the association of the changes in CEAS-based teaching practices with changes in students' adoption of performance approach goals ($\beta = .07$, $p = .015$). The hypothesized mediation of the association of competition-based teaching practices with performance approach goals via performance approach goal structures (Hypothesis 5b) could not be found.

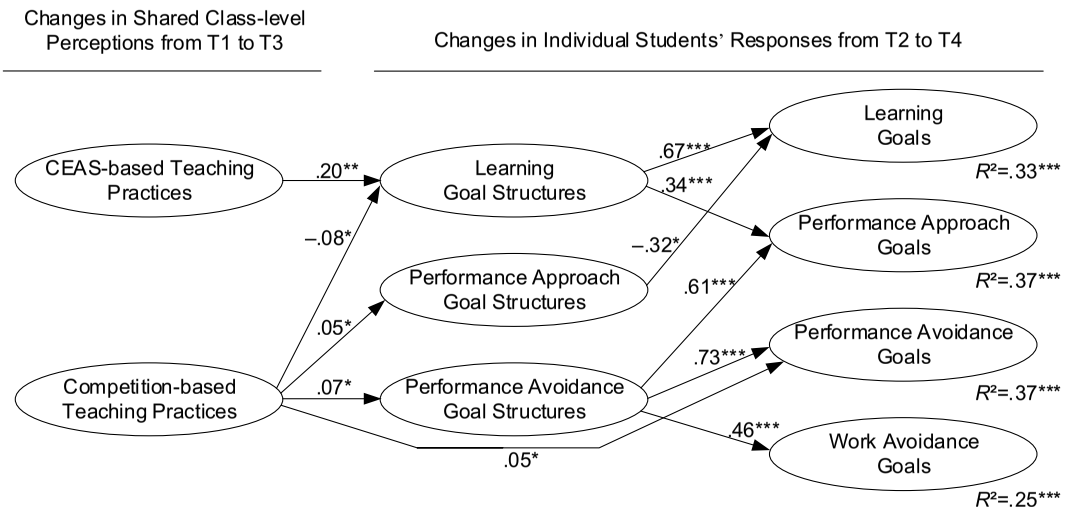

Fig. 1 LDSM results ($\chi^2 = 2{,}117.6$, $p < .001$, CFI = .93, TLI = .91, RMSEA = .04) for the associations between changes in shared class-level perceptions of teaching practices and changes in students' individual perceptions of goal structures and their achievement goals. To improve comprehensibility, only statistically significant coefficients are presented, while correlations between the difference scores as well as factor loadings of the indicators of the latent factors are not shown.

5 Discussion

The present study aimed to demonstrate whether and how changes in teaching practices at the beginning of secondary school are associated with the frequently observed deterioration in students' motivations during this transitional phase. Insights into this issue are important to gain a better understanding of how teaching can be employed to counteract this maladaptive development. The results of our analyses indicate that changes in shared perceptions of CEAS-based teaching practices are positively associated with changes in learning goals at the individual level. This association was completely mediated by changes in individual perceptions of a learning goal structure. Similarly, we found indirect effects of CEAS-based teaching practices on performance approach goals mediated by changes in learning goal structures. The direct associations found between learning goal structures and performance approach goals are in accordance with previous findings that have documented that associations between goal structures and achievement goals become more likely when they overlap with respect to valence or content (Bardach et al. 2019). This might also explain the observed associations between performance avoidance goal structures and performance approach goals. However, these theoretical considerations cannot explain the negative association that we found between perceived learning goal structures and performance approach goals. Likewise, performance approach goal structures were not found to promote learning goals in our sample despite the shared valence between both constructs (approach goals). Finally, perceived changes in competition-based teaching practices showed maladaptive relationships with changes in learning goals, performance approach goals, performance avoidance goals, and work avoidance goals. We only found direct associations between changes in this kind of teaching practices and changes in performance avoidance goals, whereas all other achievement goals were only indirectly linked to competition-based teaching practices mediated by changes in performance avoidance goal structures and learning goal structures. Teaching practices were not found to be associated with performance approach goal structures.

5.1 Theoretical Implications

As expected, we observed a maladaptive development in students' achievement goals at the beginning of secondary school in the present study. Similar to existing literature on this topic (see Scherrer and Preckel 2019), the students experienced

a substantial decline in learning goals and a relatively mild decline in performance approach goals. Simultaneously, their performance avoidance and work avoidance goals increased. Although we did not expect this latter finding, it highlights the notion that students may shift from learning goals to other, less adaptive, achievement goals at the beginning of secondary school.

Moreover, this study provided first indications that the aforementioned changes in achievement goals are associated with changes in class-level perceptions of teaching practices. Thus, our results imply that employing certain teaching practices can signal to students that certain types of goals lead to success, which in turn makes them more likely to pursue these goals. Previous research on this topic typically examined either the association between teaching practices and goal structures (Dresel et al. 2013; Benning et al. 2019) or the association between goal structures and achievement goals (Wolters 2004; Murayama and Elliot 2009), but not both. Thus, the present findings can inform the development of a comprehensive process model explaining how teaching practices influence students' achievement goals via goal structures (see also Dresel et al. 2013).

Teaching practices in accordance with the CEAS dimensions (Benning et al. 2019) seem to be positively associated with changes in students' learning goals and might thus be suitable to counteract the observed maladaptive decline of learning goals over time. We would like to note that CEAS-based teaching practices particularly emphasize perceived competence (evaluation dimension), perceived autonomy (autonomy dimension) and perceived relatedness (social dimension). Accordingly, in line with self-determination theory, our findings suggest that learners are particularly likely to set growth-related goals (i.e., learning goals as specific form of competence-based growth-related goals; Janke and Dickhäuser 2019) when they can pursue their goals autonomously, feel competent with respect to achieving their goals, and feel that they can rely on social support when faced with challenges (Deci and Ryan 2000; Janke et al. 2015). Such contexts might foster the belief that meaningful growth and true skill development is possible.

However, we found no indication that CEAS-based teaching practices reduce performance goals (see Ames 1992a; Wolters 2004). CEAS-based teaching practices were only negatively associated with work avoidance goals. This might be because CEAS-based teaching practices make the investment of time and effort in learning seem worthwhile. However, the lack of negative associations with performance goals, as assumed by Ames (1992a), is surprising. In fact, our results contradict her assumptions: in our sample, teaching based on the CEAS dimensions actually facilitated the development of performance approach goals by strengthening a learning goal structure. This finding indicates that the promotion

of learning goals and performance goals are not mutually exclusive, which aligns with the reasoning that different classes of achievement goals can be pursued independently of one another (Pintrich 2000). Accordingly, it has been argued that a combination of learning goals and performance approach goals is beneficial to learners' self-efficacy and performance (see e.g., Pintrich 2000; Lo et al. 2017). Thus, the observed positive associations between CEAS-based teaching practices and both achievement goal classes further highlight the importance of the CEAS dimensions for promoting motivation.

Moreover, our findings illustrate that focusing teaching on social comparisons and competition among students is associated with a maladaptive development of achievement goals (increased performance avoidance goals and work avoidance goals, reduced learning goals). Contrary to our expectations, we found no associations with or via performance avoidance goal structures. A possible explanation for this pattern of results is that only some, but not all students can succeed in highly competitive learning situations (see Nicholls 1989), even though all students are increasingly motivated by the desire to avoid poor performance. Given that performance avoidance goals are directly related to test anxiety (Elliot and McGregor 1999; Huang 2011; Janke et al. 2016) and work avoidance goals are associated with lower effort (King and McInerney 2014), we think that competition-based teaching practices should be regarded as maladaptive, at least from a motivational psychology perspective.

5.2 Practical Implications

Our findings suggest that appropriate teaching practices might help to diminish students' negative motivational development at the beginning of secondary school (Anderman and Maehr 1994; Dickhäuser et al. 2017). It must be noted that this maladaptive trend was also found in our sample: Students' learning goals declined in the observed time period, while maladaptive avoidance goals increased (in contrast to Scherrer and Preckel 2019). Nevertheless, our findings also indicate that students' motivational development is substantially related to perceived changes in teaching practices. Hence, incorporating the CEAS dimensions more extensively into teaching might contribute to the retention of a learning goal structure in class even after the transition to secondary school. This might make it possible to at least slow the decline in students' learning goals during secondary school. Simultaneously, minimizing social comparison processes and competitive situations in class can help avert the development of maladaptive achievement goals (see also Rheinberg and Fries 2018 regarding negative effects of social comparisons).

5.3 Limitations and Future Research

One limitation of the present analyses concerns the use of students' shared perceptions as a measure of teaching in class. It is true that according to social constructivist approaches (e.g., Martin et al. 2011), students' shared perspectives about teaching practices are more important for students' experiences and behaviors than teachers' perceptions. Nevertheless, it is unclear whether the observed changes in student-perceived teaching practices refer to actual changes in teachers' teaching practices or merely a change in students' view of teaching. Hence, observation-based and experimental intervention studies are of critical importance to further identify a) true changes in teaching practices in secondary school and b) their impact on student motivation.

Moreover, we used two composite measures to operationalize teaching practices, which were grounded in several different teaching aspects. It is plausible that some of these individual aspects have differential or at least differently sized effects on students' motivation. In future research, these potentially nuanced effects of the different aspects of teaching could be studied in more detail. Furthermore, we focused on perceived goal structures as an individual-level characteristic rather than as a class-level characteristic, with the latter operationalization being more common in the literature. Despite our use of a German translation of the original PALS scale, which was developed to measure students' shared perceptions of goal structures (Midgley et al. 2000), the measure did not reach sufficient reliability on the class level (for similar findings concerning this scale, see also Dickhäuser et al. 2020). We recommend that future researchers seeking to investigate goal structures as a class-level construct should employ a different scale that is more suitable to measuring shared student perceptions.

Additionally, it is not possible to conclusively determine causality with respect to the identified associations using this dataset. Even though the associations were based on a clear temporal logic (changes in teaching preceded subsequent changes in goal structures and goal orientation), we were not able to test alternative temporal orderings and the teaching variables were not manipulated in a controlled environment. This is even more problematic with respect to the observed associations between the mediator variables (changes in goal structures) and criterion variables (changes in achievement goals), which were assessed at the same measurement point. Further field experiments would be necessary to comprehensively test the underlying causality behind these associations. For example, teaching practices could be deliberately varied while simultaneously controlling for baseline differences in the mediator, criterion and external variables.

In addition, it should be noted that all constructs (teaching practices as well as goal structures and achievement goals) were explicitly assessed with respect to mathematics. Specifying the subject in this way is particularly necessary when measuring teaching practices, as it cannot be assumed that different teachers teach the same way in different subjects. Nevertheless, this raises the question of whether our findings can be generalized to other subjects. Although we see no reason why the observed associations should differ for different subjects, we do believe that subject-specific differences in the development of achievement goals are likely. For instance, the unexpected increase in performance avoidance goals might be explained by a particularly strong difference in performance demands in mathematics between elementary and secondary school compared to other subjects. Thus, systematic investigations of subject-specific developments in achievement goals seem worthwhile.

6 Conclusion

In the present study, we demonstrated that changes in students' shared perceptions of teaching practices are linked to subsequent changes in students' achievement goals. Although the question of causality with respect to these associations has not yet been sufficiently addressed, the results suggest that teaching could influence which goals students perceive as adaptive for their success in a given subject (as indicated by perceived goal structure) and choose to pursue themselves. Therefore, teaching in secondary school should more extensively incorporate CEAS practices in order to counteract the frequently observed decline in students' learning goals.

Acknowlegements The presented research was made possible through a research grant by the German Federal Ministry for Education and Research to Oliver Dickhäuser (01 HJ 0901) and Markus Dresel (01 HJ 0902). We thank Katharina Benning, Michaela Fasching, Ines Giermann and Sebastian Nitsche for their scientific work within the respective research project as well as for their contribution to data collection. Furthermore, we thank Keri Hartman for translation of the manuscript and Raven Rinas for language corrections as well as additional proofreading.

References

Ames, C. (1992a). Achievement goals and the classroom motivational climate. In D. H. Schunk & J. L. Meece (Eds.), *Student perceptions in the classroom* (pp. 327–348). Hillsdale: Lawrence Erlbaum Associates.

Ames, C. (1992b). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology, 84,* 261–271. https://doi.org/10.1037/0022-0663.84.3.261.

Anderman, E. M., & Maehr, M. L. (1994). Motivation and schooling in the middle grades. *Review of Educational Research, 64,* 287–309. https://doi.org/10.3102/00346543064002287.

Bardach, L., Oczlon, S., Pietschnig, J., & Lüftenegger, M. (2019). Has achievement goal theory been right? A meta-analysis of the relation between goal structures and personal achievement goals. *Journal of Educational Psychology*. Advanced online publication. doi:https://doi.org/10.1037/edu0000419

Baumert, J., Blum, W., Brunner, M., Dubberke, T., Jordan, A., Klusmann, U., & Tsai, Y. (2008). *Professionswissen von Lehrkräften, kognitiv aktivierender Mathematikunterricht und die Entwicklung von mathematischer Kompetenz (COACTIV). Dokumentation der Erhebungsinstrumente [Professional knowledge of teachers, cognitively activating math lessons, and the development of mathematical competencies. Documentation of assessment instruments].* Berlin: Max-Planck-Institute.

Benita, M., Roth, G., & Deci, E. L. (2014). When are mastery goals more adaptive? It depends on experiences of autonomy support and autonomy. *Journal of Educational Psychology, 106,* 258–267.

Benning, K., Praetorius, A.-K., Janke, S., Dickhäuser, O., & Dresel, M. (2019). Das Lernen als Ziel: Zur unterrichtlichen Umsetzung einer Lernzielstruktur [Learning as an objective: instructional implementation of a mastery goal structure in classroom]. *Unterrichtswissenschaft, 47,* 523–545. https://doi.org/10.1007/s42010-019-00054-7.

Bieg, S., Reindl, M., & Dresel, M. (2016). The relation between mastery goals and intrinsic motivation among university students: A longitudinal study. *Educational Psychology, 37,* 666–679. https://doi.org/10.1080/01443410.2016.1202403.

Black, A. E., & Deci, E. L. (2000). *The Learning Climate Questionnaire (LCQ).* https://www.learningandthinking.co.uk/Learning%20Climate%20Questionnaire.pdf. Accessed: 25. Aug. 2020.

Bonefeld, M., Dickhäuser, O., Janke, S., Praetorius, A. K., & Dresel, M. (2017). Migrationsbedingte Disparitäten in der Notenvergabe nach dem Übergang auf das Gymnasium [Students' grading according to migration background]. *Zeitschrift für Entwicklungspsychologie und Pädagogische Psychologie, 49,* 1–23. https://doi.org/10.1026/0049-8637/a000163.

Chouinard, R., & Roy, N. (2008). Changes in high-school students' competence beliefs, utility value and achievement goals in mathematics. *British Journal of Educational Psychology, 78,* 31–50. https://doi.org/10.1348/000709907X197993.

Daumiller, M. (2018). *Motivation von Wissenschaftlern in Lehre und Forschung: Struktur, Eigenschaften, Bedingungen und Auswirkungen selbstbezogener Ziele [Motivation of university scholars for teaching and research: Structure, attributes, antecedents, and consequences of achievement goals].* Wiesbaden: Springer VS. https://doi.org/10.1007/978-3-658-21182-0

Daumiller, M., Dickhäuser, O., & Dresel, M. (2019). University instructors' achievement goals for teaching. *Journal of Educational Psychology, 111,* 131–148. https://doi.org/10.1037/edu0000271.

Daumiller, M., Rinas, R., Olden, D., & Dresel, M. (2021). Academics' motivations in professional training courses: Effects on learning engagement and learning gains. *International*

Journal of Academic Development, 26(1), 7–23. https://doi.org/10.1080/1360144X.2020.1768396

Deci, E. L., & Ryan, R. M. (2000). The 'what' and 'why' of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry, 11,* 227–268. https://doi.org/10.1207/S15327965PLI1104_01.

Dickhäuser, O., Dinger, F. C., Janke, S., Spinath, B., & Steinmayr, R. (2016). A prospective correlational analysis of achievement goals as mediating constructs linking distal motivational dispositions to intrinsic motivation and academic achievement. *Learning & Individual Differences, 50,* 30–41. https://doi.org/10.1016/j.lindif.2016.06.020.

Dickhäuser, O., Janke, S., Daumiller, M., & Dresel, M. (2021). Motivational school climate and teachers' achievement goal orientations: A hierarchical approach. *British Journal of Educational Psychology, 91*(1), 391–408. https://doi.org/10.1111/bjep.12370.

Dickhäuser, O., Janke, S., Praetorius, A.-K., & Dresel, M. (2017). The effects of teachers' reference norm orientations on students' implicit theories and academic self-concepts. *Zeitschrift für Pädagogische Psychologie, 31,* 205–219. https://doi.org/10.1024/1010-0652/a000208.

Diseth, Å. (2011). Self-efficacy, goal orientations and learning strategies as mediators between preceding and subsequent academic achievement. *Learning and Individual Differences, 21,* 191–195. https://doi.org/10.1016/j.lindif.2011.01.003.

Ditton, H. (2001). *DFG-Projekt „Qualität von Schule und Unterricht" – QuaSSU Skalenbildung Hauptuntersuchung*. https://www.quassu.net/SKALEN_1.pdf. Accessed: 16. Aug. 2018.

Dresel, M., Fasching, M. S., Steuer, G., Nitsche, S., & Dickhäuser, O. (2013). Relations between teachers' goal orientations, their instructional practices and student motivation. *Psychology, 4,* 572–584. https://doi.org/10.4236/psych.2013.47083.

Eccles, J. S., Midgley, C., Wigfield, A., Buchanan, C. M., Reuman, D., Flanagan, C., & Mac Iver, D. (1993). Development during adolescence: The impact of stage-environment fit on young adolescents' experiences in schools and in families. *American Psychologist, 48,* 90–101. https://doi.org/10.1037//0003-066X.48.2.90.

Elliot, A. J. (1999). Approach and avoidance motivation and achievement goals. *Educational Psychologist, 34,* 169–189. https://doi.org/10.1207/s15326985ep3403_3.

Elliot, A. J. (2005). A conceptual history of the achievement goal construct. In A. J. Elliot & C. S. Dweck (Hrsg.), *Handbook of competence and motivation* (S. 52–72). New York: Guilford Publications.

Elliot, A. J., & Church, M. A. (1997). A hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology, 72,* 218–232. https://doi.org/10.1037/0022-3514.72.1.218.

Elliot, A. J., & McGregor, H. A. (1999). Test anxiety and the hierarchical model of approach and avoidance achievement motivation. *Journal of Personality and Social Psychology, 76,* 628–644. https://doi.org/10.1037/0022-3514.76.4.628.

Frey, A., Taskinen, P., Schütte, K., Prenzel, M., Artelt, C., Baumert, J., & Pekrun, R. (2009). *PISA 2006: Skalenhandbuch [PISA 2016: Documentation of Scales]*. Münster: Waxmann.

Fryer, J. W., & Elliot, A. J. (2007). Stability and change in achievement goals. *Journal of Educational Psychology, 99,* 700–714. https://doi.org/10.1037/0022-0663.99.4.700.

Huang, C. (2011). Achievement goals and achievement emotions: A meta-analysis. *Educational Psychology Review, 23,* 359–388. https://doi.org/10.1007/s10648-011-9155-x.

Janke, S., & Dickhäuser, O. (2019). A neglected tenet of achievement goal theory: Associations between life aspirations and achievement goal orientations. *Personality and Individual Differences, 142,* 90–99. https://doi.org/10.1016/j.paid.2019.01.038.

Janke, S., Nitsche, S., & Dickhäuser, O. (2015). The role of perceived need satisfaction at work for teachers' work-related learning goal orientation. *Teaching and Teacher Education, 47,* 184–194. https://doi.org/10.1016/j.tate.2015.01.009.

Janke, S., Nitsche, S., Praetorius, A. K., Benning, K., Fasching, M., Dresel, M., & Dickhäuser, O. (2016). Deconstructing performance goal orientations: The merit of a dimensional approach. *Learning and Individual Differences, 50,* 133–146. https://doi.org/10.1016/j.lindif.2016.08.013.

King, R. B., & McInerney, D. M. (2014). The work avoidance goal construct: Examining its structure, antecedents, and consequences. *Contemporary Educational Psychology, 39,* 42–58. https://doi.org/10.1016/j.cedpsych.2013.12.002.

Korn, R. M., Elliot, A. J., & Daumiller, M. (2019). Back to the roots: The 2 × 2 standpoints and standards achievement goal model. *Learning and Individual Differences, 72,* 92–102. https://doi.org/10.1016/j.lindif.2019.04.009.

Krapp, A. (2002). Structural and dynamic aspects of interest development: Theoretical considerations from an ontogenetic perspective. *Learning and instruction, 12,* 383–409. https://doi.org/10.1016/S0959-4752(01)00011-1.

Kunter, M., Baumert, J., & Köller, O. (2007). Effective classroom management and the development of subject-related interest. *Learning and Instruction, 17,* 494–509. https://doi.org/10.1016/j.learninstruc.2007.09.002.

Little, T. D., Rhemtulla, M., Gibson, K., & Schoemann, A. M. (2013). Why the items versus parcels controversy needn't be one. *Psychological Methods, 18,* 285–300. https://doi.org/10.1037/a0033266.

Little, T. D., Cunningham, W. A., Shahar, G., & Widaman, K. F. (2002). To parcel or not to parcel: Exploring the question, weighing the merits. *Structural Equation Modeling, 9,* 151–173. https://doi.org/10.1207/S15328007SEM0902_1.

Lo, M. T., Chen, S. K., & Lin, S. S. (2017). Groups holding multiple achievement goals in the math classroom: profile stability and cognitive and affective outcomes. *Learning and Individual Differences, 57,* 65–76. https://doi.org/10.1016/j.lindif.2017.06.001.

Lüftenegger, M., Tran, U. S., Bardach, L., Schober, B., & Spiel, C. (2017). Measuring a mastery goal structure using the TARGET framework. *Zeitschrift für Psychologie, 225,* 64–75. https://doi.org/10.1027/2151-2604/a000277.

Lüftenegger, M., Van De Schoot, R., Schober, B., Finsterwald, M., & Spiel, C. (2014). Promotion of students' mastery goal orientations: Does TARGET work? *Educational Psychology, 34,* 451–469. https://doi.org/10.1080/01443410.2013.814189.

Martin, A. J., Bobis, J., Anderson, J., Way, J., & Vellar, R. (2011). Patterns of multilevel variance in psycho-educational phenomena: Comparing motivation, engagement, climate, teaching, and achievement factors. *Zeitschrift für Pädagogische Psychologie, 25,* 49–61. https://doi.org/10.1024/1010-0652/a000029.

Meece, J. L., Anderman, E. M., & Anderman, L. H. (2006). Classroom goal structure, student motivation, and academic achievement. *Annual Review of Psychology, 57,* 487–503. https://doi.org/10.1146/annurev.psych.56.091103.070258.

Meece, J. L., & Miller, S. D. (2001). A longitudinal analysis of elementary school students' achievement goals in literacy activities. *Contemporary Educational Psychology, 26,* 454–480. https://doi.org/10.1006/ceps.2000.1071.

Meier, A. M., Reindl, M., Grassinger, R., Berner, V. D., & Dresel, M. (2013). Development of achievement goals across the transition out of secondary school. *International Journal of Educational Research, 61,* 15–25. https://doi.org/10.1016/j.ijer.2013.03.006.

Midgley, C., Maehr, M. L., Hruda, L. Z., Anderman, E., Anderman, L., Freeman, K. E., & Urdan, T. (2000). *Manual of the Patterns of Adaptive Learning Scales.* Michigan, MI: University.

Muthén, L. K., & Muthén, B. O. (2019). *Mplus User's Guide* (8. Aufl.). Los Angeles: Muthén & Muthén.

Murayama, K., & Elliot, A. J. (2009). The joint influence of personal achievement goals and classroom goal structures on achievement-relevant outcomes. *Journal of Educational Psychology, 101,* 432–447. https://doi.org/10.1037/a0014221.

Murayama, K., Elliot, A. J., & Yamagata, S. (2011). Separation of performance-approach and performance-avoidance achievement goals: A broader analysis. *Journal of Educational Psychology, 103,* 238–256. https://doi.org/10.1037/a0021948.

Nicholls, J. G. (1989). *The competitive ethos and democratic education.* Cambridge: Harvard University.

Nicholls, J. G., Patashnick, M., & Nolen, S. B. (1985). Adolescents' theories of education. *Journal of Educational Psychology, 77,* 683–692. https://doi.org/10.1037/0022-0663.77.6.683.

Nitsche, S., Praetorius, A.-K., Janke, S., Drexler, K., Fasching, M. S., Dresel, M., & Dickhäuser, O. (2017). Berufliche Zielorientierungen von Lehrkräften: Entwicklungsbedingungen, Auswirkungen auf berufliche Kompetenzentwicklung, Effekte auf instruktionales Verhalten sowie Lernprozesse und Lernergebnisse von Schülerinnen und Schülern [Work related achievement goal orientations of teaching personal: Antecedents, consequences for the development of competencies, effects on instruction, professional development and student learning]. In C. Gräsel & K. Trempler (Eds.), *Entwicklung von Professionalität pädagogischen Personals: Interdisziplinäre Betrachtungen, Befunde und Perspektiven* (pp. 17–36). Heidelberg: Springer.

Patrick, H., Kaplan, A., & Ryan, A. M. (2011). Positive classroom motivational environments: Convergence between mastery goal structure and classroom social climate. *Journal of Educational Psychology, 103,* 367–382.

Payne, S. C., Youngcourt, S. S., & Beaubien, J. M. (2007). A meta-analytic examination of the goal orientation nomological net. *Journal of Applied Psychology, 92,* 128–150. https://doi.org/10.1037/0021-9010.92.1.128.

Pintrich, P. R. (2000). Multiple goals, multiple pathways: The role of goal orientation in learning and achievement. *Journal of Educational Psychology, 92,* 544–555. https://doi.org/10.1037/0022-0663.92.3.544.

Plenter, I. (2004). *Vorhersage von Fähigkeitsselbstkonzepten [Prediction of self-concepts] (unpublished thesis).* Gießen: Universität Gießen.

Praetorius, A.-K., Klieme, E., Herbert, H., & Pinger, P. (2018). Generic dimensions of teaching quality: The German framework of Three Basic Dimensions. *ZDM Mathematics Education, 50,* 407–426. https://doi.org/10.1007/s11858-018-0918-4.

Praetorius, A.-K., Lauermann, F., Klassen, R. M., Dickhäuser, O., Janke, S., & Dresel, M. (2017). Longitudinal relations between teaching-related motivations and student-reported teaching quality. *Teaching and Teacher Education, 65,* 241–254. https://doi.org/10.1016/j.tate.2017.03.023.

Praetorius, A.-K., Nitsche, S., Janke, S., Dickhäuser, O., Drexler, K., Fasching, M., & Dresel, M. (2014). Here today, gone tomorrow? Revisiting the stability of teachers' achievement goals. *Contemporary Educational Psychology, 39,* 379–387. https://doi.org/10.1016/j.cedpsych.2014.10.002.

Rakoczy, K. (2008). *Motivationsunterstützung im Mathematikunterricht – Unterricht aus der Perspektive von Lernenden und Beobachtern [Supporting motivation in Maths—Instruction from the perspective of teachers and observers]*. Münster: Waxmann.

Rakoczy, K., Buff, A., & Lipowsky, F. (2005). Befragungsinstrumente [Assessment instruments]. In E. Klieme, C. Pauli & K. Reusser (Eds.), *Dokumentation der Erhebungs- und Auswertungsinstrumente zur schweizerisch-deutschen Videostudie „Unterrichtsqualität, Lernverhalten und mathematisches Verständnis"* [*Documentation of the assessment and analyses instruments of the German-Swiss video study "teaching quality, learning behaviors, and mathematical comprehension"*]. Frankfurt: GFPF.

Ramm, G., Prenzel, M., Baumert, J., Blum, W., Lehmann, R., Leutner, D., & Schiefele, U. (2006). *PISA 2003: Dokumentation der Erhebungsinstrumente [PISA 2003: Documentation of assessment instruments]*. Münster, Germany: Waxmann.

Ross, C. M., & Harrison, P. L. (2006). Ability grouping. In G. G. Bear & K. M. Minke (Eds.), *Children's needs III: Development, prevention, and intervention* (pp. 579–588). Washington: National Association of School Psychologists.

Rheinberg, F., & Fries, S. (2018). Bezugsnormorientierung. In D. H. Rost, J. R. Sparfeldt & S. R. Buch (Eds.), *Handwörterbuch Pädagogische Psychologie* [Pocket dictionary Pedgagogical Psychology] (pp. 56–63). Weinheim: BELTZ.

Scherrer, V., & Preckel, F. (2019). Development of motivational variables and self-esteem during the school career: A meta-analysis of longitudinal studies. *Review of Educational Research, 89,* 211–258. https://doi.org/10.3102/0034654318819127.

Schöne, C., Dickhäuser, O., Spinath, B., & Stiensmeier-Pelster, J. (2004). Zielorientierung und Bezugsnormorientierung: Zum Zusammenhang zweier Konzepte. *Zeitschrift für Pädagogische Psychologie, 18,* 93–99. https://doi.org/10.1024/1010-0652.18.2.93.

Senko, C., Durik, A. M., Patel, L., Lovejoy, C. M., & Valentiner, D. (2013). Performance-approach goal effects on achievement under low versus high challenge conditions. *Learning and Instruction, 23,* 60–68. https://doi.org/10.1016/j.learninstruc.2012.05.006.

Senko, C., Hulleman, C. S., & Harackiewicz, J. M. (2011). Achievement goal theory at the crossroads: Old controversies, current challenges, and new directions. *Educational psychologist, 46,* 26–47. https://doi.org/10.1080/00461520.2011.538646.

Shim, S. S., Ryan, A. M., & Anderson, C. J. (2008). Achievement goals and achievement during early adolescence: Examining time-varying predictor and outcome variables in growth-curve analysis. *Journal of Educational Psychology, 100,* 655–671. https://doi.org/10.1037/0022-0663.100.3.655.

Skaalvik, E. M. (1997). Self-enhancing and self-defeating ego orientation: Relations with task and avoidance orientation, achievement, self-perceptions, and anxiety. *Journal of Educational Psychology, 89,* 71–81. https://doi.org/10.1037/0022-0663.89.1.71.

Skaalvik, E. M., & Federici, R. A. (2016). Relations between classroom goal structures and students' goal orientations in mathematics classes: When is a mastery goal structure adaptive? *Social Psychology of Education, 19,* 135–150. https://doi.org/10.1007/s11218-015-9323-9.

Spinath, B., Stiensmeier-Pelster, J., Schöne, C., & Dickhäuser, O. (2002). *Skalen zur Erfassung der Lern-und Leistungsmotivation [Measurement scales for learning and performance motivation]*. Göttingen: Hogrefe.

Steuer, G., Rosentritt-Brunn, G., & Dresel, M. (2013). Dealing with errors in Mathematics classrooms: Structure and relevance of perceived error climate. *Contemporary Educational Psychology, 38,* 196–210. https://doi.org/10.1016/j.cedpsych.2013.03.002.

Tröbst, S., Kleickmann, T., Lange-Schubert, K., Rothkopf, A., & Möller, K. (2016). Instruction and students' declining interest in science: An analysis of German fourth-and sixth-grade classrooms. *American Educational Research Journal, 53,* 162–193. https://doi.org/10.3102/0002831215618662.

Van Yperen, N. W., Blaga, M., & Postmes, T. (2014). A meta-analysis of self-reported achievement goals and nonself-report performance across three achievement domains (work, sports, and education). *PLoS ONE, 9*(4), e93594.

Wild, E. (1999). *Elterliche Erziehung und schulische Lernmotivation [Parental education and learning motivation at school](unpublished habilitation thesis) (unpublished habilitation thesis).* Mannheim: University of Mannheim.

Wolters, C. A. (2004). Advancing Achievement Goal Theory: Using goal structures and goal orientations to predict students' motivation, cognition, and achievement. *Journal of Educational Psychology, 96,* 236–250. https://doi.org/10.1037/0022-0663.96.2.236.

Ziegler, A., & Finsterwald, M. (2008). Attributionstraining [Attributional training]. In W. Schneider & M. Hasselhorn (Eds.), *Handbuch Pädagogische Psychologie/Handbook pedagogical psychology* (S. 416–430). Göttingen, Germany: Hogrefe.